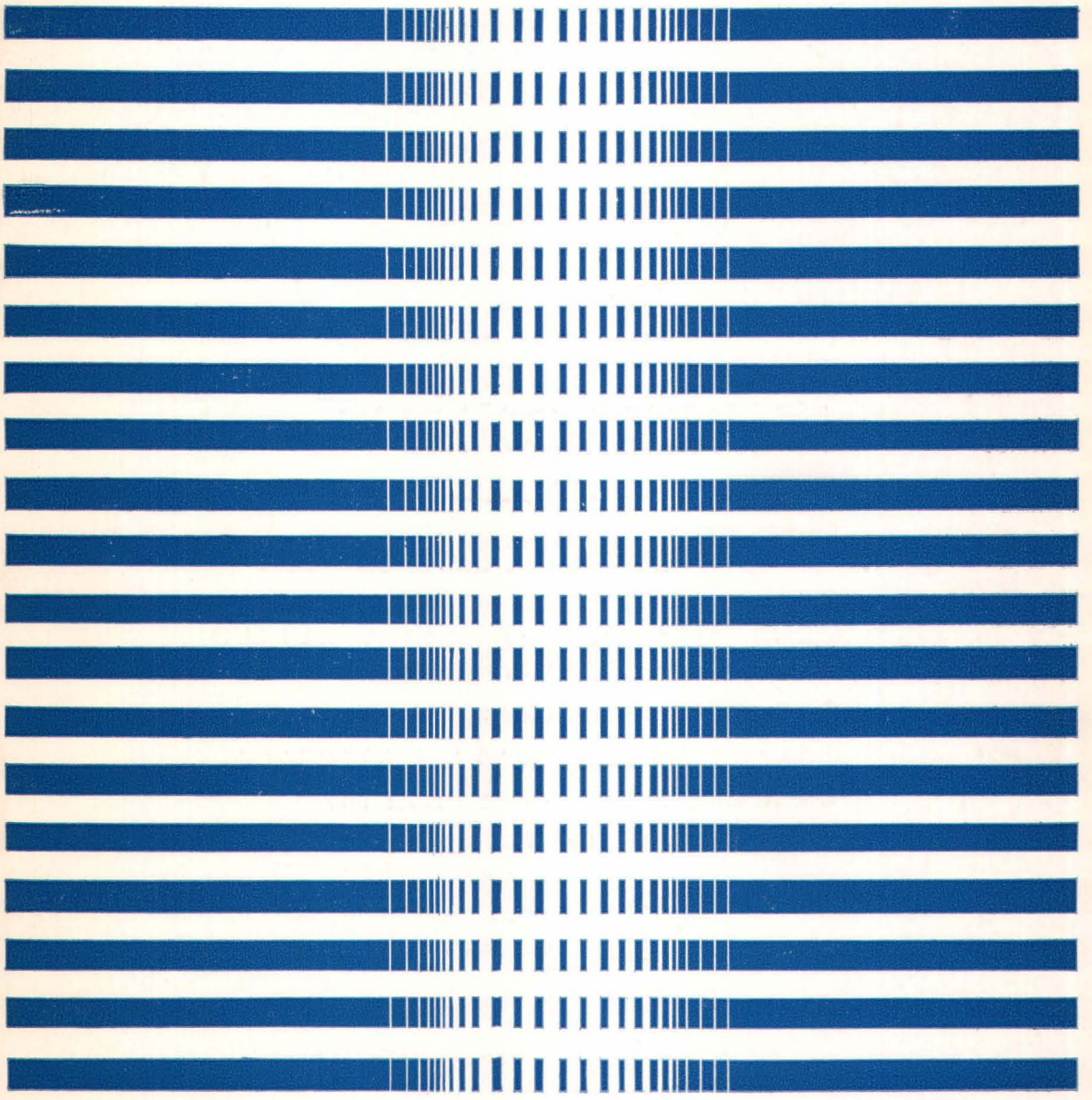
神経化学

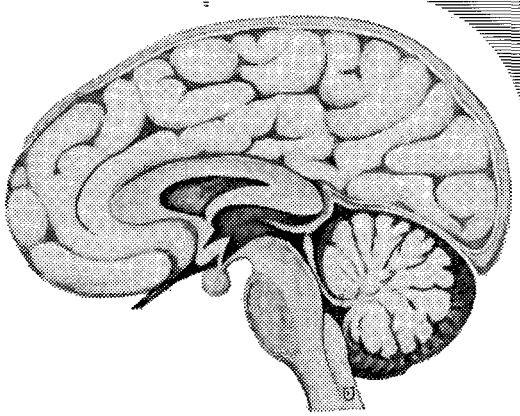
Bulletin of the Japanese Neurochemical Society



Vol. 8, No. 2, 1969

日本神経化学会

健保適用



感情領域の疾患に….

ブチロフェノン系
新精神分裂病治療剤

プロピタン

特長

①感情領域の改善に優れ、自閉・自発性欠如を主症状とする精神疾患の精神レベルを高揚させる。

②幻覚・妄想などの異常体験を速かに消退させる。

③過度の精神抑制状態を起こすことなく、静穏効果が得られる。

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PPセー1

提　　言

科学は限りなきスパイラルに譬えることが出来る。偉大な神秘は決してその全貌を解き難く，常に新しい方法と技術の導入によってほんの部分的にしかその謎を知り難い。神秘—生命—の扉を一つだに開いたその時，眼前には過去において何人も見なかった夥しい神秘が展開される。科学が何故に我々を魅了し続けるかの理由はここにある。

生化学はもはやそれ自体が科学ではなく，今日，医学や生物学にとって不可欠な方法であり技術である。過去においてあまりにも複雑と見做され，手の下しようもなかった神秘への挑戦にとって生化学は著しく有力な武器としてその偉力を発揮しつつある。新しい方法と技術，しかしそれは正しい適用を誤るなれば甚だ危険を伴う。我々は常に一つの方法や技術に就いてその限界を正しく理解しておらねばならない。そして科学する者は全て現在や過去において得られた知識をあそび，これを応用する事に満足するよりは，常に新しい方法と技術を開発し，神秘の扉を開き続けねばならぬであろう。

優れた研究は，何時，何処でそれがなされようと，いつかは必ず陽が当り，正しく評価される時が来る。一時の気の効いた仕事ならば時には出来るであろうが，人，一人の生涯の研究にはその人間が如実に現われる。普通の人である限り，科学の世界の数年先を見越したり，同時に2つも3つもの実験に従事出来る筈がない。実験とは神秘の扉を叩くことである。我々は日常，最も手近かな実験を一つ行うべきであり，その応答の判定がついて始めて次の実験に移るべきと考えている。常に無数に考えられる可能性は，この最初の応答によってすっかり変り得るからである。研究とはこの手近かな最初の一つの実験を常に考え続ける事であり，夜に至り，明日の日に行う実験を考えているのが研究者であろう。こうした研究者の心が尊ばれ，その成果が正しく評価される事が真の科学の世界の民主化であろうと考えている。研究の世界はきびしい。しかしそれは立場や身分でなく，試験管を一日余計に振った人にはそれだけの長がある事を忘れてはなるまい。流行を追い，外国の仕事を輸出する事は易いが，優れた研究にはそれだけの年月をかけた歴史が必ず存在する。人とその研究を尊んで始めて，自らの研究を育てることができると思う。

研究と教育とは両立し難いと言う人も多いが，例外はあっても優れた教育者は優れた研究者であろうと私は考えている。欧米の教科書にはすでに数ケ月前までの研究成果がとり入れられ，学生の受ける講義は現時点から話が始っている。無限の可能性をもつ学生は現時点の研究とその場がそんなものだと思い込み，そこから出発している。研究と教育にとって如何にその“場”が重大であるかは論をまたない処であろう。神経化学を同好する我々には幸いにして，我国では類例を見ぬ特色ある学会を持っている。我々はもっともっとこの特長を守り，言い度い事を気楽に言い，恥もかき，喧嘩もし，仲直りもし，こうした環境を伸ばしてゆき度いと念じている。

大西洋を囲む周囲の研究は大河をなして滔々として流れ，半年，一年にしてすっかり世の中が変ってしまっている。我々は今からでも畠を耕し，種を播き，年月をかけて日本の地にしかない見事な花を咲かせて行き度いものである。

先般，高垣さんから御依頼があった際，私などの分際で僭越にも提言など引きうけるべきではなかったと悔んでいる。「神経化学のことに限らず，広く医学の教育研究のこと」につき会員へのアンケートという事であり，私への責めの一端を果しておれば幸甚である。

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[原著]

RNase ならびに RNase-inhibitor の脳内分布と発育脳における変動*

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脳における RNA の役割を多少とも明らかにしていくために，脳内 RNase 並びに RNase-inhibitor について若干の検討を行い以下のような結果を得た。

1. 脳組織には至適 PH を 6.0 に持つ酸性 RNase と 7.9 付近にもつアルカリ性 RNase が認められた。前者の活性は後者のそれより，はるかに高かった。

2. 家兎の脳に於ける RNase の局所的分布は，海馬，大脳皮質，視床下部に高く，小脳，中脳，橋-延髄がこれに次ぎ，大脳白質，脊髄で最も低かった。RNase-inhibitor の分布も同様な傾向を示していた。

3. RNase の家兎大脳皮質層内分布は全体的に見て，細胞構築学上の 3, 4, 5 層に高く，5 層の上部-中部に最高値が認められた。

4. ラッテ大脳皮質における RNase の細胞内分布はミトコンドリヤ分画，マイクロゾーム分画，核分画，シナプトゾーム分画，ミエリン分画，上清分画の順に高かった。リボゾームは，かなり活性が高いが，ポリゾームには殆んど活性が認められなかった。又，いわゆる post-mitochondrial fraction は RNase 活性を示さず，DOC 処理，又は PCMB 添加により活性が出現した。この結果とポリゾーム調製時における RNase-inhibitor の役割について考察した。

5. 発育脳における酸性，アルカリ性両 RNase, 及び RNase-inhibitor の変動をラッテ脳を用いて調べた。どちらも出生時の活性はやや低く，10 日前後のいわゆる critical period に著しい上昇が認められ，成長と共に徐々に低下を示した。この結果を，RNA polymerase, 前駆物質の RNA への incorporation の変動等と比較検討した。

(受付: 1969. 2. 26)

緒　言

脳における RNA の機能は HYDÉN (1966) らによって古くから研究され，重要な役割を演ずることが示唆されてきた。最近核酸生化学の発展につれて，脳における RNA の代謝的研究は非常に活発になり，C^{14}-オロチン酸，H^3-ウリジンをはじめとする種々の前駆物質を使用して，in vivo, in vitro での RNA 生合成と，それに対する種々の薬剤(主として RNA 合成の阻害剤である Actinomycin D 等) の影響が多くの研究者によって検討された。そして脳機能，特に学習，記憶と RNA 代謝の関連性についての研究は，多くの注目を集めた。

筆者らの研究室でもすでに古沢(1963) により，C^{14}-オロチン酸を使用して，代謝的研究が行われたが，さらに，脳からポリゾームを調製し，その調製に際して脳から分離した Ribonuclease-inhibitor (RNase-inhibitor) を調製用溶液に添加した方がよいことを見出し (TAKAHASHI et al., 1966; 高橋康夫，鈴木雄二，1966)，また，脳から RNase-inhibitor を約 6500 倍程度精製することに成功し，その性質を検討した (TAKAHASHI et al.,

* Developmental Changes and Regional Distribution of RNase and RNase-inhibitor in Brain.

Yuji SUZUKI: Department of Psychiatry, Niigata University School of Medicine, Niigata.

1967)。この研究に関連して，脳の RNase および RNase-inhibitor について，さらに若干の検討を試みた。すなわち，(1) RNase ならびに RNase-inhibitor の脳局所的分布，(2) RNase の大脳皮質における層的分布，(3) RNase の細胞内分布，(4) RNase および RNase-inhibitor の発育脳 (developing brain) における変動，等について検討したので，その結果をここに報告する。

脳 RNase については，これまで間瀬 (1962) により基本的性質が検討され，KURIHARA (1967) により精製が試みられ，また別に NECHAEVA (1964) によっても性質が検討されている。また，DATTA et al. (1964) に 2～3 の断片的報より，リボゾーム RNase の性質も検討された。その他告はあるが，筆者の述べようとするような報告は余り行われていないように思われる。

実 験 方 法

1. 実験材料

実験動物としては，種々の発育期のラッテ，成熟した体重 2.5～3.0 Kg の家免および成熟した豚を使用した。試薬として用いた RNA は，酵母 RNA (Nutritional Biochemical Corp., U. S. A.) を KIRBY 法(1956) の改良法 (SDS-phenol 法) により抽出精製し，0.01 M EDTA 溶液に対して 1 回，最後に水に対して 5 時間内外透析し，K塩として乾燥し，用に臨んで溶解した。結晶性膵臓 RNase は Sigma Chemical Corp. の 5 回結晶製品で，RNase 溶液は普通 0.1% 溶液として −20°C に凍結保存し，用に臨んで溶解稀釈した。PCMB は和光純薬の製品で，NaOH 溶液を滴下することにより，使用濃度に溶解したが，PH は大体 8.0～8.5 内外であった。Sodium Desoxycholate は Difco の製品であった。その他の試薬は，和光純薬の特級試薬を使用した。

2. RNase 活性測定法

この方法は，ほぼ SHORTMAN (1961) に従った。すなわち，動物を断頭後直ちに脳を取り出し，0.25 M シヨ糖液 (4°C) 中でよく洗い，液をろ紙で除いた後秤量し，5 倍量の 0.25 M シヨ糖液を添加し，POTTER-ELVEHJEM 型のテフロン棒のガラスホモゲナイザーを使用して 3 分間ホモゲナイズしたものを酵素標品として使用した。反応系は緩衝液 0.5 ml (アルカリ性 RNase には 0.02 M Tris 緩衝液，PH 7.8 を，酸性 RNase には 0.02 M 酢酸緩衝液 PH 6.0 を使用)，ホモジェネート 0.25 ml (脳組織 42 mg に相当)，1% RNA 水溶液 0.5 ml，PCMB 溶液 (終濃度 1.7×10^{-3} M) 0.1 ml (酸性側には使用せず，代りに水を入れた)，からなり，全量 1.35 ml である。尚，RNA，ホモジェネート，PCMB 等をそれぞれ除いた系でも反応を行い盲検とした。反応は厚手のガラス製遠心管を用い，37°C のインキュベーター中で，60分間振盪して行い，その後直ちに管を氷水中に浸けて反応を停止し，これに酸性エタノール (1 N HCl in 76% Ethanol) を等量添加，混和した後，約 1 時間冷凍室中に放置してから，3000 RPM, 10 分間遠心し，上清の 0.2 ml を水 3.8 ml に薄め，混合後，島津 DU 分光光度計を使用して，260 mμ での吸光度を測定し，その吸光度の上昇を RNase 活性とした。活性値は直接この吸光度 (absorbance/42 mg wet tissue) で表わすか，単位蛋白量当りの吸光度 (absorbance/mg protein) として表わした。

3. RNase の大脳皮質層内分布測定法

これは上記の反応系のスケールを微量化したもので，0.02 M 酢酸緩衝液 10 μl，ホモジェネート 5 μl，1% RNA 10 μl，水 2 μl，計 27 μl となっており，これを内径 3 mm 高さ 6.5 cm の小試験管内で反応させた後，前記の場合と同様，酸性エタノールを等量添加し，遠心後，上清 0.02 ml を水 0.38 ml でうすめ，日立 Perkin-Elmer UV-VIS 139 型分光光度計でマイクロセルを使用して，260 mμ での吸収を測定した。活性値は単位蛋白量当りの吸光度 (absorbance/mg protein) として表わした。この場合のホモジェネートは次のような手順で調製したものである。すなわち，家兎の大脳を −13°C～−15°C の冷凍室内で凍結させ，その area parietalis で直径 4 mm の円柱を，コルクボーラーを使用して，表面に垂直にくり抜き，この円柱を，その室内で POPE (1952) の方法とほぼ類似した方法で rotary microtome を使用して，表面から 25 μ ずつの厚さの切片に切り，その 5 枚ずつを 1 組にまとめ，これに 5 μl の 0.25 M シヨ糖液を加え，微量ホモゲナイザー (高島製作所製でテフロン棒の先端が三角形のもの) でホモゲナイズした。なおコルクボーラーでくり抜いた場所のすぐ隣接部位，および他動物の同一部位よりくり抜いた円柱から，表面に垂直な切片を造り，K-B 染色で組織標本とし，その細胞構築像と RNase 活性とを比較検討するようにした。この組織学的検討は新潟大学脳研究所(新大脳研)神経病理，久保宏博士にお願いした。

4. RNase の細胞内分布測定法

ラッテの大脳皮質を材料とし，その細胞を核，ミトコンドリヤ (Mt)，シナプトゾーム，ミエリン，マイクロゾーム(Mc)，上清等に分離し，また別に Mt を分離した後の上清分画 (postmitochondrial fraction) や，リボゾーム (Rb)，ポリゾーム (Ps) 等に分離し，各々における RNase 活性を調べた。前者の各分画の分離法は大体 WHITTAKER (1963) の方法に従って行った。後者す

なわち，Rb の分離は TAKAHASHI et al. (1966) の方法，Ps の分離は高橋，鈴木 (1966) の方法に従った。当然前者の場合と後者の場合では使用した調製用溶液が異り，前者は 0.32 M ショ糖，後者は 0.05 M Tris, 0.005 M $MgCl_2$, 0.010 M KCl, 0.25 M ショ糖であった。シナプトゾーム，Mt については新大脳研神経病理小柳新策博士に電子顕微鏡的に純度をチェックしていただいた。分離された各分画に一定量の 0.25 M ショ糖液を加えてホモゲナイズし，その一定量 (0.25 ml) について上記の手順で RNase 活性を測定した。分画に際して使用した超遠心器は日立 40 P, 日立 65 P, Spinco Model L 等であった。

5. RNase-inhibitor 活性測定法

これは RNase の場合同様，ほぼ SHORTMAN (1961) に従った。すなわち，0.25 M ショ糖液で洗った脳組織を 2 倍量の 0.25 M ショ糖液で 3 分間ホモゲナイズし，40,000 RPM, 90 分間前記の場合と同じ超遠心器を使用して遠心し，その上清を取り，これを RNase-inhibitor の標品として使用した。反応系は 0.03 M Veronal 緩衝液 pH 7.8, 0.3 ml, 膵臓 RNase 液 (0.1 μg または，0.05 μg) 0.1 ml, 1% RNA 溶液 0.2 ml, RNase-inhibitor 液 (添加前に，あらかじめ蛋白量を測定し，蛋白含量が 1 mg/0.1 ml になるように 0.25 M ショ糖液を加えて調整したもの) 0.1 ml, および水 0.1 ml, 合計 0.8 ml よりなり，RNase と RNase-inhibitor 液とをまず混和し，次に RNA を添加して，37°C, 30 分間振盪しながら反応させた。反応後，直ちに管を氷水に浸して冷却し，酸性エタノールを等量加えてから，260 mμ での吸光度測定までは，RNase 活性測定の場合と全く同じである。なお RNase, RNase-inhibitor, RNA 等をそれぞれ除いた適当な対照，ならびに盲検の反応を同時に行い，測定値を補正すると共に，RNase-inhibitor の活性値は，RNase 活性の抑制度(% inhibition/mg protein) として表わした。

6. その他

RNase, RNase-inhibitor いずれの場合も，脳内局所分布は，家兎脳を大脳皮質，大脳白質，小脳，中脳，橋-延髄，海馬，視床下部，脊髄の 8 カ所に分離して各部位の活性を測定した。各部位の区分は TAKAHASHI and Abe (1963) が，新大歯学部解剖学教室布施教授の援助によって行ったものと同様に行った。また，developing brain の研究には新大脳研で出生し，合成固形飼料で飼育されたラッテを，日を追って使用した。蛋白の定量法は FOLIN and CIOCALTEU (1927) の方法および LOWRY et al. (1951) の方法を適宜使用した。なお，特記しない限り 0～4°C の冷凍室で全操作を行った。

実 験 結 果

1. 基礎実験

本実験に入る前に，まず基本的条件について 2～3 の予備的検討を試みた。

PH 依存性：図 1 は RNase 活性の PH 依存性を示したものである。図に見る通り最も強い活性は PH 6.0 付近にあり，それをピークとして両側に活性は低下しており，PH 7.9 付近にもう 1 つ非常に低いピークが認められる。すなわち酸性 RNase とアルカリ性 RNase の両者の存在が認められるが，前者に比し後者の活性は極めて低い。

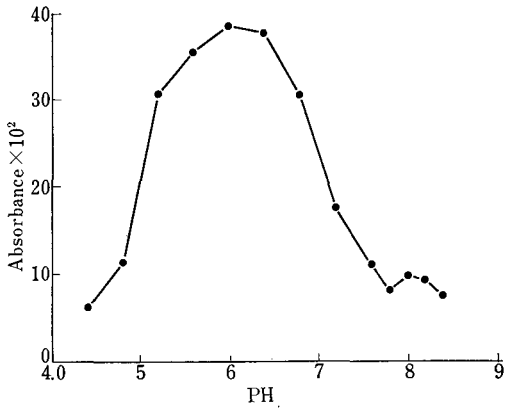


図 1 PH 活性曲線

使用緩衝液は PH 4.4～6.0: 0.02 M 酢酸緩衝液，PH 6.4～7.2: 0.02 M リン酸緩衝液，PH 7.6～8.4: 0.02 M Tris 緩衝液．酵素標品はラッテ大脳皮質ホモジェネートで調製法は実験方法の項に記した．

組織量と RNase 活性の関係：図 2 に示す結果が得られた。酸性でもアルカリ性でも，ホモジェネート量 0.25 ml までは組織量と RNase 活性との間に，ほぼ直線的関係が見られる。

反応時間と RNase 活性の関係：この結果を図 3 に示した。図に見る通り PH 6.0 でも 7.8 でも反応時間 0～75 分の間で，時間と活性との間に，ほぼ直線的関係が認められた。それ故，本実験では 60 分を使用した。

凍結隔解ならびに PCMB の影響：次にホモジェネートを，ドライアイス-アセトンに浸して充分凍らせ，次いでそれを温水 (37°C) に浸して融解する操作を 8 回繰返す凍結融解の影響を調べたが，活性の上昇は，表 1 のように軽度であった。さらに，アルカリ側で，これに PCMB を終濃度 1.7×10^{-3} M に添加してみたが，それでも余り大きな上昇は見られなかった (表 1)。

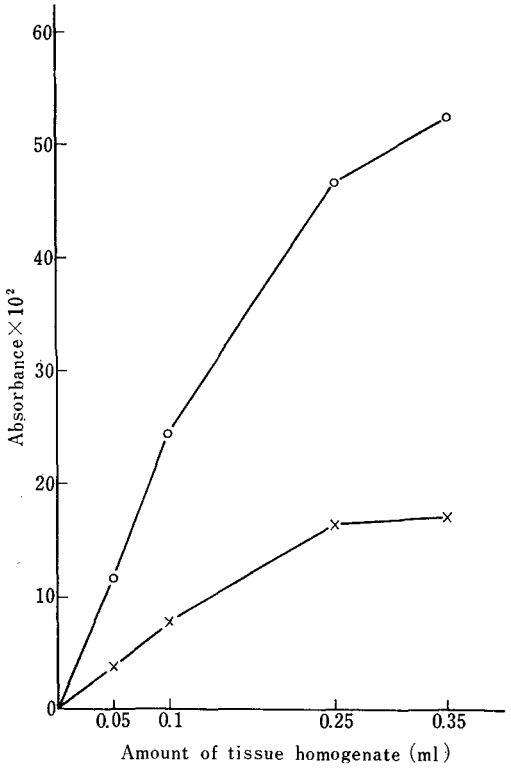


図 2 組織量と RNase 活性値の関係

○——○: PH 6.0, ×——×: PH 7.8. 酵素標品は図1に同じ. ホモジェネート1 ml は組織量1/6 g に相当する.

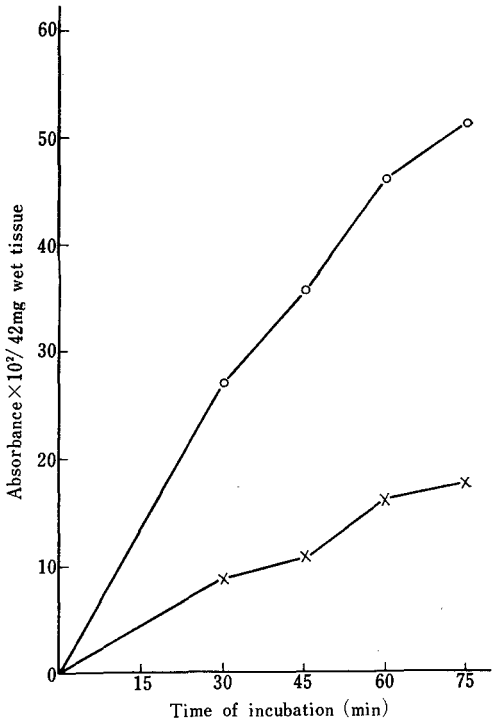


図 3 反応時間と RNase 活性の関係

○——○: PH 6.0, ×——×: PH 7.8. 酵素標品は図1に同じ.

表 1 凍結融解ならびに PCMB の影響

Exp. No.	PH 6.0		PH 7.8	
	control	Homogenate subjected to repeated freezing and thawing (no PCMB)	control	Homogenate subjected to repeated freezing and thawing (PCMB added)
1	29.3	37.5	16.9	18.5
2	38.0	39.2	13.2	21.6
3	36.8	41.4	19.6	18.2
average	34.7	39.4	16.6	19.4

absorbance $\times 10^2$/42 mg wet tissue

RNase 量と RNase-inhibitor による抑制度の関係: RNase 量と一定量の RNase-inhibitor による抑制度の関係を調べたが, 結果は図4の通りであった。RNase量が多くなるほど抑制度は減少し, RNase 量 0.05～0.2 μg の範囲で RNase 量と抑制度の間に直線的関係が認められた。

2. RNase ならび RNase-inhibitor の脳局所的分布

RNAase の脳局所的分布: 方法の項で述べたようにして測定した結果は図5に示した通りであった。部位別に大きな差が認められ, 酸性 RNase の活性は海馬, 大脳皮質, 視床下部に高く, 小脳, 中脳, 橋-延髄がこれに次ぎ, 大脳白質, 脊髄で最も低かった。この順位はアルカリ性 RNase でも同様であった。大脳皮質の活性は白質の約4倍であった。図にはホモジェネート中の単位蛋

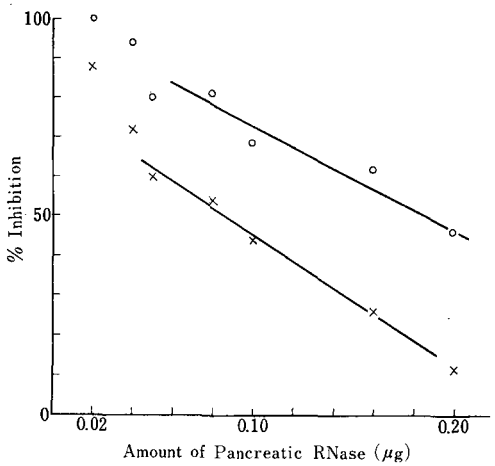


図 4 結晶性膵臓 RNase 量と RNase-inhibitor による抑制度の関係

材料は家兎大脳皮質. ○——○ は Inhibitor 分画の蛋白含量 1 mg/0.1 ml, ×——× は 0.5 mg/0.1 ml.

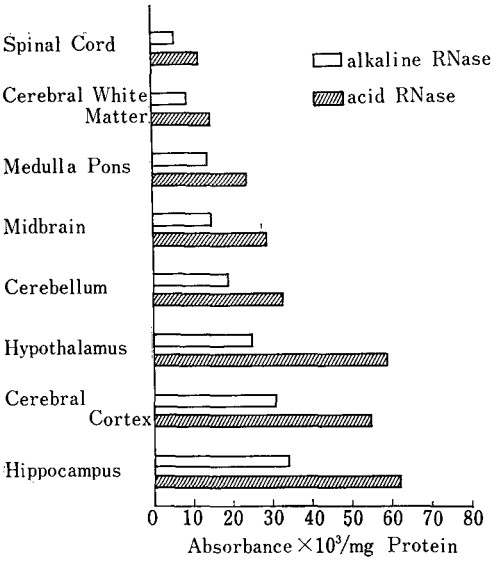


図 5 RNase の家兎脳局所的分布 (5 例の平均値)

白量当りの活性を記したが，部位別の蛋白含量には，あまり大きな差がないため，この活性の大きさの順位は，新鮮組織量当りにしても殆んど変りはない。また図には示さなかったが，各局所で基礎実験の項で述べたように，凍結融解および PCMB 添加をして測定，比較したが，基礎実験の場合同様，著明な促進効果は認められず，この場合にも，局所的分布は，同様であった。

RNase-inhibitor の脳局所的分布: RNase と関連のある RNase-inhibitor が，家兎脳局所にどのように分布しているかを検討した。結果は図 6 の如くであった。すな

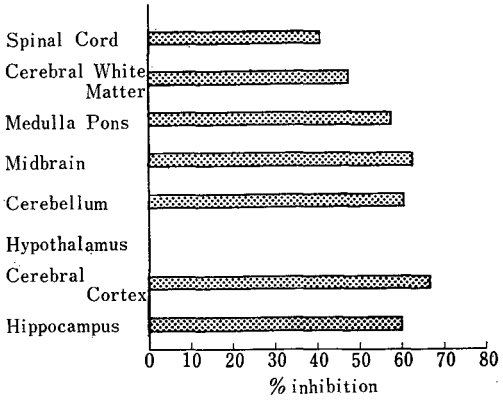


図 6 RNase-inhibitor の家兎脳局所的分布
膵臓 RNase 量 0.05 μg. 視床下部については資料不充分のため記載しなかった(4例の平均値).

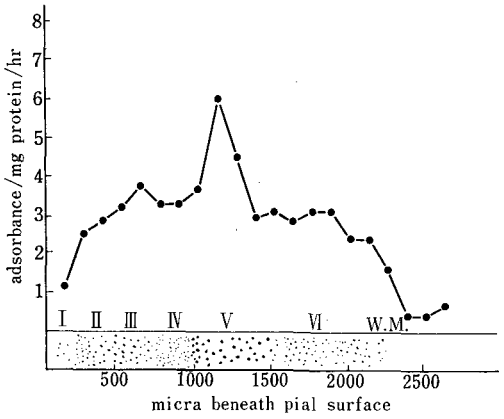


図 7 RNase の家兎大脳皮質層内分布
測定部位は area parietalis で，PH 6.0 (5 例の平均値).

わち，0.05 μg の膵臓 RNase 活性の抑制率を各局所の上清蛋白 1 mg 当りで比較したが，それによると，RNase 程局所差が著明ではないが，RNase の分布とほぼ似た傾向を示している。大脳皮質で最も高く，海馬，小脳，中脳がこれに次ぎ，大脳白質，脊髄で最も低い。視床下部については，組織量が少なすぎるため充分な検討ができず，図に記さなかったが，かなり高い活性を示すようである。

3. RNase の大脳皮質層内分布

方法の項で述べた手順で家兎の大脳皮質における酸性 RNase の層的分布を調べたが，その結果は図 7 の通りであった。すなわち表層における RNase 活性は比較的低く，深くなるにつれて次第に高値を示し，大体 1,000 ～1,500 μ，平均すると 1,200 μ 付近に最高値を示すが，さらに深くなると，また低値を示すようになる。この分

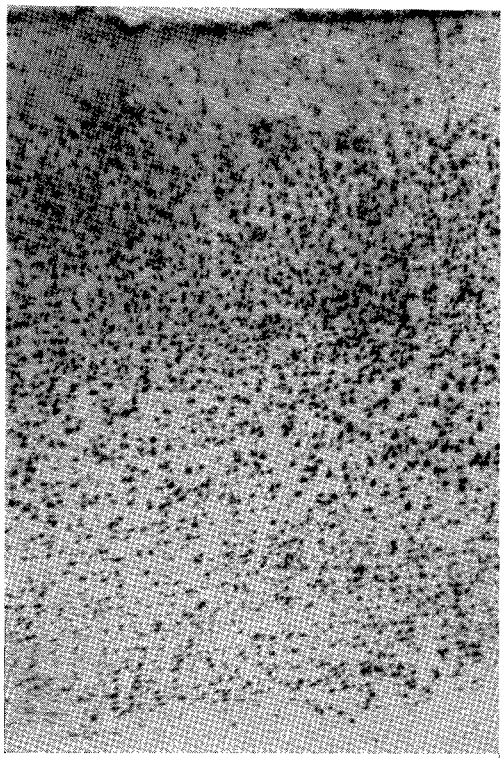


図 8 層内分布測定部位の家兎大脳皮質組織像，K-B 染色(×20)

布を並記した大脳皮質の細胞構築学上の6層構造と比較すると最も活性の高いのは，大体第5層の上部-中部に当り，全体的に見て 3, 4, 5 の各層が高値を示している。図8は測定部位を判別するために作製した組織標本の顕微鏡写真であるが，はっきりした6層構造が認められる。

4. RNase の細胞内分布

この点については，すでに 間瀬 (1962) が大体の傾向を報告しているが，その細胞分画法は古く，筆者の行ったような詳細なものではない。実験結果は表2の通りであった。すなわち，酸性，アルカリ性共に，その分布の傾向は似ており，Mt 分画が最高値を示し，次いで Mc 分画，核分画，シナプトゾーム分画，ミエリン分画，上清分画の順になっていた。既述の全組織の場合と同様に，どの細胞分画においても，アルカリ性に比し，酸性 RNase 活性が非常に高かった。またここで興味あることは Mt を沈澱させた後の上清，すなわち Mc と上清を合わせたもの (Postmitochondrial fraction) は殆んど RNase 活性を示さず，これは Ps 調製時の如く DOC 処理か，或は反応系中に PCMB 添加すると表3の如く，かなりの活性が認められたことである。これは Mc に存在する RNase 活性が上清分画に含有されている RNase-inhibitor によって抑制されるため Postmitochondrial fraction では活性を示さず，DOC 処理，或は PCMB 添加により RNase-inhibitor も，ある程度活性を失うと共に，存在している RNase-inhibitor 濃度では抑制し得ない量の RNase が Mc の溶解によりでてくるのではないかと考えられる。なお，Rb, Ps でもアルカリ性 RNase 活性を測定したが Rb は表2に並記した如く，高い活性を示す。しかし，Ps は殆んど活性を示さなかった。

表 2 RNase の細胞内分布（3例の平均値，材料はラッテ大脳皮質）

	PH 7.8	PH 6.0
Homogenate	11.0	53.0
Nucleus	4.0	38.0
Myelin	0	23.0
Synaptosome	5.0	31.0
Mitochondria	55.0	124.0
Microsome	20.0	38.0
Supernatant	0	5.0
Ribosome	139.0	—

Absorbance $\times 10^3$/mg protein

表 3 Postmitochondrial fraction の RNase 活性 材料はラッテ大脳皮質．DOC 処理 2 例，PCMB 添加 2 例，各々別個の動物について行った結果の平均値を示す．

	PH 7.8	
Postmitochondrial fraction	0	0
DOC-Postmitochondrial fraction	21.0	—
Postmitochondrial fraction+PCMB	—	38.5

absorbance $\times 10^3$/mg protein

5. RNase ならびに RNase-inhibitor の発育脳における変動

RNA が学習，記憶等の脳の機能に関係があるとすれば，脳の発育に伴って，当然 RNA 代謝も変化すると考えられるので，出生後成熟期に至るまでの RNase ならびに RNase-inhibitor の変化を日を追って追求してみた。材料としてラッテ大脳皮質を使用したが，RNase に関する結果は図9と図10に示した通りであった。図9は活性値を wet tissue 当りについて表わしたもので，同図中に脳発育に伴う蛋白含量の変化も並記した。図10は同一資料について，活性値を単位蛋白量当りで表わしたものである。図9によると，酸性 RNase 活性は常にアルカリ性より高く，また，酸性，アルカリ性を問わず

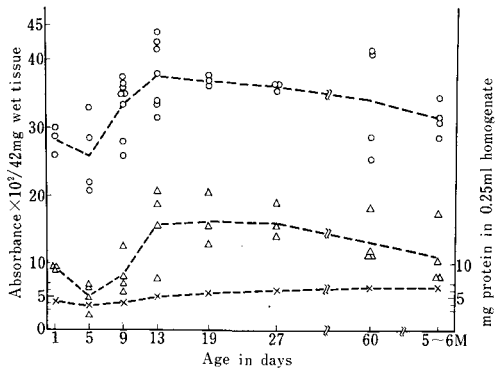


図 9 発育脳における RNase ならびに蛋白含量の変動（活性値を wet tissue 当りで表わしたもの．材料はラッテ大脳皮質．） ○……○: PH 6.0, △……△: PH 7.8, ×……×: 蛋白量.

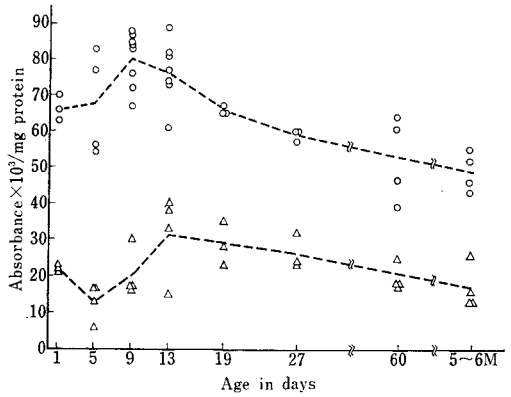


図 10 発育脳における RNase の変動（図 9 の活性値を単位蛋白量当りで表わしたもの）. ○……○: PH 6.0, △……△: PH 7.8.

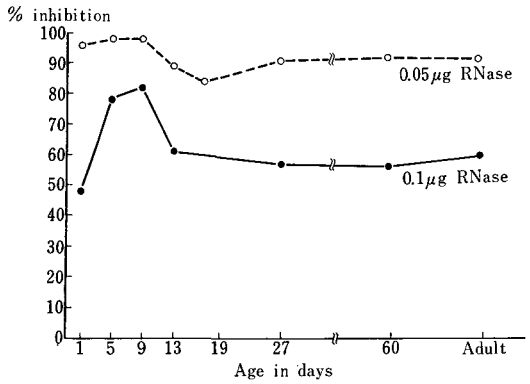


図 11 発育脳における RNase-inhibitor の変動（2～5例の平均値，材料はラッテ大脳皮質）.

全体的に見て，幼若期における活性は成熟期のそれに比して高い。生後2週目頃までの変化は特徴的で，出生直後の活性は一時低下して，5日目頃に幼若期における最低値に達し，その後再び上昇して，2週間目頃に最高値に達し，以後徐々に低下して成熟脳の値に達している。全時期を通じて，酸性，アルカリ性両 RNase の変化は，ほぼ並行している。一定組織量当りの蛋白含量は出生直後の量が一時減少して5日目頃に最低になり，その後日を追って徐々に増加している。念のため活性値を単位蛋白量当りで表わしてみると，その結果は図 10 のようになり，図9の場合と若干の相違は見られるが，凡そその傾向に変りはない。

RNase-inhibitor の変動は図 11 のようであった。これによると，出生直後の活性はやや低いが，すぐに上昇して，10日頃には最高に達し，その後急速に低下して成熟脳の値に達している。RNase や蛋白量の場合に見られるような5日頃における一時的低下は認められない。

考　　察

今日まで脳の RNase については，幾くつかの研究がある。それらの文献に報告された成績と比較しながら本研究によって得られた成績について若干の考察を試み，脳における RNA と RNA 代謝に対する RNase, RNase-inhibitor の関係を検討して見よう。

PH による RNase 活性の変化を見ると PH 6.0 付近に高いピークがあり，アルカリ側には非常に低い活性しか見出し得なかった。この成績は間瀬 (1962)，Lamirande ら (1954) と異り大体 Kurihara (1967)，Nechaeva (1964) らの成績に近い。RNase 活性は使用した基質 RNA の性質と緩衝液の種類，沈澱剤の種類により異って来る。筆者は RNA を精製透析しているためか，アルカリ側での活性は非常に弱かった。また Tris 緩衝液は RNase 活性に有利ではないようであった。この点について，凍結融解法や PCMB の添加により特にアルカリ側で RNase 活性の上昇が期待されたが筆者の条件では，余り大きな上昇が見られなかった。この点種々検討したが，その理由は，はっきりしなかった。酸性 RNase の場合も凍結融解により軽度の上昇しか認められなかった。これらの点は，RNase の局所的分布の場合でも developing brain の場合でも常に同様の成績を示した。

RNase の脳局所分布測定の結果は実験結果の項に記したように活性の高さにより，凡そ3つのグループに分類された。これまで RNase の脳内局所分布については2,3の簡単な報告があり，Skvirskaya and Silich (1954) は大脳皮質，大脳白質，小脳の3カ所について調べ，皮

質，小脳，白質の順に活性が高いといい，MAY and GRENELL (1959) は大脳皮質と小脳について調べ，前者が高いとし，NECHAEVA (1964) は大脳皮質と大脳白質について比較し，やはり前者が高いとしている。これらの報告は，わずか 2～3 カ所についての物ではあるが筆者の成績と一致している。さらに RNA に関連して，脳局所生化学的研究には，RNA の分布，in vivo での前駆物質の RNA への incorporation, RNA polymerase の分布等の研究がある。例えば，RNA の分布は MANDEL et al. (1964) によれば，家兎で大脳皮質，海馬，小脳皮質，臭球等が高く，大脳白質，小脳白質が低く，中脳，橋-延髄，視床等が中間に位していた。また P^{32} の RNA への incorporation は臭球，視床下部，大脳皮質，海馬等が高かった。一方，RNA polymerase については BONDY and WAELSCH (1965) の報告があり，家兎で大脳皮質，視床-視床下部，小脳，橋-延髄の順に高く，また，BARONDES (1964) によれば，大脳皮質は白質より高いという。これらの報告と比較すると，筆者により得られた RNase 活性の高い部位は RNA 濃度が高く，RNA polymerase 活性が高く，前駆物質の RNA への incorporation の高い部位とよく一致しているようで，同部位における RNA 代謝の活発さを示していると考えられる。

RNase-inhibitor については肝臓組織で ROTH (1956), SHORTMAN (1961, 1962) らによって研究されて来たが，脳では筆者ら (1967) により精製，検討された。脳の各局所での分布は大体 RNase の分布と同様で，RNA が高濃度で，RNA 合成の活発な所で RNase-inhibitor 活性も高いようである。このことは RNase-inhibitor が上清分画に存在しており，アルカリ性 RNase と結合して働くことから考えると合理的であるように思われる。また，以上の結果は，大脳皮質，海馬，視床下部等が RNase, RNase-inhibitor, RNA polymerase 等の活性の高い細胞を多く含有していることの現われであると考えればよいのかも知れない。

酸性 RNase のみであるが，家兎大脳皮質各層の分布は大体第 5 層の上部-中部が最も高く，3, 4, 5 の各層で一般に高かった。白質になると非常に低い。この際活性がマクロスケールの場合より高い値を示しており，その理由は完全には解決されていないが，ともかく，大脳皮質層内でこのように差があることは興味深い。この実験終了後 NECHAEVA が猫の視覚領 (area 17) を大まかに 6 層に分けて，RNase 活性を測定し 5, 6 層が高いことを見出していることを聞き知った。しかしその詳細は解らない。筆者の成績では第 5 層の上部,-中部が最も高い値を示していた。第 5 層は組織学的には内大錐体細胞層に当り，細胞数はそれ程多くないが，大きな神経細胞からなっており，これらの細胞の酵素活性が高いものと推定される。

細胞内分布は酸性，アルカリ性両 RNase 共 Mt で最も高かった。これは Mt そのものが真にこのような RNase を含有しているのか，まだ脳においては分離されてはいないが組織学的に存在するといわれている lysosome (KOENIG et al. 1964) が Mt 分画内に入ってくるために，そうなのか決定することは困難である。筆者は分離したシナプトゾームでの活性をはじめて測定したが活性は Mt に比較して問題にならない程低かった。また RNA 合成が主として行われている核においても RNase 活性はそれ程高くなかった。特にアルカリ性 RNase の低かったことは注意に値する。また蛋白合成の主なる場である Mc では，Mt に次いで活性が高いが，Mt と比較すれば，かなり低い。ここで筆者は Ps 調製時の問題を検討するために，Mt を沈澱させた後の，いわゆる Postmitochondrial fraction とこれを DOC 処理，或は PCMB 添加した場合の変化を調べてみた。DOC 処理，或は PCMB 添加すると処理前は殆んど 0 であったアルカリ性 RNase 活性が出現してくる。この点は注目に値し Ps 調製時弱アルカリ性液中で DOC 処理する訳であるから，この際 Mc の膜部分が溶解されるが，その時 RNase が遊離され，この活性が通常に含まれている上清中の RNase-inhibitor の活性を越えて，Ps の分解をきたすように働くことが予想される。筆者ら（高橋，鈴木，1966）が Ps 調製時，別に調製した RNase-inhibitor を調製液中に加えたのは，この理由によるものである。ZOMZELY et al. (1968) によれば DOC 未処理の Postmitochondrial fraction にも RNase 活性が肝臓と同じ位に存在していたという。この点，筆者の成績と異るが，この相違は用いた方法の違いによるものかも知れない。筆者の得た Ps 中には酸性 RNase は勿論，アルカリ性 RNase も殆んど存在しないか，あったとしても極めて少ないものであった。それ故一旦分離されれば Ps は RNase により分解される恐れは少ないと考えられる。この点については UTSUNOMIYA and ROTH (1960) が肝臓や腫瘍の Ps について考察してるように，構造上の関係から RNase 活性が現われないのかも知れないし，また高濃度のシヨ糖層で RNase の混在が除かれたのかも知れない。このことは脳 Ps での ZOMZELY et al. (1968) の成績とも一致している。山上ら (1968) の報告でも，Ps の RNase は非常に低い。Rb には Mc より以上のアルカリ性 RNase が認められた。それは DOC 処理したために RNase が現われたものと思われる。しかし，このように高い活性が現われた

のは，この実験に使用した Rb の純度に問題があるのかも知れない。この点は間瀬 (1962), Dotta et al. (1964), Zomzely et al. (1968) によっても認められている。蛋白合成におけるこれら Rb, Ps, Mc の RNase 活性との関連性については現在の所，何ともいえない。

RNase の発育に伴う変動をみると，生後 2 週目頃までの間に，特に著しい変化が認められる。すなわち活性は生後一時低下して5日目頃には幼若期における最低値に達し，次いで上昇して2週目頃には生涯の最高値に達するという激しい変動を示している。脳の発生の過程は形態学的に通常4段階に分けて考えられており (Flexner, 1955)，この RNase 活性に著しい変化の見られる出生直後の一時期は，その第2期に相当している。この第2期は，また，一般に生理学的，生化学的に最も著しい変化の見られる時期として，critical period (Flexner, 1955) と呼ばれており，RNase もこの時期に著しく変化している訳である。RNase-inhibitor についても同様の変化が認められる。このことは，これら RNase, RNase-inhibitor が，この時期における脳の著しい生理学的変化と深い関連を持っていることを示しているように思われる。5 日目頃の一時的低下は，RNase だけに見られるものではなく，蛋白含量 (図 9)，DNA 量 (Uzman and Rumley, 1958)，酸素消費量 (Himwich, 1951) 等もこの時期に一時低下している。RNase-inhibitor にはこのような変化は見られず，また，Mandel et al. (1964) によると RNA 濃度はラッテでは15日まで上昇し，以後成熟期まで変化しないという。RNA polymerase に関する Barondes (1964) の検討では，ラッテ脳で9カ月の活性は12日のものの約半分になっているが，わずか2点のみでは凡その経過も解らない。この点 Bondy and Waelsch (1965) の検討は数点について行われ，RNA polymerase 活性は脳でも肝臓でも，出生後成熟期に至るまでは，徐々に上昇し続けるといい，2 週間で上昇の止る RNase とは経過を異にしているようである。他方 Johnson (1967) によれば，マウス脳 RNA への前駆物質の incorporation は，生後日を追って低下しており，Bondy and Waelsch の polymerase に関する結果と一見矛盾しているように見える。しかし真に矛盾しているかどうか，これら脳内 RNA 量，蛋白量，RNase, RNase-inhibitor, RNA polymerase, 前駆物質の incorporation 等は互に深い関連を持っているものであろうが，今のところ個々の変化についていえるだけで，総合的に理解することは難かしい。

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文　献

Barondes S. H.: (1964) *J. Neurochem.*, **11**, 663.
Bondy S. C. and Waelsch H.: (1965) *J. Neurochem.*, **12**, 751.
Datta R. K., Bhattacharyya D. and Ghosh J. J.: (1964) *J. Neurochem.*, **11**, 87.
Flexner L. B.: (1955) *In Biochemistry of the Developing Nervous System.* (ed. Waelsch H.), p 281, *Academic Press, New York.*
Folin O. and Ciocalteu V.: (1927) *J. Biol. Chem.*, **73**, 627.
古沢清三郎: (1963) 精神経誌, **65**, 694.
Himwich H. E.: (1951) *Brain Metabolism and Cerebral Disorders, Williams, Baltimore.*
Hydén H.: (1966) *In Progress in Nucleic Acid Research* (ed. Davidson J. N. and Cohn W. E.) **6**, 187.
Johnson T. C.: (1967) *J. Neurochem.*, **14**, 1075.
Kirby K. S.: (1956) *Biochem. J.*, **64**, 405.
Koening H., Gaines D., McDonald T., Gray R. and Scott J.: (1964) J. Neurochem., **11**, 729.
Kurihara T.: (1967) *J. Biochem.*, **62**, 26.
Lamirande G., Allard C., Costa H. C. and Cantero A.: (1954) *Science*, **119**, 351.
Lowry O. H., Rosebrough N. S., Farr A. L. and Randall R. J.: (1951) *J. Biol. Chem.*, **193**, 265.
Mandel P., Rein H., Harth-Edel S. and Mardell R.: (1964) *In Comparative Neurochemistry* (ed. Richter D.), p 149, *Pergamon Press, Oxford.*
間瀬桂吉: (1962) 生化学, **34**, 339.
May L. and Grenell R. G.: (1959) *Proc. Soc. Exp. Biol. Med.*, **102**, 235.
Nechaeva G. A.: (1964) *Ukrayins'kyi Biokhimichnyi Zhurnal*, **36**, 607.
Pope A.: (1952) *J. Neurophysiol.*, **15**, 115.
Roth J. S.: (1956) *Biochim. Biophys. Acta*, **21**, 34.
Skvirskaya E. B. and Silich T. P.: (1954) 神経系の生化学 (ed. Palladin A. V.) 松本淳治訳, 34頁, 協立書店.
Shortman K.: (1961) *Biochim. Biophys. Acta*, **51**, 37.

SHORTMAN K.: (1962) *Biochim. Biophys. Acta*, **61**, 50.
TAKAHASHI Y. and ABE S.: (1963) *Experientia*, **19**, 186.
TAKAHASHI Y., MASE K. and SUGANO H.: (1966) *Biochim. Biophys. Acta*, **119**, 627.
TAKAHASHI Y., MASE K. and ABE S.: (1966) *J. Biochem.*, **60**, 363.
高橋康夫，鈴木雄二：(1966) 神経化学, **5** Supp., 109.
TAKAHASHI Y., MASE K. and SUZUKI Y.: (1967) *Experientia*, **23**, 525.
UTSUNOMIYA T. and ROTH J. S.: (1960) *J. Cell Biol.*, **29**, 395.
UZMAN L. L. and RUMLEY M. K.: (1958) *J. Neurochem.*, **3**, 170.
WHITTAKER V. P.: (1963) *Biochem. Soc. Symp.*, **23**, 109.
山上栄，森浩一，川北幸男：(1968) 神経化学, **7** Supp., 17.
ZOMZELY C. E., ROBERTS S., GRUBER C. P. and BROWN D. M.: (1968) *J. Biol. Chem.*, **243**, 5396.

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* 印は，その号について検索したが，神経化学文献が見当らなかったことを示します。

I. General Neurochemistry (149-202)

149. Auerbach, A. A. & Bennett, M. V. L.
Chemically mediated transmission at a giant fibre synapse in the central nervous system of a vertebrate.
J. Gen. Physiol. **53** (2): 183–210, '69.

150. Baxter, B. L.
Induction of both emotional behavior and a novel form of REM sleep by chemical stimulation applied to cat mesencephalon.
Exp. Neurol. **23** (2): 220– , '69.

151. Bennett, E. L., et al.
Rat brain: Effects of enviromental enrichment on wet and dry weights.
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152. Blass, E. M.
Separation of cellular from extracellular controls of drinking in rats by frontal brain damage.
Science **162** (3861): 1501– , '68.

153. Bovet, D., et al.
Genetic aspects of learning and memory in mice.
Science **163** (3863): 139–149, '69.

154. Brandt, N. N. & Rafaelsen, O. J.
Biochemical screening of psychiatric patients.
Acta Psychiat. Scand. Suppl. 203: 101– , '68.

155. Bresler, D. E. & Bitterman, M. E.
Learning in fish with transplanted brain tissue.
Science **163** (3867): 590– , '69.

156. Chase, H. P., et al.
Undernutrition and cerebullum development.
Nature **221** (5180): 554–5, '69.

157. Cocks, J. A., et al.
The effect of thyroid hormones on the biochemical maturation of the rat brain. (Proc.)
Biochem, J. **111** (3): 18P– , '69.

158. Davis, W. M. & Su, M. Q.
Effects of adrenalectomy and repeated convulsions on responses of rats to flurothyl.
Int. J. Neuropharmacol. 8 (1): 55– , '69.

159. de Robertis, E., et al.
Astrogial swelling and phosphohydrolases in cerebral cortex of Metrazol convulsant rats.
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160. Dewhurst, K.
Tje composition of the cerebrospinal fluid in the neurophilitic psychoses.
Acta Neurol. Scand. **45** (1): 119– , '69.

161. Diamond, M. C., et al.
Lack of direct effect of hypophysectomy and growth hormone on postnatal rat brain morphology.
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162. Eichenwald, H. F. & Fry, P. C.
Nutrition and learning.
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163. Ellis, F. R.
Some effects of Pco_2 and pH on nerve tissue.
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164. Emerson, T. E., Jr. & Heath, C.
Effects of local alteration of pCO_2 and pH on cerebrovascular resistance in isolated dog heads.
Pro. Soc. Exp. Biol. Med. **130** (1): 318–322, '69.

165. Emfree, L. J., et al.
Biochemical structural components of clonic N-nitrosomethylurea-induced astrocytomas grown subcutaneously. (Proc.)
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166. Ferguson, R. K. & Woodbury, D. M.
Penetration of ^{14}C-inulin and ^{14}C-sucroses into brain, cerebrospinal fluid, and skeletal muscle of developing rats.
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167. Frohman, L. A., et al.
Hypothelamic stimulation of growth hormone secretion.
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168. Fuller, R. N.
Phenylketonuria and intelligence.
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169. Glow, P. H.
Brain tumours induced in rats by an organophosphate.

Nature **221** (5187): 1265– , '69.

170. Harel, D., et al.
The influence of high oxygen pressure on the electrical activity of the brain.
Electroenceph. Clin. Neurophysiol. **26** (3): 310– , '69.

171. Johnson, M. K.
A phosphorylation site in brain and the delayed neurotoxic effect of some organophosphorus compounds.
Biochem. J. **111** (4): 487–495, '69.

172. Jonsson, G., et al.
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173. Kare, M. R., et al.
Direct pathway to the brain.
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Distribution of C^{14}-sucrose and I^{126}-iodide in the central nervous system of the cat after various routes of injection into the cerebrospinal fluid.
J. Pharmacol. Exp. Therap. **164** (2): 412–420, '68.

175. Kostowski, W., et al.
Studies on behavioural and biochemical changes in rats after lesion of midbrain raphé.
Europ. J. Pharmacol. **4** (4): 371– , '68.

176. Laverty, R. & Taylor, K. M.
Behavioural and biochemical effects of 2-(2, 6 dichlorophenylamino)-2-imidazoline hydrochloride (St 155) on the central nervous system.
Brit. J. Pharmacol. **35** (2): 253– , '69.

177. Leonard, B. E. & Riddell, D.
Some properties of a behaviour-depressing material obtained from mammalian brain. (Proc.)
Brit. J. Pharmacol. **34** (3): 659p.– , '68.

178. Longuet-Higgins, H. C.
The non-local storage of temporal information.
Proc. Roy. Soc. [Biol.] **171** (1024): 327–334, '68.

179. Luria, A. R. & Karasseva, T. A.
Disturbances of auditory-speech memory in focal lesions of the deep regons of the left temporal lobe.
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181. Nadel, L. & Buresova, O.
Interhemispheric transfer phenomenon.
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182. Nakazawa, S.
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183. Naqvi, S. H. M., et al.
Detection of monohydroxy "bile" acids in the brains of guinea pigs afflicted with experimental allergic encephalomyelitis.
J. Lipid Res. **10** (1): 115–120, '69.

184. Nizzola, V. & Testa, C.
A case of calcification in the spinal arachnoid giving rise to spinal cord compression.
J. Neurol. Sci. **7** (2): 381–384, '68.

185. Ochs, S., et al.
Fast transport system of materials in mammalian nerve fibers.
Science **163** (3868): 686– , '69.

186. Patel, A. J. & Balázs, R.
Development of metabolic compartmentation in rat brain. (Proc.)
Biochem. J. **111** (3): 17P.–18P., '69.

187. Pribram, K. H.
The neurophysiology of remembering: Surgical experiments on monkeys suggest that remembering in akin to holography.
Sci. Amer. **220** (1): 73– , '69.

188. Rajalakshmi, R., et al.
Effects of different supplements to low Protein and poor quality protein diets on performance and brain enzymes in the albino rat.
J. Neurochem. **16** (4): 599– , '69.

189. Rauch, R., et al.
Isolation of a third neurophysin from bovine pituitary posterior lobes.
Biochem. J. **110** (3): 38P– , '68.

190. Reichelt, K. L.
Current research at the department of neurochemistry. The University Psychiatric Clinic, Vinderen. Oslo.
Acta Psychiat. Scand. Supple. 203: 111, '68.

191. Rosser, M. J. & Sears, M. L.

Further studies on the mechanism of the increased outflow of aqueous humor from the eyes of rabbits twenty-four hours after cervical sympathetic ganglionectomy.
J. Pharmacol. Exp. Therap. **164** (2): 280–289, '68.

192. Skaug, O. E. & Herlofsen, H.
Deficiency of vitamin B12 in psychoses.
Acta Psychiat. Scand. Suppl. 203: 103, '68.

193. Stern, J. & Cowie, V.
Inherited abnormalities affecting the nervous system: genetic and psychiatric aspects. (Proc.)
Biochem. J. **111** (3): 9P–10P, '69.

194. Swanson, P. D.
The effects of oxygen deprivation on electrically stimulated cerebral cortex slices.
J. Neurochem. **16** (1): 35–45, '69.

195. Swanson, P. D.
pH Effects on the metabolic properties of isolated cerebral tissues. (Proc.)
Neurology **19** (3): 298, '69.

196. Weiskrantz, L.
Experiments on the r.n.s. (real nervous system) and monkey memory.
Proc. Roy. Soc. [Biol] **171** (1024): 335–352, '68.

197. Winick, M. & Rosso, P.
The effect of severe early malnutrition on cellular growth of human brain.
Pediat. Res. **3** (2): 181– , '69.

198. Wohlman, A., et al.
The effect of chymotrypsin on the gastrointestinal absorption, tissue penetration and pharmacological activity of drugs. I. Penetration of penicillin through the blood brain and blood-retinal barriers.
Can. J. Physiol. Pharmacol. **46** (6): 815– , '68.

199. Woods, W. H., et al.
Connection of cerebral structures functioning in neurohypophysial hormone release.
Brain Res. **12** (1): 26–46, '69.

200. Woodward, D. J., et al.
Postnatal development of electrical and enzyme hisochemical activity in Purkinje cells.
Exp. Newnrol. **23** (1): 120– , '69.

201. Wyers, E. J., et al.
Retroactive impairment of passive avoidance learning by stimulation of the caudate nucleus.
Exp. Neurol. **22** (3): 350– , '68.

202. Yamamoto, C. & Kawai, N.
Generation of the seizure discharge in thin sections from the guinea pig brain in chloride-free medium in vitro.
Jap. J. Physiol. 18 (5): 620– , '68.

II. Electrolytes, Metals & Inorganic Constituents (203-221)

203. Abdel-Latif, A. A., et al.
Studies on the effect of ouabain on sodium and phosphate uptake into nerve endings of developing rat brain.
Life Sci. **7** (23): 1325– , '68.

204. Baker, P. F., et al.
Sodium transport and perfused axons.
Biochim. Biophys. Acta **163** (4): 560– , '68.

205. Binstock, L. & Lecar, H.
Ammonium ion currents in the squid giant axon.
J. Gen. Physiol. **53** (3): 34– , '69.

206. Bradbury, M. W.
Dependence of cerebrospinal fluid potassium, calcium and magnesium on cerebrospinal fluid sodium.
J. Physiol. (London) **201** (1): 32P– , '69.

207. Canelas, H. M., et al.
Biochemistry of cerebral tumors: Sodium, potassium, calcium, phosphorus, magnesium, copper and sulphur contents of astrocytomata, medulloblastomate and glioblastomata multiforme.
J. Neurochem. 15 (12): 1455– , '68.

208. Coben, L. A. & Smith, K. R.
Iodide transfer at four cerebrospinal fluid sites in the dog: Evidence for spinal iodide carrier transport.
Exp. Neurol. **23** (1): 76– , '69.

209. Escueta, A. V. & Appel. S. H.
Potassium transport in isolated nerve endings in vitro. (Proc.)

Neurology **19** (3): 298– , '69.

210. Granholm. L.
Electrolyte and acid/base concentrations in arterial blood and cerebrospinal fluid in experimental hydrocephalus.
Acta Neurol Scand 44 (5): 651– , '68.

211. Hadžović, S., et al.
The effect of tremorigenic substances on the copper content in different areas of the rabbit brain.
J. Neurochem. **16** (1): 117–9, '69.

212. Hammerstad, J. P., et al.
Iodine transport from the spinal subarachnoid fluid in the cat.
Amer. J. Physiol. **216** (2): 353–8, '69.

213. McIlwain, H., et al.
Tetrodotoxin on the sodium and other ions of cerebral tissues, excited electrically and with glutamate.
J. Neurochem. **16** (3): 363–370, '69.

214. Muchnik, S. & Venosa
Internal concentration of sodium important in the release of neurotransmitter.
Nature **222** (5189): 169–, '69.

215. Rojas, E. & Hidalgo, C.
Effect of temperatura and metabolic inhibitors on ^{45}Ca outflow from squid giant axons.
Biochim. Biophys. Acta **163** (4): 550– , '68.

216. Shaw, D. M., et al.
Brain electrolytes in depressive and alcoholic suicides.
Brit. J. Psychiat. **115** (518): 69–79, '69.

217. Tasaki, I., et al.
Analysis of excitation process in squid giant axons under bi-ionic conditions.
Amer. J. Physiol. **216** (1): 130–8, '69.

218. Tower, D. B.
Ouabain and the distribution of culcium and magensium in cerebral tissues in vitro.
Exp. Brain Res. **6** (4): 273– , '68.

219. Van Harreveld, A. & Ahmed, N.
Release of intravenously administered iodide from the pial and dural surfaces.
Brain Res. **11** (1): 32– , '68.

220. Wespi, H. H.
Active transport and passive fluxes of K, Na, and Li in mammalian non-myelinated nerve fibres.
Pflûgers Arch.-Eur. J. Physiol. **306** (3): 262– . '69.

221. Woodward, J. K., et al.
Electrolyte distribution in rabbit superior cervical ganglion.
J. Neurochem. **16** (3): 289–299, '69.

III. Carbohydrates & Related Compounds (222-243)

222. Ammon, H. P. T., et al.
Different effects of inhibition of lipolysis by nicotinic acid on the rate of glycolytic carbohydrate breakdown in brain and skeletal muscle.
Life Sci. 8 (4): 213– , '69.

223. Balliano, M., et al.
Metabolism of glucose-6-phosphate in slices of rat brain cortex.
Brain Res. **13** (1): 181– , '69.

224. Chain, E. B., et al.
Metabolism of hexoses in rat cerebral cortex slices.
J. Neurochem. **16** (1): 93–100, '69.

225. De Ribaupierre, F.
Localisation, synthese et utilisation du glycogene dans le ganglion sympathique cervical du rat.
Brain. Res. **11** (1): 42– , '68.

226. Fishman, R. A. & Borton, E. A.
Brain glucose transport in ammonia intoxication. (Proc.)
Neurology. **19** (3): 297–298, '69.

227. Folbergrová, J., et al.
Glycogen, ammonia and related metabolites in the brain during seizures evoked by methionine sulphoximine..
J. Neurochem. **16** (2): 191–203, '69.

228. Granholm, L., et al.
The lactate/pyruvate ratios of cerebrospinal fluid of rats and cats related to the lactate/pyruvate, the ATP/ADP, and the phosphocreatine/creatine rations of brain tissue.

Acta Physiol. Scand. **74** (3): 398–409, '68.

229. Guth, L. & Watson, P. K.
A correlated histochemical and quantitative study on cerebral glycogen after brain injury in the rat.
Exp. Neurol. **22** (4): 590–602, '68.

230. Hurwitz, B. S. & Wolfson, S. K., Jr.
Brain lactate in anoxia and hypothermia: relationship to brian vability.
Exp. Neurol. **23** (3): 426–434, '69.

231. Karadzic, V. & Mrsulja, B.
Deprivation of paradoxical sleep and brain glycogen.
J. Neurochem. **16** (1): 29–34, '69.

232. Masi, I.
Metabolism of labelled glucose in sympathetic ganglia in vitro, at rest and during sustained activity.
Brain Res. **12** (2): 467– , '69.

233. Michalek, H., et al.
Effect of triperidol on carbohydrate and amino acid metabolism in rat brain-cortex slices.
Biochem. J. **110** (2): 237– , '68.

234. Pitts, F. N., Jr.
The biochemistry of anxiety; Anxiety neurosis may be related to a high concentration of lactate in the blood.
Sci. Amer. **220** (2): 69–75, '69.

235. Plum, F., et al.
Effect of hyperbaric-hyperoxic hyperventilation on blood, brain and CSF lactate.
Am. J. Physiol. **215** (5): 1240– , '68.

236. Raskin, N. H. & Sokoloff, L.
Alcohol metabolism in brain, muscle, optic nerve, and peripheral nerve. (Proc.)
Neurology **19** (3): 299–230, '69.

237. Rose, S. P. R.
Glucose and amino acid metabolism in isolated neuronal and glial cell fractions in vitro.
J. Neurochem. **15** (12): 1415– , '68.

238. Shimazu, T. & Amakawa, A.
Regulation of glycogen metabolism in liver by the automic nervous system. II. Neural control of glycigenolytic enzymes.
Biochim. Biophys. Acta. **165** (3): 335– , '68.

239. Shimazu, T. & Amakawa, A.
Regulation of glycogen metabolism in liver by the automatic nervous system. III. Differential effects of symphathetic-nerve stimulation and of catecholamines on liver phosphorylase.
Biochim. Biophys. Acta. **165** (3): 349– , '68.

240. Swaiman, K. F. & Lemieux, B.
The effect of phenylalanine and its metabolites on glucose utilization in developing.
J. Neurochem. **16** (3): 385–8, '69.

241. Thurston, J. H. & Pierce, R. W.
Increase of glucose and high energy phosphate reserve in the brain after hydrocortisone.
J. Neurochem. **16** (1): 107–111, '69.

242. Torre, M. & Vergani, E.
LSD-25 and carbohydrate metabolism.
Brain Res. **12** (1): 165–171, '69.

243. Vos, J., et al.
Distribution of acid mucopolysaccharides in subcellular fractions of mouse brain.
Brain Res. **12** (1): 172–9, '69.

IV. Amino Acids, Peptides & Related Compounds (244-278)

244. Aars, H. & Akre, S.
Effect of angiotensin on sympathetic nerve activity.
Acta Physiol. Scand. **74** (1/2): 134– , '68.

245. Aleksidze, N. & Blomstrand, C.
The influence of hydroxylamine, thiosemicarbazide and gamma-aminobutyric acid upon succinate oxidation by Deiters' nerve cells and neuroglia.
Brain Res. **11** (3): 717–719, '68.

246. Angeletti, R. H.
Nerve growth factor (NGF) from snake venom and mouse submaxillary gland: interaction with serum proteins.
Brain Res. **12** (1): 234–7, '69.

247. Anton-Tay, F. & Wurtman, R. J.
Regional uptake of ^{3}H-melatonin from blood or cerebrospinal fluid by rat brain.

Nature **221** (5179): 474–5, '69.

248. Bartolini, A., et al.
Effect of midfrain transections on the content of gamma-aminobutyric acid (GABA) in the cerebral cortex of the cat. (Proc.)
Brit. J. Pharmacol. **34** (3): 660p–661p, '68.

249. Berl, S. & Frigyesi, T. L.
Comparison of cerbral regional metabolism of [^{14}C]leucine following third ventricle and intravenous administration in the cat.
J. Neurochem. **16** (3): 405–415, '69.

250. Berl, S. & Frigyesi, T. L.
The turnover of glutamate, glutamine, asparate and GABA labeled with [1-^{14}C] acetate in caudate nucleus, thalamus and motor cortex (cat).
Brain Res. **12** (2): 444– , '69.

251. Carver, M. J.
Free amino acids of fetal brain. Influence of the branched chain amino acids.
J. Neurochem. **16** (1): 113–6, '69.

252. Clarke, J. T. R. & Lowden, J. A.
Hyperphenylalanemia; effect on the developing rat brain.
Canad. J. Biochem. **47** (3): 291–5, '69.

253. Cunningham, W. L. & Goldberg, J. M.
The determination of glycosaminoglycans present in various mammalian brains.
Biochem. J. **110** (3): 35P– , '68.

254. DeFeudis, F. V. & Elliott, K. A. C.
Convulsions and the γ-aminobutyric acid content of rat brain.
Can. J. Physiol. Pharmacol. **46** (5): 803– , '68.

255. de Marchi, W. J. & Johnston, G. A. R.
The oxidation of glycine by D-Amino acid oxidase in extracts of mammalian central nervous tissue.
J. Neurochem. **16** (3): 355–361, '69.

256. Fisher, R., et al.
The free amino acids in adult human cerebrosinal fluid.
Acta Neurol. Scand. **44** (5): 619– , '68.

257. Foulkes, J. A. & Robinson, N.
[^{14}C] Leucine incorporation and axoplasmic flow in the rat brain stem reticular formation.
Brain Res. **11** (3): 638–647, '68.

258. Hori, S.
The presence of bradykinin-like polypeptides, kinin-releasing and destroying activity in brain.
Jap. J. Physiol. **18** (6): 772–787, '68.

259. Jörgensen, O. S., et al.
Amino acid screenings of urine in children with psychiatric diseases.
Acta Psychiat. Scand. (Suppl. 203): 97–9, '68.

260. Kaplan, H. R., et al.
Central and reflexogenic cardiovascular actions of prostaglandins E_1.
Int. J. Neuropharmacol. 8 (1): 15– , '69.

261. Kayaalp, S. O. & McIsaac, R. J.
Absence of effects of prostagladins E_1 and E_2 on ganglinic transmission.
Europ. J. Pharmacol. **4** (3): 283– , '68.

262. Kuriyama, K., et al.
The γ-aminobutyric acid system in the developing chick embtyo cerebellum.
Brain Res. **11** (2): 412– , '68.

263. Lorenzo, A. V. & Cutler, R. W. P.
Amino acid transport by choroid plexus in vitro.
J. Neurochem. **16** (4): 577– , '69.

264. Lurvey, A. N., et al.
Homovanillic acid content of neuroblastomas.
Proc. Soc. Exp. Biol. Med. **130** (3): 972– , '69.

265. Marcucci, F. & Airoldi, L.
Postnatal changes in brain aspartic and glutamic acid content of normal and hypothyroid suckling rats.
J. Neurochem. **16** (4): 673– , '69.

266. Marcucci, F. & Giacalone, E.
N-acetyl aspartic, aspartic and grutamic acid brain levels in aggressive mice.
Biochem. Pharmacol. **18** (3): 691– , '69.

267. Marcucci, F., et al.
Brain level of N-acetyl-L-aspartate in different straius of mouse and rat.
J. Neurochem. **16** (2): 272–3, '69.

268. Margolis, R. K. & Lajtha, A.
Ion dependence of amino acid uptake in brain slices.
Biochim. Biophys. Acta **163** (3): 374– , '68.

269. Margolis, R. K., et al.
Effects of changes in cellular composition following neuronal degeneration on

amino acids in brain.
Brain Res. **11** (1): 19– , '68.

270. Michaelson, I. A., et al.
The regional distribution of histamine in brain of the Rhesus monky (Macaca Mulatta).
Biochem. Pharmacol. **17** (12): 2435– , '68.

271. Mitchell, J. F., et al.
The release of 3H-gamma-aminobutyric acid (GABA) from rat cerebral cortex. (Proc.)
Brit. J. Pharmacol. **34** (3): 661p–662p, '68.

272. Nakajima, T., et al.
α-(γ-aminobutyryl)-lysine in mammalian brain: its identification and distribution.
J. Neurochem. **16** (3): 417–422, '69.

273. Nicklas, W. J., et al.
Decarboxylation studies of glutamate, glutamine, and asparate from brain labelled with [1-^{14}C] acetate, L-[U-^{14}C] asparate, and L-[U-^{14}C] glutamate.
J. Neurochem. **16** (4): 549– , '69.

274. Oja, S. S., et al.
Changes in cerebral and hepatic amino acids in the rat and guniea pig during development.
Brain Res. **11** (3): 655–661, '68.

275. Rizzoli, A. A.
Distribution of gultamic acid, aspartic acid, γ-aminobutyric acid and glycine in six areas of cat spinal cord before and after transection.
Brain Res. **11** (1): 11– , '68.

276. Snodgrass, R. JR., et al.
Transport of neutral amino acids out of feline cerebrospinal fluid. (Proc.)
Neurology **19** (3): 300–301, '69.

277. Ten Bruggencate, G. & Engberg, I.
Analysis glycine actions on spinal interneurones by intracellular recording.
Brain Res. **11** (2): 446– , '68.

278. Wood, J. D., et al.
Correlation between depreases in brain γ-aminobutyric acid levels and susceptibility to convulsions induced by hyperbaric oxygen.
J. Neurochem. **16** (3): 281–7, '69.

V. Proteins (279-311)

279. Abood, L. G. & Matsubara, A.
Properties of an ATP-binding protein isolated from membranes of nerve endings.
Biochim. Biophys. Acta **163** (4): 539– , '68.

280. Bennett, G. S. & Edelman, G. M.
Isolation of an acidic protein from rat brain.
J. Biol. Chem. **243** (23): 6234– , '68.

281. Bennett, G. S. & Edelman, G. M.
Amino acid incorporation into rat brain proteins during spreading cortical depression.
Science **163** (3865): 393– , '69.

282. Bowman, R. E., et al.
Protein synthesis during learning.
Science **164** (3876): – , '69.

283. Brink, J. J. & Stein, D. G.
The metabolism and distribution of pemoline in rat brain.
Biochem. Pharmacol. **17** (11): 2365– , '68.

284. Brown, B. M. & Noble, E. P.
Cycloheximide, amino acid incorporation and learning in the isolated corkroach ganglron.
Biochem. Pharmacol. **17** (11): 2371– , '68.

285. Brunngraber, E. G.
Chromatography on calcium hydroxylapatite of glycoproteins solubilized by triton X-100 from particulates prepared from rat brain.
Arch. Biochem. Biophys. **129** (1): 131– , '69.

286. Burdman, J. A. & Journey, L. J.
Protein synthesis in isolated nuclei from adult rat brain.
J. Neurochem. **16** (4): 493– , '69.

287. Carnegie, P. R.
N-terminal sequence of an encephalitogenic protein from human myelin.
Biochem. J. **111** (2): 240–2, '69.

288. Dencker, S. J.

Quantification of individual CSF propteins by immune precipitation in agar gel.
J. Neurochem. **16** (3): 465–6, '69.

289. Dencker, S. J. & Malm, U.
Protein pattern of cerebrospinal fluid in mental disease.
Acta Psychiat. Scand. Suppl. 203: 105–9, '68.

290. D'Monte, B., et al.
Protein metabolism in the components of cerebral mitochondria. (Proc.)
Neurology **19** (3): 306, '69.

291. Edström, A. & Sjöstrand, J.
Protein synthesis in the isolated Mauthner nerve fibre of goldfish.
J. Neurochem. **16** (1): 67–81, '69.

292. Einstein, E. R., et al.
Protein and lipid changes in the developing brain. (Proc.)
Neurology **19** (3): 306, '69.

293. Eylar, E. H. & Thompson, M.
Allergic encephalomplitis: the physicochemical properties of the basic protein encephalitogen from bovine spinal cord.
Arch. Biochem. Biophys. **129** (2): 468– , '69.

294. Filipowicz, W., et al.
Topographical distribution of fast and slow migrating fractions of beef brain S-100 protein fraction.
Life Sci. **7** (24): 1243–1250, '68.

295. Frantzen, E., et al.
Protein studies on cerebrospinal fluid and neurological symptoms in myelomatosis.
Acta Neurol. Scand. **45** (1): 1– , '69.

296. Gartside, I. B.
Role of protein synthesis in mechanism of increased firing of neurones in cerebral cortex of rat after polarization.
Nature. **220** (5165): 383– , '68.

297. Hashim, G. A. & Eylar, E. H.
Allergic encephalomyelitis: enzymatic degradation of the encephalitogenic basic protein from bovine spinal cord.
Arch. Biochem. Biophys. **129** (2): 635– , '69.

298. Hashim, G. A. & Eylar, E. H.
Allergic encephalomyelitis: isolation and characterization of encephalitogenic petides from the basic protein of bovine spinal cord.
Arch. Biochem. Biophys. **129** (2): 645– , '69.

299. Holtzman, E. & Peterson, E. R.
Uptake of protein by mammalian neurons.
J. Cell. Biol. **40** (3): 863–9, '69.

300. Lim, R. & Agranoff, B. W.
Protein metabolism in goldfish brain.
J. Neurochem. **16** (3): 431–445, '69.

301. Martenson, R. E. & Gaitonde, M. K.
Electrophoretic analysis of the highly basic proteins of the rat brain fraction which induces experimental allergic encephalomyelitis.
J. Neurochem. **16** (3): 333–347, '69.

302. Matheson, D. F.
Influence of age on the incorporation of [^{14}C] glycine into protein in chicken peripheral nerve.
J. Neurochem. **16** (2): 215–223, '69.

303. Minard, F. N. & Richter, D.
Electroshock-induced seizures and the turnover of brain protein in the rat.
J. Neurochem. **15** (12): 1463– , '68.

304. Murthy, M. R. V.
Post-microsomal fractions from rat brain which stimulate ribosomal amino acid incorporation.
Canad. J. Biochem. **47** (2): 75–8, '69.

305. Rusca, G., et al.
Chromatographic and electrophoretic patterns of soluble proteins from nervous and muscle tissue in Periplaneta americana.
Brain Res. **11** (1): 256– , '68.

306. Schain, R. J., et al.
Postnatal changes in protein metabolism of brian. I. Studies in newborn miniature pigs at varying conceptual, ages.
Pediat. Res. **3** (2): 135–139, '69.

307. Swaiman, K. F., et al.
The effect of food deprivation on protein metabolism in immature rat brain. (Proc.)
Neurology **19** (3): 305, '69.

308. Tewari, S. & Baxter, C. F.
Stimulatory effect of γ-aminobutyric acid upon amino acid incorporation into protein by a ribosomal system from immature rat brain.

J. Neurochem. **16** (2): 171–180, '69.

309. Weisenberg, R. C., et al.
The colchicine-binding protein of mammalian brain and its relation to microtubules.
Biochemistry **7** (12): 4466–79, '68.

310. Zanini, A. & Angeletti, P.
Immunochemical assay of a protein characteristic of the nervous tissue in embryonic sensory ganglia cultured with and without nerve growth factor.
Brain Res. **11** (1): 260– , '68.

311. Zomzely, C. E., et al.
Cerebral protein synthesis. II. Instability of cerebral messenger ribonuceic acid-ribosome complexes.
J. Biol. Chem. **243** (20): 5396– , '68.

VI. Nucleic Acids & Related Compounds (312-341)

312. Acobson, C.-O.
Reactivation of DNA synthesis in mammalian neuron nuclei after fusion with cells of an undifferentiated fibroblast line.
Exp. Cell Res. **53** (1): 316– , '68.

313. Adair, L. B., et al.
Brain function and macromolecules, III. Uridine incorporation into polysomes of mouse brain during short-time avoidance conditioning.
Proc. Nat. Acad. Sci. U.S.A. **61** (2): 606– , '68.

314. Adair, L. B., et al.
Brain function and macromolecules, IV. Uridine incorporation into polysomes of mouse brain during behavioral experiences.
Proc. Nat. Acad. Sci. U.S.A. **61** (3): 917– , '68.

315. Angel, A., et al.
The effects of polyhydroxyphenols on brain ATP in the mouse.
Exp. Brain Res. **7** (3): 250– , '69.

316. Appel, S. H. & Silberberg, D. H.
Pyrimidine synthesis in tissue culture.
J. Neurochem. **15** (12): 1437– , '68.

317. Blomstrand, C., et al.
Effect of cerebellectomy upon the cytochemistry of neurons in the lateral vestibular nucleus. II. Effect on the RNA content and succinoxidase activity in Deiters' neurons after warm and cold water calrization.
Brain Res. **11** (3): 648–654, '68.

318. Caldarera, C. M., et al.
Polyamines and nucleic acid metabolism during development of chick embryo brain.
J. Neurochem. **16** (3): 309–316, '69.

319. Cohan, S. & Ford, D.
The effect of neonatal X-irradiation on the accumulation of (^{3}H) by the central nervous system of the rat following injection of (^{3}H)-5-uridine.
Acta Neurol. Scand. **45** (1): –53, '69.

320. Dabholkar, A. & Tewari, H.
The functional significance of the presence of acid phosphatase at the nucleic acid synthesizing sites in the nuclei of the neurons of the cephalothoracic ganglionic masses of palaemnius.
Acta Neurol. Scand. **44** (5): 533– , '68.

321. D-Nowak, B. & Niemierko, S.
Synthesis of nucleic acids in the schwann cells as the early cellular response to nerve injury.
J. Neurochem. **16** (2): 235–248, '69.

322. Dravid, A. R., et al.
Studies on in vitro RNA synthesis in human brain tumor nuclei.
Brain Res. **12** (1): 242–5, '69.

323. Edström, A., et al.
Sedimentation analysis of ribonucleic acid extracted from isolated Mauthner nerve fibre components.
J. Neurochem. **16** (1): 53–66, '69.

324. Ellis, D. B., et al.
Magnesium pemoline: lack of effect on brain RNA metabolism.
Life Sci. **7** (24): 1259–1264, '68.

325. Faiszt, J. & Adam, G.
Successful effect of learning in rats in volves

a ribosmal RNA fraction from the brain.
Nature **220** (5165): 367– , '68.

326. Held, I. & Wells, W.
Observations on purine metabolism in tat brain.
J. Neurochem. **16** (4): 529– , '69.

327. Howard, E.
Reductions in size and total DNA of cerebrum and cerebellum, in adult mice after corticosterone treatment in infancy.
Exp. Neurol. **22** (2): 191– , '68.

328. Kakiuchi, S., et al.
The effect of electrical stimulation upon the accumulation of adenosine 3′,5′-phosphate in isolated cerebral tissue.
J. Neurochem. **16** (4): 485– , '69.

329. Kimberlin, R. H. & Anger, H. S.
DNA synthesis in the glial cells of scrapie-affected mouse brain.
J. Neurochem. **16** (4): 543– , '69.

330. Lentz, R. D. & Lapham, L. W.
A quantitative cytochemical study of the DNA content of neurons of rat cerebellar cortex.
J. Neurochem. **16** (3): 379–384, '69.

331. Ltoh, T. & Quastel, J. H.
Ribonucleic acid biosynthesis in adult and infant rat brain in vitro.
Science **164** (3874): 79– , '69.

332. Maker, H. S., et al.
Changes in ATP and creatine phosphate (CP) in mouse cerebellar layers during ischemia. (Proc.)
Neurology **19** (3): 297, '69.

333. Margolis, F. L.
DNA and DNA-polymerase activity in chicken brain regions during ontogeny.
J. Neurochem. **16** (3): 447–456, '69.

334. Marthens, E. V. & Zamenhof, S.
Deoxyribonucleic acid of neonatal rat cerebrum increased by operative restriction of litter size.
Exp. Neurol. **23** (2): 214– , '69.

335. Merits, I. & Cain, J.
Rapid loss of labeled DNA from rat brain due to radiation damage.
Biochim. Biophys. Acta **174** (1): 315– , '69.

336. Miani, N., et al.
Synthesis of adenosine triphosphate by myelin of spinal nerves of rabbit.
J. Neurochem. **16** (2): 249–260, '69.

337. Murhty, M. R. V., et al.
Depolymerization of polyadenylic acid by subcellular fractions of rat brain and liver.
Canal J. Biochem. **47** (3): 283–9, '69.

338. Piccoli, F., et al.
Purine and pyrimidine nucleotides in the brain of normal and convulsant rats.
J. Neurochem. **16** (2): 159–169, '69.

339. Prives, C. & Quastel
Cerebral stimulating agents promote chaged rates of nucleotide and RNA biosynthesis.
Nature **221** (5185): 1053– , '69.

340. Schneider, D. & Roberts, S.
Base compositions of 18S and 28S RNA fractions from rat cerebral ribosomes.
J. Neurochem. **15** (12): 1469– , '68.

341. Sung, S.
DNA synthesis in the developing rat brain.
Canal. J. Biochem. **47** (1): 47– , '69.

VII. Lipids, Steroids & Related Compounds (342-383)

342. Abdulla, Y. H. & Turner ,
ATP and ADP induce turbidity changes in rat brain myelin fraction.
Nature **221** (5182): 775– , '69.

343. Ansell, G. B. & Spanner, S.
The metabolism of [Me-^{14}C] choline in the brain of the rat in vivo.
Biochem. J. **110** (2): 201– , '68.

344. Arnetoli, G., et al.
Fatty acid and aldehyde changes in choline- and ethanolamine-containing phospholipids in the white matter of multiple sclerosis brains.
J. Neurochem. **16** (3): 461–463, '69.

345. Basu, S., et al.
Enzymatic synthesis of ceramide-glucose and ceramide-lactose by glycosyltransferases from embryonic chicken brain.

J. Biol. Chem **243** (21): 5802– , '68.

346. Bell, O. E., Jr. & White, H. B., Jr.
Plasmalogen metabolism in developing rat brain: aldehydes as a direct precursor in the formation of the vinyl ether linkage.
Biochim. Biophys. Acta **164** (2): 441– , '68.

347. Benech, C. R., et al.
In vivo local uptake of C-14 orotic acid by peripheral nerve.
Exp. Neurol. **22** (3): 436– , '68.

348. Benjamins, J. A. & Agranoff, B. W.
Distribution and properties of CDP-diglyceride; inositol transferase from brain.
J. Neurochem. **16** (4): 513– , '69.

349. Birnberger, A. C. & Eliasson, S. G.
Expermental ischemia and polyphosphoinositide metabolism. (Proc.)
Neurology **19** (3): 297, '69.

350. Century, B. & Horwitt, M. K.
Effect of dietary lipid on chlorpromazine depression of ^{32}P labeling of rat brain phospholipids.
Life Sci. 8 (3): 215– , '69.

351. Chevallier, F. & Gautheron, C.
A method for the study of cholesterol biosynthesis in the central nervous system.
J. Neurochem. **16** (3): 323–331, '69.

352. Clausen, J.
The effect of viatmine A deficiency on myelination in the central nervous system of the rat.
Europ. J. Biochem. 7 (4): 575– , '69.

353. Fishman, M. A., et al.
Low content of cerebral lipids in infants suffering from malnutrition.
Nature **212** (5180): 552–3, '69.

354. Foote, J. L. & Tao, R. V. P.
The effects of p-chlorophenylalanine and phenylalanine on brain ester-bond fafty acids of developing rats.
Life Sci. 7 (22): 1187– , '68.

355. French, J. H., et al.
Lipid composition of the brain in infantile Gaucher's disease.
Neurology **19** (1): 81–6, '69.

356. Friedel, R. O., et al.
The enzymic hydrolysis of phosphatidyl inositol by guinea pig brain: sub-cellular distribution and hydrolysis products.
Neurochem. **16** (3): 371–8, '69.

357. Heitzman, R. J. & Skipworth, S.
The fatty acid composition of brain and myelin of normal and scrapieaffected mice.
J. Nourochem. **16** (1): 121–2, '69.

358. Hendelman, W. J. & Bunge, R. P.
Radioautographic studies of choline incorporation into peripheral nerve myelin.
J. Cell Biol. **40** (1): 190–208, '69.

359. Hiroshige, T., et al.
Effects on ACTH release of intrapituitary injections of posterior pituitary hormones and several amines in the hypothalamus.
Jap. J. Physiol. **18** (5): 609– , '68.

360. Hokin, M. R.
Effect of norepinephrine on ^{32}P incorporation into individual phosphatides in slices from different areas of the guinea pig brain.
J. Neurochem. **16** (2): 127–134, '69.

361. Hokin, M. R. & Brown, D. F.
Inhibition by γ-hexachlorocyclohexane of acetylcholine-stimulated phosphatidylinositol synthesis in cerebral cortex slices and of phosphatidic acid-inositol transferase in cerebral contex particulate fractions.
J. Neurochem. **16** (4): 475– , '69.

362. Horrocks, L. A.
Metabolism of the ethanolamine phosphoglycerides of mouse brain myelin and microsomes.
J. Neurochem. **16** (1): 13–18, '69.

363. Kaufman, B., et al.
Enzymatic synthesis of disialogangliosides from monosialogangliosides by sialytransferases from embryonic chicken brain.
J. Biol. Chem. **243** (21): 5804– , '68.

364. Klenk, E. & Huang, R. T. C.
C_{18}- and C_{20} sphingosines in ceramide and sphingomyelines of the grey and white matter of human brain.
Hoppe-Seiler's Z. Physiol. Chem. **350** (3): 373– , '69.

365. Lin, S.
Phosphoryl ethanolamine in rabbit brain cortical slices. (Proc.)
Neurology **19** (3): 306–307, '69.

366. MacBrinn, M. C. & O'Brien, J. S.

Lipid conposition of optic nerve myelin.
J. Neurochem. **19** (1): 7–12, '69.

367. McEwen, B. S., et al.
Selective retention of corticosterone by limbic structures in rat brain.
Nature **220** (5170): 911– , '68.

368. Morell, P. & Radin, N. S.
Synthesis of cerebroside by brain from uridine diphosphate galactose and ceramide containing hydroxy fatty acid.
Biochamistry 8 (2): 506– , '69.

369. Paoletti, E. G. & Weiss, J. F.
Sterol precursors of cholesterol in adult human brain.
Science **162** (3861): 1495– , '68.

370. Paoletti, P., et al.
The sterol test for the diagnosis of human brain tumors.
Neurology **19** (2): 190– , '69.

371. Pascal, T. A. & Saifer, A.
Immunochemical studies of isolated human brain ganglioside components.
J. Neurochem. **16** (3): 301–7, '69.

372. Pumphrey, A. M.
Incorporation of [^{32}P] orthophosphate into brain-slice phospholipids and their precursors. Effects of electrical stimulation.
Biochem. J. **112** (1): 61– , '69.

373. Rowe, C. E.
The measurement of triglyceride in brain and the metabolism of brain triglyceride in vitro.
J. Neurochem. **16** (2): 205–214, '69.

374. Rumsby, M. G. & Rossiter, R. J.
Alkyl ethers from the glycerogalactolipid fraction of nerve tissue.
J. Neurochem. **15** (12): 1473– , '68.

375. Sheltawy, A. & Dawson, R. M. C.
The deposition and metabolism of polyphosphoinositides in rat and gunia-pig brain during development.
Biochem. J. **111** (2): 147–55, '69.

376. Sheltawy, A. & Dawson, R. M. C.
The metabolism of polyphosphoinositides in hen brain and sciatic nerve.
Biochem. J. **111** (2): 157–65, '69.

377. Smith, M. E.
An in vitro system for the study of myelin synthesis.
J. Neurochem. **16** (1): 83–92, '69.

378. Steiner, F. A., et al.
Steroid-sensitives neurones in rat brain: Anatomical localization and responses to neurohumours and ACTH.
Brain Res. **12** (1): 74–85, '69.

379. Sun, G. Y. & Horrocks, L. A.
The metabolism of palmitic acid in the phospholipids, neutral glycerides and galactolipids of mouse brain.
J. Neurochem. **16** (2): 181–9, '69.

380. Wolfe, L. S., et al.
Systemic late infantile lipidosis: Batagalactosidase deficiency with cerebral GM, gangliosidosis and accumulation and excretion of a keratan sulfate. (Proc.)
Neurology **19** (3): 305, '69.

381. Yabuuchi, H. & O'Brien, J. S.
Brain cardiolipin: isolation and fatty acid positions.
J. Neurochem. **15** (12): 1383– , '68.

382. Yanagihara, T. & Cumings, J. N.
Alteration of phospholipids, particularly plasmalogens, in the demyelination of multiple sclerosis as compared with that of cerebral oedema.
Brain **92** (1): – , '69.

383. Yatsu, F. M. & Moss, S.
Fatty acid elongation by brain mitochondria. (Proc.)
Neurology **19** (3): 306, '69.

VIII. Biogenic Amines (384-455)

384. Ander, N.-E., et al.
Normetanephrine accumulation in the spinal cord due to nerve impulse activity.
Europ. J. Pharmacol. 4 (3): 349– , '68.

385. Ashcroft, G. W., et al.
The active transport of 5-hydroxyindol-3-ylacetic acid and 3-methoxy-4-hydroxyphenylacetic acid from a reticulatory perfusion system of the cerebral ventricles of the unaesthetized dog.

J. Physiol. **199** (2): 397– , '68.

386. Baker, P. C. & Quay, W. B.
5-hydroxytriptamine metabolism in early embryogenesis, and the development of brain and retinal tissues.
Brain Res. **12** (2): 273– , '69.

387. Bazelon, M., et al.
The effect of high doses of 5-hydroxytryptophan on a patient with trisomy 21. Clinical, chemical and EEG correlations.
Brain Res. **11** (2): 397– , '68.

388. Björklund, A. & Falck, B.
An improvement of the histochemical fluorescence method for monoamines. Observations on varying extractability of fluorophores in different nerve fibers.
J. Histochem. Cytochem. **16** (11): 717–720, '68.

389. Bliss, E. L., et al.
Metabolism of norepinephrine serotonin and dopamine in rat brain with stress.
J. Pharmacol. Exp. Therap. **164** (1): 122– , '68.

390. Boakes, R. J., et al.
Effects of noradrenaline and its analogues on brain stem neurones.
J. Physiol. (London) **201** (1): 20P– , '69.

391. Breese, G. R., et al.
Metabolism of some phenylethylamines and their β-hydroxylated analogs in brain.
J. Pharmacol. Exp. Ther. **165** (1): 9–13, '69.

392. Browning, E. T. & Schulman, M. P.
[^{14}C] Acetylcholine synthesis by cortex slices of rat brain.
J. Neurochem. **15** (12): 1391– , '68.

393. Carlsson, A., et al.
Demonstration of extraneuronal 5-hydroxytryptamine accumulation in brain following menbrane-pump blockade by chlorimipramine.
Brain Res. **12** (2): 456– , '69.

394. Chase, T. N., et al.
Release of [^{3}H] serotonin from brain slices.
J. Neurochem. **16** (4): 607– , '69.

395. Ciaranello, R. D., et al.
Enzymatic synthesis of adrenaline in mammalian brain.
Nature **221** (5178): 368–9, '69.

396. Collier, B. & Lang, C.
The metabolism of choline by a sympathetic ganglion.
Canad. J. Pjysiol. Phamacol. **47** (2): 119–126, '69.

397. Collier, B. & MacIntosh, F. C.
The source of choline for acetylcholine synthesis in a sympathetic ganglin.
Canad. J. Physiol. Phamacol. **42** (2):127–135, '69.

398. Comis, S. D. & Davies, W. E.
Acetylcholine as a transmitter in the cat auditory system.
J. Neurochem. **16** (3): 423–9, '69.

399. Cox, B. & Potkonjak, D.
The relationship between tremore and change in brain acetylecholine concentration produced by injection of tremorine or oxotremorine in the rat.
Brit. J. Pharmacol. **35** (2): 295– , '69.

400. Dahlström, A.
Effect of colchicine on transport of amine storage granules in sympathetic nerves of rat.
Europ. J. Pharmacol. **5** (1): 111–3, '68-'69.

401. de Iraldi, A. P. & Gueudet, R.
Catecholamine and serotonin in granulated vesicles of nerve endings in the pineal gland of the rat.
Int. J. Neuropharmacol. 8 (1): 9– , '69.

402. De Schaepdryver, A. F., et al.
Brain monoamines and adrenocortical actioation. (Proc.)
Brit. J. Pharmacol. **34** (3): 663p.–664p., '68.

403. Diamond, I. & Kennedy, E. P.
Carrier-mediated transport of choline into synaptic nerve endings. (Proc.)
Neurology **19** (3): 298–299, '69.

404. Eccleston, D., et al.
5-Hydroxytryptamine metabolism in brain and liver slices and the effects of ethanol.
J. Neurochem. **16** (2): 274–6, '69.

405. Eccleston, D., et al.
Release of 5-hydroxytryptamine and 5-hydroxyindol-3-ylacetic acid in the forebrain by stimulation of mid-brain raphé.
J. Physiol. (London) **201** (1): 22P– , '69.

406. Euler, U. S. v. & Lishajko, F.
Inhibitory action of adrenergic blocking agents on reuptake and net uptake of noradrenaline in nerve granules.
Acta Physiol. Scand. **74** (3): 501–506, '68.

407. Fellman, J. H.
A chemical method for the determination of acetylcholine: Its application in a study of presynaptic release and a choline acetyltransferase assay.
J. Neurochem. **16** (2): 135–143, '69.

408. Geen, A. R. & Curzon, G.
Decrease of 5-hydroxytryptamine in the brain provoked by hydrocortisone and its prevention by allopurinol.
Nature **220** (5172): 1095, '68.

409. Geffen, L. B., et al.
Is there bidirectional transport of noradrenaline in sympathetic nerves?
J. Neurochem. **16** (4): 469– , '69.

410. Gfeller, E., et al.
Regional differences in [^{3}H] noradrenalin accumulation in monkey brain (Macaca irus).
Brain Res. **11** (1): 263– , '68.

411. Giacalone, E. & Kostowski, W.
5-Hydroxytryptamine and 5-hydroxyindoleacetic acid in rat brain: effect of some psychotropic drugs and electrical stimulation of varions forebrain areas. (Proc.)
Brit. J. Pharmacol. **34** (3): 662p.–663p., '68.

412. Goldstein, M., et al.
Studies of amines in the striatum in monkeys with nigral lesions. The disposition, biosynthesis and metabolites of [^{3}H] dopamine and [^{14}C] serotonin in the striatum.
J. Neurochem. **16** (4): 645– , '69.

413. Goodwin, J. S., et al.
Effect of bromide on evoked release of monoamines from brain slices and intact atria.
Nature **221** (5180): 556–7, '69.

414. Guth, P. S. & Amaro, J.
A possible cholinergic link in olivo-cochlear inhibition.
Int. J. Neuropharmacol. 8 (1): 49– , '69.

415. Gwyn, D. G., et al.
Evidence for ascending and descending cholinergic fibres in cat spinal cord.
J. Physiol. (London) **201** (1): 23P– , '69.

416. Häggendal, J. & Malmpors, T.
The effect of nerve stimulation on the uptake of noradrenaline into the adrenergic nerve terminals.
Acta Physiol. Scand. **75** (1–2): 28–32, '69.

417. Häggendal, J. & Malmpors, T.
The effect of nerve stimulation on catecholamines taken up in adrenergic nerves after reserpin pretreatment.
Acta Physiol. Scand. **75** (1–2): 33–38, '69.

418. Hammar, C. G., et al.
Identification of acetylcholine in fresh rat brain.
Nature **220** (5170): 915– , '68.

419. Heilbronn, E.
The effect of phospholipases on the uptake of atropine and acetylcholine by slices of mouse brain cortex.
J. Neurochem. **16** (4): 627– , '69.

420. Huszti, Z. & Borsy, J.
Comparative studies on the oxidation of 5-hydroxytryptamine and 3,4-dimethoxyphyenylethylamine in rat, dog and human brain.
J. Neurochem. **15** (12): 1407– , '68.

421. Johnson, E. S., et al.
Adrenergic responses in the cerebral cortex.
J. Physiol. (London) **201** (1): 21p– , '69.

422. Katz, R. I., et al.
Evoked release of norepinephrine and serotonin from brain slices: inhibition by lithium.
Science **162** (3852): 466– , '68.

423. Mandell, A. J., et al.
Neurochemical correlates of the imipramine antagonism of the behavioral effects of norepinephrine.
Life Sci. **7** (23): 1317– , '68.

424. Matsuda, Y.
Effect of some sympathomimetic amines administered intraventricularly on rabbit's EEG.
Jap. J. Pharmacol. **19** (1): 102– , '69.

425. Muelheims, G. H., et al.
Catecholamine release after spinal cord section.
Proc. Soc. Exp. Biol. Med. **130** (2): 574– , '69.

426. Naumenko, E. V.
Hypothalamic chemoreactive structures and the regulation of pituitary–adrenal function. Effect of local injections of norepinephrine, carbachol and serotonin into the brain of guinea pigs with intact

brains and after mesencephalic transection.
Brain Res. **11** (1): 1– , '68.

427. Navon, S. & Agrest, A.
Acetylcholine content in central nervous system of rats with chronic hypercapnia.
Life Sci. **7** (23): 1271– , '68.

428. Nybäck, H., et al.
Accumlation and disappearance of catecholamines formed from tyrosine-^{14}C in mouse brain; effect of some psychotropic drugs.
Europ. J. Pharmacol. **4** (4): 395– , '68.

429. Nybäck, H. & Sedvall, G.
Regional accumulation of catecholamines formed from tyrosine-^{14}C in rat brain: effect of chlorpomazine.
Europ. J. Pharmacol. **5** (3): 245– , '69.

430. Persson, T. & Roos, B.-E.
Acid metabolites from monoamines in cerebrospinal fluid of chronic schizophrenics.
Brit. J. Psychiat. **115** (518): 95–98, '69.

431. Phillis, J. W., et al.
Depression of spinal motoneurones by noradrenaline, 5-hydroxytryptamine and histamine.
Europ. J. Pharmacol. **4** (4): 471– , '68.

432. Pohorecky, L. A., et al.
Enzymatic conversion of norepinephrine to epinephrine by the brain.
J. Pharmacol. Exp. Ther. **165** (2): 190– , '69.

433. Quay, W. B.
Differences in circadian rhythms in 5-hydrorytryptamine according to brain region.
Am. J. Physiol. **215** (6): 1448– , '68.

434. Reis, D. J., et al.
A circadian rhythm of norepinephrine regionally in cat brain: its relationship to environmental lighting and to regional diurnal variations in brain serotonin.
J. Pharmacol. Exp. Therap. **164** (1): 135– , '68.

435. Rutledge, C. O. & Jonason, J.
The rate of metabolism of dopamine, dihydroxyphemylzcetic acid and methoxytyramine in rabbit brain in vitro.
Europ. J. Pharmacol. **4** (3): 264– , '68.

436. Schildkraut, J. J., et al.
The effects of lithium salts on the turnover and metabolism of norepinephrine in rat brain.
Psychopharmacologia **14** (2): 135– , '69.

437. Schweitzer, J. W. & Friedhoff, A. J.
A new method for the determination of labeled dopamine, norepinephrine and their metabolites in rat brain homogenate.
Life Sci. **8** (4): 173– , '69.

438. Sharman, D. F.
Gas chromatographic evidence for the presence of glycol metabolites of catecholamines in brain tissue. (Proc.)
J. Physiol. **200** (1): 33p–35p, '69.

439. Slater, P. & Rogers, K. J.
The effects of triethylcholine and hemicholinium-3 on tremor and brain acetylcholine.
Europ. J. Pharmacol. **4** (4): 390– , '68.

440. Smookler, H. H., et al.
Relationships between brain catecholamine synthesis, pituitary adrenal function and the production of hypertension during prolonged exposure to environmental stress.
Int. J. Neuropharmacol. **8** (1): 33– , '69.

441. Snyder, S. H., et al.
Kinetics of ^{3}H-norepinephrine accumulation into slices from different regions of the rat brain.
J. Pharmacol. Exp. Therap. **164** (1): 90– , '68.

442. Snyder, S. H. & Coyle, J. T.
Regional differences in H^{3}-norepinephrine and H^{3}-dopamine uptake into rat brain homogenates.
J. Pharmacol. Exp. Ther. **165** (1): 78–86, '69.

443. Symposium on 5-hydroxytryptamine. Helsinki, Mar. 29–30, 1968.
Ann. Med. Exp. Biol. Fenn. **46** (3): pt. 2 359–519, '68.

444. Takeno, K., et al.
Bound acetylcholine in the nerve ending particles.
J. Neurochem. **16** (1): 47–52, '69.

445. Thierry, A. M., et al.
Effect of stress on the metabolism of noradrenaline, dopamine and serotonin

(5HT) in the central nervous system of the rat. (II) Modifications of serotonin metabolism.
Europ. J. Pharmacol. **4** (4): 384– , '68.

446. Ungerstedt, U.
6-hydroxy-dopamine induced degeneration of central mono-amine neurons.
Europ. J. Pharmacol. **5** (1): 107–110, '68-'69.

447. Uretsky, N. J. & Iversen, L. L.
Effects of 6-hydroxydopamine on noradrenaline-containing neurones in the rat brain.
Nature **221** (5180): 557–559, '69.

448. Van Winkle, E. & Friedhoff, A. J.
Enzymatic conversion of N-acetyldopamine to normal and isomeric N-acetylmethoxytyramine by rat liver in vitro.
Life Sci. **7** (22): 1135– , '68.

449. Vas, C. J., et al.
Effects of anticholinergic drugs on epileptic activity from amygdala and frontal cortex: A comparative study in monkeys.
Neurology **19** (3): 234– , '69.

450. Viala, D. & Buser, P.
The effects of DOPA and 5-HTP on rhythmic efferent discharges in hind limb nerves in the rabbit.
Brain Res. **12** (2): 437– , '69.

451. Vogel, W. H., et al.
Activities of enzymes involved in the formation and destruction of biogenic amines in various areas of human brain.
J. Pharmacol. Exp. Ther. **165** (2): 196– , '69.

452. Vogt, M.
Physiological aspects of cholinergic and monoaminergic neurons.
J. Physiol. (London) **201** (1): 3P– , '69.

453. Volicer, L. & Reid, W. D.
Effect of drugs on turnover rate of heart norepinephrine.
Int. J. Neuropharmacol. **8** (1): 1– , '69.

454. Weiner, N. & Rabadjija, M.
The regulation of norepinephrine synthesis. Effect of puromycin on the accelerated synthesis of norepinephrine associated with nerve stimulation.
J. Pharmacol. Exp. Therap. **164** (1): 103– , '68.

455. Wise, C. D.
Facilitation of brain self-stimulation by central administration of norepinephrine.
Science **163** (3864): 299– , '69.

IX. Neuro- & Psychotropic Drugs (456-508)

456. Aghajanian, G. K. & Weiss, B. L.
LSD blocks the increase in rat brain serotonin turnover induced by an elevated ambient temperature.
Nature **220** (5169): 795– , '68.

457. Anden, N.-E.
Effect of reserpin and other drugs on the monoamine metabolism with special reference to the CNS.
Ann. Med. Exp. Biol. Fenn. **46** ( ): 361–6, '68.

458. Armitage, A. K., et al.
Effects of nicotine on electrocortical activity and acetylcholine release from the cat cerebral cortex.
Brit. J. Pharmacol. **35** (1): 152–160, '69.

459. Barnett, A., et al.
Activity of antihistamines in laboratory antidepressant tests.
Int. J. Neuropharmacol. **8** (1): 73– , '69.

460. Boakes, R. J., et al.
Agonistic and antagonistic effects of alhamethylnoradrenaline at central receptors.
Brain Res. **11** (2): 450– , '68.

461. Brodie, B. B., et al.
Interaction between desipramine, tyramine, amphetamine at adrenergic neurones.
Brit. J. Pharmacol. **34** (3): 648– , '68.

462. Brown, A. M. & Julian, T.
The body temperature response of two inbred strains of mice to handling, saline and amphetamine.
Int. J. Neuropharmacol. **7** (6): 531– , '68.

463. Brownlow, E. K. & Heath, H.
Biochemical changes in β, β'-iminodipropionitrile-treated rat brain and preven-

tion of toxicity by ethionine.
J. Neurochem. **16** (4): 567– , '69.

464. Cowie, A. L., et al.
Mode of action of morphine-like drugs on autonomic neuro-effectors.
Nature **220** (5171): 1040– , '68.

465. Davidoff, R. A. & Aprison, M. H.
Picrotoxin antagonism of the inhibition of interneurons by glycine.
Life Sci. 8 ( ): 107– , '69.

466. Evans, M. H.
Spinal reflex actioity during exposure to saxitoxin and tetrodotoxin. (Proc.)
Brit. J. Pharmacol. **34** (3): 664p.–665p., '68.

467. Faith, M. E., et al.
Differences in the duration of reserpine action in the rat depending on the measure employed.
Int. J. Neuropharmacol. **7** (6): 575– , '68.

468. Fauroye, A. & Pind
Bufotenin in the urine of schizophrenics and normal persons.
Nature **220** (5166): 489– , '68.

469. Festoff, B. W. & Appel, S. H.
The effect of diphenylhydantoin on synaptosome metabolism. (Proc.)
Neurology **19** (3): 300, '69.

470. Freibergs, V., et al.
The effect of chlorpromazine on concept learning in hyperactive children under two conditions of reinforcement.
Psychopharmacologia **13** (4): 299– , '68.

471. Garg, M.
The effects of some central nervous system stimulant and depressant drugs on rearing activity in rats.
Psychopharmacologia **14** (2): 150– , '69.

472. Giorgi, G., et al.
Pentobarbitone distribution in various regions of the rat brain in relation to the kinetics of its effect. (Proc.)
Brit. J. Pharmacol. **34** (3): 667p., '68.

473. Gumulka, W. & Szreniawski, Z.
The effect of 1,1-dimethyl-4-phenylpiperazinium iodide on transmission in the superior cervucal ganglion of the cat.
Int. J. Neuropharmacol. **7** (6): 511– , '68.

474. Held, I., et al.
Metabolic effects of azaserine in rat brain.
J. Neurochem. **16** (4): 537– , '69.

476. Hemsworth, B. A. & Neal, M. J.
The effect of central stimulant drugs on acetylcholine release from rat cerebral cortex.
Brit. J. Pharmacol. **34** (3): 543– , '68.

476. Hendley, E. D. & Snyder
Relations between antidepressant activity and inhibition of noradrenaline uptake.
Nature **220** (5174): 1330–1331, '68.

477. Hofman, W. W.
Caffeine effects on transmitter depletion and mobilization at motor nerve terminals.
Amer. J. Physiol. **216** (3): 621– , '69.

478. Holtzman, D., et al.
1-Δ^9-Tetrahydrocannabinol: neurochemical and behavioral effects in the mouse.
Science **163** (3874): 1464– , '69.

479. Kadzielawa, K., et al.
The potentiating influence of imipramine on ganglionic effects of catecholamines.
Int. J. Neuropharmacol. **7** (6): 517– , '68.

480. King, L. J. & Carl, J.
Effects of antiepileptic drugs on brain energy reserves during convulsion.
J. Neurochem. **16** (4): 637– , '69.

481. Kordas, M.
The effect of atropine and curarine on the time course of the end-plate potential in frog sartorius muscle.
Int. J. Neuropharmacol. **7** (6): 523– , '68.

482. Kosterlitz, H. W., et al.
Non-specific inhibitory effects of morphine-like drugs on transmission in the superior cervical ganglion and guinea-pig isolated ileum. (Proc.)
Brit. J. Pharmacol. **34** (3): 691p.–692p., '68.

483. Lee, S. I. & Bass, N. H.
Blood and regional brain concentrations of diphenylhydantoin during acute intoxication. (Proc.)
Neurology **19** (3): 300, '69.

484. Maickel, R. P., et al.
Correlation of brain levels of drugs with behavioral effects.
J. Pharmacol. Exp. Ther. **165** (2): 216– , '69.

486. Marriott, A. S.
The effects of amphetamine, caffeine and methylphanidate on the locomotor ac-

tivity of rats in an unfamiliar environment.
Int. J. Neuropharmacol. 7 (6): 487– , '68.

486. Martin, W. R. & Eades, C. G.
Interactions between norepinephrine antagonists and potentiators (chlorpromazine, chlorpromazine sulfoxide and imipramine) and sympathetic amines (amphetamethoxamine) on the flexor reflex of the chronic spinal dog.
Int. J. Neuropharmacol. 7 (6): 493– , '68.

487. Matsuzaki, M.
Differential effects of Na-butyrate and physostigmine on brain stem activities of para-sleep.
Brain Res. 11 (1): 251– , '68.

488. Mazel, P. & Bush, M. T.
Brian barbital levels and anesthesia as influenced by physostigmine and epinephrine.
Biochem. Pharmacol. 18 (3): 579– , '69.

489. Miyasaka, M. & Domino, E. F.
Neuronal mechanisms of katamine-induced anesthesia.
Int. J. Neuropharmacol. 7 (6): 557– , '68.

490. Mulé, S. J.
Inhibition of phospholipid-facilitated calcium transport by central nervous system-acting drugs.
Biochem. Pharmacol. 18 (2): 339– , '69.

491. Nakai, Y. & Domino, E. F.
Differential effects of pentobarbital, ethyl alcolhol, and chlorpromazine in modifying reticular facilitation of visually evoked responses in the cat.
Int. J. Neuropharmacol. 8 (1): 61– , '69.

492. Oldendorf, W. H., et al.
The affinity of ventricular ^{99m}Tc-pertechnetate and iodide for chroid plexus. (Proc.)
Neurology 19 (3): 301, '69.

493. Oliverio, A.
Effects of nicotine and strychnine on transfer of avoidance learing in the mouse.
Life Sci. 7 (22): 1163– , '68.

494. Ordy, J. M., et al.
Haloperidol and electric shock interaction effects on tremors and on catecholamine concentrations in the caudate nucleus of the squirrel monkey.
Brain Res. 12 (2): 427– , '69.

495. Pepeu, G. & Bartolini, A.
Effect of psychoactive drugs on the output of acetylcholine from the cerebral cortex of the cat.
Europ. J. Pharmacol. 4 (3): 254– , '68.

496. Prockop, L. D.
Clearance of amphotericin B-C^{14} from cerebrospinal fluid.
Life Sci. 8 (1): 79– , '69.

497. Ray, A. K. & Ghosh, J. J.
Changes in the hypothalamo-neurohypophysical neuro-secretory materials of rats during different phases of morphine administration.
J. Neurochem. 16 (1): 1–5, '69.

498. Schneider, G. & Schneider, G.
On the absorption and metabolism of imipramine by the rat brain after single and repeated doses.
Psychopharmacologia 14 (1): 74– , '69.

499. Silvestrini, B., et al.
Pharmacological propertics of AF1161, a new psychotropic drug.
Int. J. Neuropharmacol. 7 (6): 587– , '68.

500. Taborsky, R. G.
Indoxyl derivatives: potential psychotropic metabolites.
Int. J. Neuropharmacol. 7 (6): 483– , '68.

501. Takagi, H., et al.
Electroencephalographic studies on morphine dependence in rat.
Jap. J. Pharmacol. 19 (1): 174– , '69.

502. Tarby, T. J., et al.
Effects of tetrodotoxin on impedance in normal and asphyxiated cerebral tissue.
Exp. Neurol. 22 (4): 517–531, '68.

503. Taylor, D. B., et al.
The mode of action of morphine on the uptake of carbachol and decamethonium by slices of rat cerebral cortex.
J. Pharmacol. Exp. Ther. 165 (2): 310– , '69.

504. Toman, J. E. P. & Sabelli, H. C.
Neuropharmacology of earthworm giant fibers.
Int. J. Neuropharmacol. 7 (6): 543– , '68.

505. Uehling, B. S.
Effects of chronic d-amphetamine sulfate

administration during development in rats.
Int. J. Neuropharmacol. 8 (1): 43– , '69.

506. Ungar, G. & Galvan, L.
Conditions of transfer of morphine tolerance by brain extracts.
Pro. Soc. Exp. Biol. Med. **130** (1): 287–291, '69.

507. Vizi, E. S., et al.
Internaction between phanylalkylamine derivatives and reserpine.
Int. J. Neuropharmacol. **7** (6): 503– , '68.

508. Way, E. L., et al.
Morphine tolerance, physical dependence, and synthesis of brain.
Science **162** (3859): 1290– , '68.

X. Subcellular Units (509-520)

509. Dekirmenjian, H. & Brunngraber, E. G.
Distribution of protein-bound N-acetylneuraminic acid in subcellular particulate fraction prepared from rat whole brain.
Biochim. Biophys. Acta **177** (1): 1– , '69.

510. Gregson, N. A. & Williams, P. L.
A comparative study of brain and liver mitochondria from new-born and adult rats.
J. Neurochem. **16** (4): 617– , '69.

511. Hems, D. A.
Incubation of cerebral microsomes with [^{3}H] acetyl phosphate.
J. Neurochem. **16** (2): 277–280, '69.

512. Kishimoto, K., et al.
Comparison of the fatty acids of lipids of subcellular brain fractions.
Neurochem. **16** (3): 397–404, '69.

513. Koch, R. B.
Fractionation of olfactory tissue homogenates. Isolation of a concentrated plasma membrane fraction.
J. Neurochem. **16** (2): 145–157, '69.

514. Lapetina, E. G., et al.
^{32}P incorporation into different membranous structures separated from rat cerebral cortex.
J. Neurochem. **16** (1): 101–6, '69.

515. Marchbanks, R. M.
The uptake of [^{14}C] choline into synaptosomes in vitro.
Biochem. J. **110** (3): 533– , '68.

516. Neidle, A. et al.
The heterogeneity of rat brain mitochondria isolated on continuous sucrose cradients.
J. Neurochem. **16** (2): 225–234, '69.

517. Robinson, J. D.
Sodium-induced efflux of calcium from brain microsomes. Biphasic effect of sulphydryl reagents.
J. Neurochem. **16** (4): 587– , '69.

518. Sellinger, O. Z. & Borens, R. N.
Zonal density gradient electrophoresis of intracellular membranes of brain cortex.
Biochim. Biophys. Acta **173** (2): 176– , '69.

519. Sellinger, O. Z., et al.
The action of trypsin and neuraminidase on the synaptic membranes of brain cortex.
Biochim. Biophys. Acta **173** (2): 185– , '69.

520. Spyropoulos, C. S.
Ion-exchange properties of nerve membrane.
Fed. Proc. **27** (6): 1252– , '68.

XI. Enzymes & Co-factors (521-578)

521. Atkinson, A., et al.
Maganese activation of a (Na^{+}–K^{+})-dependent ATPase in pig brain microsomes.
Biochim. Biophys. Acta **167** (2): 469– , '68.

522. Banks, P., et al.
The re-distribution of cytochrome oxidase, noradrenaline and adenosine triphosphate in adrenergic nerves constricted at two points.
J. Physiol. **200** (3): 745–762, '69.

523. Berg, S. W. & Maickel, R. P.
A simplified method for determination of brain acetylcholinesterase activity.
Life Sci. 7 (22): 1197– , '68.

524. Bowen, D. M. & Radin, N. S.
Hydrolase activities in brain of neurological mutants: cerebroside galactosidase, nitrophenyl galactoside hydrolase, nitrophenyl glucoside hydrolase and sulphatase.
J. Neurochem. **16** (3): 457–460, '69.

525. Bowen, D. M. & Radin, N. S.
Cerebroside galactosidase: A method for determination and comparison with other lysosomal enzymes in developing rat brain.
J. Neurochem. **16** (4): 501– , '69.

526. Bulcke, J. A. & Sherwin, A. L.
Immunological differentiation of creatine kinase isozymes in skeletal muscle and brain. (Proc.)
Neurology **19** (3): 299, '69.

527. Chaudhary, K. D., et al.
Effect of ecdysone on glutamic decarboxylase in rat brain.
Experientia **25** (3): 250–1, '69.

528. Choy, A. E. & Cravioto, H.
A study of aryl sulfatase and acid phosphatase in the developing nervous system of the rat.
J. Histochem. Gytochem. **16** (9): 582–9, '68.

529. Clendenon, N. R., et al.
Experimental alterations of the bound state of cerebral lysosomal enzymes. (Proc.)
Neurology **19** (3): 298, '69.

530. Consolo, S., et al.
Monoamine oxidase in sympathetic ganglia of the cat.
Acta Physiol. Scand. **74** (4): 513–520, '68.

531. Curzon, G. & Green, A. R.
Rat liver tryptophan pyrolase activity and brain 5-hydroxytryptamine. (Proc.)
Biochem. J. **111** (3): 15P., '69.

532. Dabich, D., et al.
Purification and properties of esterases characteristic of adult rat brain.
Biochem. J. **110** (4): 713– , '68.

533. Dawson, A. P. & Thorne, C. J. R.
Preparation and some properties of L-3-glycerophosphate dehydrogenase from pig brain mitochondria.
Biochem. J. **111** (1): 27–34, '69.

534. Dousa, T. & Rychlik, I.
Adenyl cyclase and adenosine 3′,5′-cyclic phosphate phosphodiesterase in the receptor tissues of neurohypophysial hormones.
Life Sci. **7** (20): 1039– , '68.

535. Estrugo, S. F., et al.
Isolation and properties of some molecular species of human brain esterases.
Biochim. Biophys. Acta **171** (2): 265– , '69.

536. Formby, B.
The topographic and subcellular distribution of some cation-activated phosphohydrolases in rat brain.
Acta Neurol. Scand. **44** (5): 561– , '68.

537. Foxwell, C. J., et al.
Preparation of isolated multiple forms of rabbit brain aldolase.
Biochem. J. **110** (4): 721– , '68.

538. George, H. & Gabay, S.
Brain aromatic aminotransferase. I. Purification and some properties of pig brain L-phenylalanine-2-oxoglutarate aminotransferase.
Biochim. Biophys. Acta **167** (3): 555– , '68.

539. Ghosh, S. & Ghosh, J. J.
Histochemical demonstration of acid ribonuclease in the central nervous system.
J. Neurochem. **16** (3): 349–353, '69.

540. Gielen, W. & Harpprecht, V.
The neuraminidase activity in some regions of the bovine brain.
Hoppe-Syler's Z. Physiol. Chem. **350** (2): 201– , '69.

541. Goldfarb, P. S. G. & Rodnight, R.
The role of endogenous cations in the Na^+-K^+-Mg^{2+}-effected adenosine triphosphatase of cerebral microsomes. (Proc.)
Biochem. J. **111** (3): 22p–23p, '69.

542. Graham, L. T., Jr. & Aprison, M. H.
Distribution of some enzymes associated with the metabolism of glutamate, aspartate, γ-aminobutyrate and glutamine in cat spinal cord.
J. Neurochem. **16** (4): 559– , '69.

543. Harmony, T., et al.
(Na-K)-ATPase activity in experimental

epileptogenic foci.
Brain Res. **11** (3): 672–680, '68.

544. Iversen, L. L. & Synder, S. H.
Different populations of synaptosomes in brain homogenates.
Nature **220** (5169): 796– , '68.

545. Iversen, L. L., et al.
Monoamine oxidase and catechol-O-methyl transferase activities in cat nicitating membrane and rat and guinea-pig vas deferens after sympathectomy. (Proc.)
Brit. J. Pharmacol. **34** (3): 693p.–694p., '68.

546. Iwata, H., et al.
Pharmacological significances of peptidase and proteinase in the brain (report I)-Enzymatic inactivation of bradykinin in rat brain.
Biochem. Pharmacol. **18** (1): 119–28, '69.

547. Jatzkewitz, H. & Mehl, E.
Cerebroside-sulphatase and arylsulpahatase —A deficiency in metachromatic leukodystrophy (ML).
J. Neurochem. **16** (1): 19–28, '69.

548. Johnson, M. K.
An enzyme in hen brain hydrolysing phenylacetate: a possible connection with the delayed neurotoxic effect of some organophosphorus compounds.
Biochem. J. **110** (2): 13P– , '68.

549. Johnston, G. A. R. & Vitali, M. V.
Glycine-producing transaminase activity in extracts of spinal cord.
Brain Res. **12** (2): 471– , '69.

550. Kása, P. & Silver, A.
The correlation between choline acetyltransferase and acetylcholinesterase activity in different areas of the cerebellum of rat and guinea pig.
J. Neurochem. **16** (3): 389–396, '69.

551. Keutel, H. J., et al.
Studies on adenosine triphosphate transphosphorylases. VII. Isolation of the crystalline adenosine triphosphate-creatine transphosphorylase from calf brain.
Biochemistry. **7** (12): 4283–90, '68.

552. Kling, A., et al.
Regional development of acetylcholinesterase activity in the maternally reared and maternally deprived cat.
Int. J. Neuropharmacol. **8** (1): 25– , '69.

553. Klingman, G. I. & Klingman, J. D.
Cholinesterases of rat sympathetic ganglia after immunosympathectomy, decentralization and axotomy.
J. Neurochem. **16** (2): 261–8, '69.

554. Kluge, H. & Wieczorek, V.
Der Einfluss von Askorbinsäure auf die zytoplasmatische AMP-aminohydrolase des Rattenhirns.
Biochim. Biophys. Acta **167** (3): 621– , '68.

555. Koch, R. B.
Chlorinated hydrocarbon insecticides: Inhibition of rabbit brain ATPase activities.
J. Neurochem. **16** (2): 269–270, '69.

556. Kraus, P.
Substrate induction of mouse-brain L-glutamate decarboxylase.
Hoppe-Seylers Z. Physiol. Chem. **439** (10): 1425– , '68.

557. Kuzuya, H. & Nagatsu, T.
Flavins and monoamine oxidase activity in the brain, liver and kidney of the developing rat.
J. Neurochem. **16** (1): 123–5, '69.

558. LA Torre, J. C.
Effect of differential environmental enrichment on brain weight and on acetylcholinesterase and cholinesterase activities in mice.
Exp. Neurol. **22** (4): 493–503, '68.

559. Leibovitz, Z. & Gatt, S.
Isolation of lysophospholipase, free of phospholipase activity, from rat brain.
Biochim. Biophys. Acta **164** (2): 439– , '68.

560. Marchisio, P. C.
Choline acetyltransferase (ChAc) activity in developing chick optic centres and effects of monolateral removal of retina at an early embronic stage and at hatching.
J. Neurochem. **16** (4): 665– , '69.

561. Mazlen, R. G., et al.
The control of L-glutamine-D-fructose-6-phosphate amidotransferase in bovine retina.
Biochim. Biophys. Acta **171** (2): 352– , '69.

562. Moore, C. L.
Purification and properties of two hexokinases from beef brain.
Arch. Biochem. Biophys. **128** (3): 734–744,

'68.

563. Namba, T. & Grob, D.
Cholinesterase activity of the motor end-plate in isolated muscle membrane.
J. Neurochem. **15** (12): 1445– , '68.

564. O'Brien, P. J. & Muellenberg, C. G.
Properties of glycosyl transfer enzymes of bovine retina.
Biochim. Biophp. Acta **167** (2): 268– , '68.

565. Onicescu, D. & Cuida, I.
Two particular histoenzymological aspects at the Purkinje cell level in the cerebellum.
J. Neurochem. **16** (3): 467– , '69.

566. Peters, D. A. V., et al.
The distribution of tryptophan hydroxylase in cat brain.
J. Neurochem. **15** (12): 1431– , '68.

567. Rosenblum, W. I.
Neuropathologic changes in a case of sulfite oxidase deficiency.
Neurology **18** (12): 1187– , '68.

568. Saifer, A., et al.
Lactate dehydrogenase isoenzyme distribution in the cerebral sphingolipidoses and other neurological disorders.
Neurology **19** (2): 147– , '69.

569. Smith, A. L., et al.
Induction of brain D(—)-β-hydroxybutyrate dehydrogenase activity by fasting.
Science **163** (3862): 79–81, '69.

570. Tapia, R. & Awapara, J.
Effects of various substituted hydrazones and hydrazines of pyridoxal-5′-phosplate on brain glutamate decarboxylase.
Biochem. Pharmacol. **18** (1): 145–52, '69.

571. Thompson, M. F. & Bachelard, H. S.
Solubilization of mitchondrial hexokinase from ox cerebral cortex with Triton X-100. (Proc.)
Biochem. J. **111** (3): 18P–19P, '69.

672. Turpaev, T., et al.
Cholinesterase of squid optical ganglia.
Europ. J. Biochem. **6** (1): 55– , '68.

673. Umaña, R.
Reevaluation of the method of kunitz for the assay of proteolytic activities in liver and brain homogenates.
Anal. Biochem. **26** (3): 430– , '68.

574. Wajda, I. J., et al.
Transglutaminase levels in brain and reticuloendothelial cells during allergic encephalomyelitis determined by a radiochemical method.
J. Neurochem. **16** (4): 653– , '69.

575. Waldron, H. A. & Gwyn, D. G.
Acetylcholinesterase activity in the red nucleus of the rat and its response to axotomy.
Brain Res. **13** (1): 146– , '69.

676. Weller, M. & Rodnight, R.
Protein kinase activity in a cerebral membrane fraction; effect of treatment with sodium iodide. (Proc.)
Biochem. J. **111** (3): 16P–17P, '69.

677. Wiechert, R. & Göllnitz, G.
Metabolic investigations of epileptic seizures: The activity of glutaminase and glutamine synthetase and ammonia metabolism before and during cerebral convulsions.
J. Neurochem. **16** (3): 317–322, '69.

678. Yue, R. H., et al.
Studies on adenosine triphosphate transphosphorylases. VIII. Homogeneity and physicochemical properties of the crystalline adenosine triphosphate-creatine transphosphorylase from calf brain.
Biochemistry **7** (12): 4291–8, '68.

XII. Metabolism (579-580)

579. Sanders, A. P., et al.
Protection of brain metabolism with glutathione, glutamate, gamma-aminobutyrate and succinate.
Proc. Soc. Exp. Biol. Med. **130** (3): 1021– , '69.

580. Thurston, J. H. & McDougal, D. B., Jr.
Effect of ischemia on metabolism of the brain of the newborn mouse.
Amer. J. Physiol. **216** (2): 348–352, '69.

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海外だより

滞独雑記—ドイツ人とカギ

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まったく彼らはカギが好きである。自宅用2本，研究所用本3本，しめて5本のカギはぼくにも必要だ。しかしドイツ人の同僚は30本から50本のカギを持ち歩くのである。いちいち聞いてまわったわけではないが，これはそうデタラメな数ではない。彼らがカギ穴の前にたたずむとき，横目でにらんで観察したのである。彼らはいちようにしかめ面をしている。一度でカギが開くことはめったにないからだ。こんなによく似ているのに開かないとは不思議ではないか。しかし，あきずに別のカギを探す彼らの風情は，内心カギの精巧な手答えを楽しんでいるのかもしれない。そしてこのような観察の機会が日にまず20回を下ることはなかったから，個人差を確率的に棄却するというかの高等な数学に手間どったとしても，1週間もあれば誰が何本くらいのカギを持っているか見当がつく。

もちろんカギ束は1個で足りるはずはない。まず半数くらいの人間はカギ束をふたつもっている。3個組もけっして例外的とはいえないのだが，さらに注意深く観察すると，カギ束の5個くらいはそう無理をしなくともポケットに押しこめるものだということがわかる。そこで使用に際してはカギ穴よりもまずカギ束の選択を誤らないことが肝要である。

ドイツ製のカギ束ほど魅力的な買物がそうザラにあるとは思えない。たかがカギ束くらいと軽蔑する人間には，趣味を語る資格はないのである。なにしろドイツのカギ束といえばバイエルンの優雅なためし革と強力無双のハンブルグ鋼を組合せたすばらしい作品が多い。なかでも評判が高いのは，10本くらいのカギが指先2本の操作で自在に革袋から出たり入ったりするバネ仕掛のワンタッチ式で，干柿のような形をしている。ぼくは中型の干柿を買って蝦蟇口代りに使っている。

研究所には5つの入口がある。人間が通過する数秒間を別にすれば，扉がひとつでも開いているという状況は絶対に想像できない。自由にどこからでも入りたい人は，5本のカギを持てばよいのである。しかし実際にこの特権を享受できるのはたぶん主任教授と掃除のオバサンの御両人に限られており，われわれは署名とひきかえに1本のカギをおしいただくという寸法になっている。そしてたとえば朝7時かっきりからの10分間に駐車場のはす向いの入口が3回開いたとすれば，人々は Frl. LERCHE と Herr HAHN，それに Dr. GUTESCHLAF の到着を言いあてることができるし，さらに10分後にモンキイセンターに通ずる渡り廊下の入口が2回開けば，やがて Frau ZAUBER のすてきな笑い声と Herr RÄTSEL の呪詛的なフランクフルト訛が聞えてくるに違いないと予言できるほど，カギの運用は高度にパタン化されているのである。

カギにたいするドイツ的心性のきびしさはまずかくのごとくだから，その彼らが理由もなしに30本からのカギを持ち歩くワケはない。

研究所に着いた翌日，これがプロフェソール用ですと案内された部屋は，東京の研究室の感覚からいうとぼくにはあまりにも広すぎるように思われた。しかし5台の机，4台の書棚，3台のキャビネットに2台のタイプと，その上およそぼくの欲しがりそうな器具，文房具の類が十二分以上に揃えられているのを認めたとき，思わずゼル・グートと口走ったことをぼくは否定するつもりはない。

しかし感性的な充足感がおおむね論理性に欠けることは止むをえない。部屋は真中に椅子を持出し，豊かな気分であたりを見廻していたぼくは，まもなく無数のウス気味悪い目が四方からぼくの出方をうかがっていることに気がついた。目，それはカギの穴である。実際このカギのつけ方は無茶ではないか。ひとびとの顔には目玉がある。面という面にはカギの目がある。これはおなじくらいに厳粛なことだ。この国の人間はエンピツ3本とケシゴム1個しか入らないような小さな木箱ですら，カギなしで売り出すことはしないだろう。万が一カギをつけ忘れればあたかもブレーキのないクルマを売りつけるくらいの罪業感におののかざるをえないのではあるまいか。ぼくはこのように考えた時，メマイにも似た強迫感を抑えきれなかったほどである。

かくしてたとえ3ケ月の仮住いとはいえ，もしぼくがすべてのカギを束ねるとしたら100本は軽く越えるだろう。ぼくがもしドイツに永住しようと志ざすならば，さしずめ一貫又くらいのカギをカバンにつめて持ち運ぶわけである。しかし豊かな合理精神にめぐまれたドイツ人の同僚が，カギの重みで背骨が曲るようなヘマをやるはずはない。カギの体制を温存したまま，いかにしてその合理性と重圧性を骨抜きにするかという問題は，見受けたところケーラー先生の知慧試験とおなじていどに高等な知的作業なのである。

カギを穴にさしこんだまま，クギの代りに使うという便法は，素朴であり，ひろく普及しているもののひとつである。たしかにカギに洋服をかける感じは，クギにひっかけるよりもしゃれている。廊下の両側に備えつけた整理棚のカギ穴にも，見渡すかぎり厳然とカギが林立しているのだが，これはもはやカギではなく，カギの形をした把手にすぎないことは明らかである。さらに1例をあげれば，ズッシリとしたこのドイツ製のカギをハプニング的あるいはノン・ハプニング的にカナヅチとして用いうるという事実も容易に証明できる。

しかしカギの重圧性はたんに背骨の問題にとどまらず，より精神的な色合いが強いから，これらの物理的解決法と平行してすぐれた自己暗示ないし集団暗示をほどこすことも大切である。

「たしかにこれはカギの形をしており，事実カギ穴にさしこまれている。しかしこれはカギではなく，把手なのである。だからカギ束に束ねる必要はないといえる。しかし万が一必要な場合には，正真正銘のカギとしても使えないわけではない。つまりこれはカギにしてカギにあらず，カギにあらずしてカギである。そういう絶対矛盾的自己同一の存在である」。いささか堅苦しいが，要は暗示といっても，ドイツ人の場合には没論理性があまり高すぎてはいけないということだ。

ところで暗示の有効性が暗示の内容や場のよしあしのみならず，もって生れた個人の素質にも関係することはひろく知られている。相当うまくかけたつもりでも，暗示の効く人と効かない人がでてくることは止むをえない。キキメの良い人にとっては，カギの携帯量を30本くらいに減らすことはそうむずかしい相談ではない。

しかしカギの合理性が元来イエスかノーかの二価論理に立脚していることはいうまでもないことだから，カギではあるがカギではないというような論法は，要するにカギの大群に抑え込まれた敗北主義的ギマン以外の何物でもない，といきまく人間がいてもけっして不思議ではない。このようなスジの人には，なまじっかのマジナイなどかけない方が本人のためでもある。心配しなくとも彼らは背骨が曲らない程度にカバンを重くして，のどかに歩き廻っているのである。そしてこのグループの中には意外と急進的な思想の持主がいるから，ある日突如として彼らがカバンを川へほうりこみ，代りにカギ体制断固粉砕・斗争勝利と書きつけた幟と棒1本を持ち歩くようになったとしても，けっして驚いてはならない。

ドイツには珍しい小春日和の午後，ぼくはロンドン大学から来ている神経生理学者の Dobbyn 君と茶飲み話をしていた。

「あの合理主義者のガンツ博士だが，彼は1日のうち3時間をカギの研究に過すそうだ。聞くところによると博士はしめて888本のカギの所有者であり，研究所はじまって以来の大記録だそうだが，ぼくが感心するのはなにもその本数だけではない。博士は午後3時のコーヒーを終るや否や，カギの数に過不足はないだろうか，曲ったりすり減ったりしたカギはないだろうかと，1本1本カバンからとり出して虫メガネで調べ上げるのだが，この際888本の作業に3時間しかかからないということは驚くべき錬達と言わねばならぬ。途中で多少手を抜いてもかまわないのかもしれないが，いずれにしろかかるガンツ型のツェレモニィはこのドイツ国においてもそうやたらと拝見できる代物ではない。まあしかしカギとはドアを開閉する道具であるというわれわれの認識は，いまや時代おくれの偏見なのかもしれない。たとえばカナヅチの代りにカギでカチンカチンとやるあのナイスな感じについて言うならば…」といいかけてコーヒーを一口のんだとき Dr. Ernst がさっそうと現われたので，われわれは急遽難解な英語に切り替えた。

「つまりだね，我々は我々のかかる自己ギマン的，いや自己ヒハン的思索の発展においてまず第一に日々増大しつつあるキィ・パワーのノン・ディジタル的修正主義とその未来像のなかでカナヅチにおける現存在的意義の喪失とその挫折的疎外感によって挑発された，いやされるかもしれないゲバルト的反動化の危険性を流動的に把握すると同時に安易なる日常性慣行に埋没したゲルマン系キイ体制における論理的瞞着性，いや暗示用論理の蠱惑的構成力とその多角的な有効性に関して現時点における自主的総括を試みる必然性の認識において合意に達したことを確認する必要があるね。さらにはエスカレートした次元におけるキイ体制と反キイ体制の…」

「魅力的だ。すばらしく素敵なネンブツだ。ぼくにはよく聞きとれなくて残念な点もあるがね」と総明なるドイツの同僚がきりこんだ。

「ともかくカナヅチについて一言すれば，たしか来年あたりミラノで開かれる万国ハンマー・コンクールでは，ロンドン・ペニイの優勝はまず間違いない」。エル

ンスト君の主張によれば，ロンドン・タイムスの「夕刊」にそう書いてあったというのである。

ペニイ銅貨の重量感については，「はじめてそれを手にしたとき，これはてっきり人間の脳天に穴をあけるために発明された，世にもソフィスティケーテドな器具にちがいないと信ずるまでに，5秒と躊躇する必要はなかった」とかの温厚なボケシュ氏が回顧した事実をぼくは知っていた。ドビン君には意味が判ったとは思われない。なぜなら彼はポカンと口を開けたまま二の句がつげなかったからである。しかし本当はあまりにもよく意味が判りすぎたために，ぼくの手前ポカンとしたふりをしたのかもしれない。（1969年7月）

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[資　料]

第2回国際神経化学会プログラム(ミラノ)

第2回国際神経化学会は R. Paoletti の会長のもとに，9月1日～5日，イタリーのミラノ大学で行なわれた。シンポジウム5題，round table discussion 10題，一般演題は31のセッションにわけられて，6つの会場で並行してすすめられるという大学会であった。第1回のストラスブルグの学会にくらべれると，2倍の規模であった。ここには，とりあえず，そのプログラムを資料としてのせておく。日本から学会に参加した方も何人かあったから，印象記を次の号にでも頂けると期待している。(編集部)

SYMPOSIA

1: Symposium on 'Biochemistry of simple neuronal models'

Organized by E. Costa (U.S.A.) and E. Giacobini (Sweden)

Part 1

'Biochemical Models to Study Transmitter Functions'

Chairman: E. Roberts (U.S.A.)
Co-Chairman: E. Costa (U.S.A.)
Reporters: G. Filogamo (Italy), R. McCaman (U.S.A.)

E. Giacobini (Sweden)
Biochemistry of Synaptic Plasticity Studied in Single Neurons

A. Dahlström (Sweden)
Axonal Flow of Amine Storage Granules

A. M. Poisner (U.S.A.)
Release of Transmitters from Storage

L. Iversen (England)
Neuronal Uptake Processes for Amines and Amino Acids

E. Roberts (U.S.A.)
Biochemistry of Synaptic Inhibition at the Cellular Level

L. Potter (England)
Acetylcholine Metabolism at Neuromuscular Junction

E. Costa (U.S.A.)
Models to Measure Transmitter Turnover Rates 'in vivo'

Part 2 A

'Cellular Approaches in Neurochemical Studies of Functional Activity'

Chairman: H. Hyden (Sweden)
Co-Chairman: E. Giacobini (Sweden)
Reporters: R. McCaman (U.S.A.), A. Giuditta and G. Toschi (Italy)

F. Matchinsky (U.S.A.)
Biochemical Organization Related to Function of Retina and Cochlear Duct

N. Chalazonitis (France)
Changes in Electrical Activity of Neurons During Intracellular pO_2, pCO_2, pH Transients Simultaneously Recorded

Part 2 B

'Cellular Approaches in Neurochemical Studies of Learning and Behavior'

P. Davison (U.S.A.)
Neurotubules and Neurofilaments: Possible Implications in Axoplasmic Flow

E. Koenig (U.S.A.)
Membrane Protein Synthesizing Machinery of the Axon

H. Hyden (Sweden)
Synthesis of Acidic Brain Proteins at the Establishment of New Behavior

H. Pinsker and E. Kandel (U.S.A.)
Cellular Analysis of Habituation and Dishabituation in Aplysia

2: Symposium on 'The hypothalamus and the control of anterior pituitary function: neurochemical aspects'

Organized by L. Martini (Italy)
Co-Chairmen: L. Martini, Milan (Italy)
J. Meites, East Lansing (U.S.A.)

J. Meites (U.S.A.)
Modification of Synthesis and Release of Hypothalamic Releasing Factors Induced by Exogenous Stimuli
M. Motta (Italy)
Modifications of Synthesis and Release of Hypothalamic Releasing Factors Induced by Endocrine Manipulations
K. Fuxe and T. Hokfelt (Sweden)
Participation of Central Monoaminergic Mechanism in the Regulation of the Hormone Secretion from the Pituitary Gland
J. Glowinski and C. Kordon (France)
Role of Catecholamines in the Control of Anterior Pituitary Function
R. Wurtman (U.S.A.)
Photic Control of HIOMT and Pineal Rhythms
F. Fraschini (Italy)
Role of Indoleamines in the Control of the Secretion of Pituitary Gonadotrophins
W. Lichtensteiger (U.S.A.)
Effects of Endocrine Manipulations on the Metabolism of Hypothalamic Neurotransmitters

3: Symposium on 'Receptors in the Central Nervous System,

Organized by E. De Robertis (Argentina)
S. L. Bonting (Netherland)
Recent Insights in the Photoreceptor Mechanism
J. M. Van Rossum and A. Cools (Netherland)
Drug Interaction on Dopamine Receptors in the Brain
D. R. Curtis (Australia)
Microphysiological Evidence for different Types of CNS Receptor
H. R. Mahler (U.S.A.)
Transmitters, Receptors and Protein Synthesis
L. L. Ross (U.S.A.) and V. Andreoli (Italy)
Biochemical and Morphological Studies of Adult and Embryonic Spinal Cord Subcellular Fractions
R. M. Marchbanks (England)
Some Criteria of the Specificity of Transmitter Binding
E. De Robertis (Argentina)
Isolation and Biochemical Nature of Receptors in the CNS
E. F. Soto (Argentina)
Separation and Properties of Proteolipids from Different Subcellular Structures of the CNS
L. C. Mokrasch (U.S.A.)
Incorporation of Biogenic Amines into Proteolipid Protein

4: Symposium on 'Biochemistry of Glial Cells'

Organized by A. Pope (U.S.A.)
A. Pope (U.S.A.)
Introductory Comments
H. Hydén (Sweden)
Metabolic Interactions between Neurons and Neuroglia
H. H. Hess, L. J. Embree and H. M. Shein (U.S.A.)
Biochemistry of Normal Astroglia and of Virally and Chemically Induced Astrocytomas Grown Subcutaneously
G. M. Lehrer and H. S. Maker (U.S.A.)
Energy and Carbohydrate Metabolism in Glial Cells and Glial Models
S. P. R. Rose (England)
The Biochemistry of Glial-Enriched Brain Fractions
M. E. Fewster and J. F. Mead (U.S.A.)
Lipid Composition of Glial Cells Isolated from Bovine White Matter
P. Mandel (France)
Distribution and Biosynthesis of Glial Cell Phosphatides
W. T. Norton and S. E. Poduslo (U.S.A.)
Isolation and Some Properties of Whole Neuroglial and Neuronal Perikarya from Rat Brain

5: Symposium on 'Selected Topics in Human Chemical Neuropathology'

Organized by W. W. Tourtellotte (U.S.A.)
Chairman: W. W. Tourtellotte, Ann Arbor (U.S.A.)
Secretary: C. Amaducci, Firenze (Italy)

Part 1

W. W. Tourtellotte (U.S.A.)
Introduction
R. O. Brady (U.S.A.)
Further Developments in Studies in Sphingoli-

pidoses: 'Missing Enzymes'
L. Svennerholm (Sweden)
Classification of Lipidoses
K. Adriaenseens and D. Karcher (Belgium)
Simple Biochemical Methods for the Study of Lipidoses
F. Plum, J. B. Posner and R. C. Collins (U.S.A.)
Cerebral Metabolism during Induced Seizures in Man and Animals
J. Folbergrova (Czechoslovakia)
Energy Metabolism in the Brain during Methionine-Sulfoximine Seizures
H. McIlwain (England)
Tests of Excitability Applied to Isolated Tissues from the Brain
H. M. Pappius (Canada)
The Chemistry and Fine Structure in Various Types of Cerebral Edema
V. Coxon and J. M. Waterhouse (England)
Glycerol Metabolism and its Relevance to Cerebral Edema

Part 2

Chairman: W. W. Tourtellotte, Ann Arbor (U.S.A.)
Secretary: C. Amaducci, Firenze (Italy)
O. Hornykiewicz (Canada)
The Metabolism of Dopamine in Human Parkinsonism
A. Carlsson (Sweden)
Dopamine in the Central Nervous System and the Rationale of L-DOPA in the Treatment of Parkinsonism
J. Cumings (England)
Lipid Profiles in Purified Myelin from Control and Multiple Sclerosis Brain Tissue
K. Suzuki (U.S.A.)
Lipid Composition in Purified Myelin in Various White Matter Diseases
F. J. Wolfgram, M. E. Fewster and J. F. Mead (U.S.A.)
The Amino Acids and Lipids of Myelin in Multiple Sclerosis
E. Eylar and G. Hashim (U.S.A.)
The Structure of the Encephalitogenic Protein of Myelin
A. Lowenthal (Belgium)
Cerebrospinal Fluid Gamma Globulins
H. Bauer (Germany)
Brain Gamma Globulins
R. W. P. Cutler (U.S.A.)
Synthesis of Gamma Globulin Inside the Blood Brain Barrier
Concluding Remarks—D. Tower (U.S.A.)

ROUND TABLES DISCUSSIONS

1: Round Table on 'Neurochemistry of brain tumors

Organized by P. Paoletti (Italy)
Moderator: W. H. Sweet, Boston (U.S.A.)
Participants:
M. S. Promyslov, Moscow (U.S.S.R.)
G. L. Viale, H. Kroh, G. Grosso and E. Viale, Genoa (Italy)
W. Kirsch, Denver (U.S.A.)
G. M. Lehrer and H. S. Maker, New York (U.S.A.)
E. Grossi Paoletti, R. Fumagalli and P. Paoletti, Milan (Italy)
D. Schiffer, Turin (Italy)
S. Mahaley, Durham (U.S.A.)
C. H. Tator and M. L. Schwartz, Toronto (Canada)

2: Round Table on 'Biochemistry of sleep'

Organized by A. Giuditta (Italy)
Participants:
M. Jouvet, Lyon (France)
S. S. Kety, Boston (U.S.A.)
D. Richter, Carshalton (England)
G. C. Pepeu, Cagliari (Iatly)

3: Round Table on 'Methods employed in separation' purification, and characterization of neural proteins,

Organized by Elizabeth R. Einstein (U.S.A.)
Participants:
E. Shooter, Stanford (U.S.A.)
L. Eng, Palo Alto (U.S.A.)
B. W. Moore, St. Louis (U.S.A.)
Li-Pen Chao, San Francisco (U.S.A.)

J. Folch-Pi, Belmont (U.S.A.)
Marian W. Kies, Bethesda (U.S.A.)
Marjorie Lees, Belmont (U.S.A.)
F. Wolfgram, Los Angeles (U.S.A.)

4: Round Table on 'Metabolic compartmentation'

Organized by R. Balazs (England)
Participants:
S. Berl, New York (U.S.A.)
C. Van Den Berg, Amsterdam (Netherlands)
R. Balazs, Carshalton (England)
J. Cremer, Carshalton (England)
D. Clarke, New York (U.S.A.)
E. De Robertis, Buenos Aires (Argentina)
A. Lajtha, New York (U.S.A.)

5: Round Table on 'Molecular properties and mechanisms of action of diphenylhydantoin

Organized by S. Bogoch (U.S.A.)

6: Round Table on 'Brain nucleotides and excitatory processes'

Organized by V. Bonavita (Italy)
Participants:
V. Bonavita, Palermo (Italy)
S. H. Appel, Durham (U.S.A.)
H. Koenig, Chicago (U.S.A.)
P. Mandel, Strasbourg (France)
F. Piccoli, New York (U.S.A.)
P. L. Ipata, Pisa (Italy)

7: Round Table on 'Nervous system influence on growth and development'

Organized by A. Pecile, Milan (Italy)
E. Müller, Pavia (Italy)
Participants:
J. M. Tanner, London (England)
L. L. Bernardis, Buffalo (U.S.A.)
S. Skoglund, Stockholm (Sweden)
A. Pecile, Milan (Italy)
E. Müller, Pavia (Italy)

8: Round Table on 'Pathways for phospholipid biosynthesis in the nervous tissue'

Organized by G. Porcellati, Pavia (Italy)
Secretary: C. Galli, Milan (Italy)
Participants:
G. Rouser, Duarte (U.S.A.)
J. N. Hawthorne, Birmingham (England)
R. E. McCaman, Duarte (U.S.A.)
K. P. Strickland, London (Canada)
G. B. Ansell, Birmingham (England)
R. O. Brady, Bethesda (U.S.A.)
G. Porcellati, Pavia (Italy)

9: Round Table on 'Neurochemistry of hepatic coma'

Organized by E. E. Polli (Italy)
Participants:
L. Sokoloff, Bethesda (U.S.A.)—(Paris, France)
F. Plum, New York (U.S.A.)
Bo K. Siesjö, Lund (Sweden)
G. Bianchi Porro, Milan (Italy)
S. Berl, New York (U.S.A.)
W. H. J. Summerskill, Rochester (U.S.A.)

10: Round Table on 'Correlation between behavior and transmitters (suspects) in Brain'

Organized by L. Valzelli (Italy)
Participants:
W. B. Essman, New York (U.S.A.)
K. Fuxe, Stockholm (Sweden)
J. Glowinski, Paris (France)
A. G. Karczmar, Hines (U.S.A.)
B. L. Welch, Knoxville (U.S.A.)
M. H. Aprison, Indianapolis (U.S.A.)
E. Giacobini, Stockholm (Sweden)

COMMUNICATIONS

(一般演題は，演題名，著者名の順に記載してある)

Nucleic acids (S 1)

Chairmen: Y. Tsukada (Japan)
A. Giuditta (Italy)
cago (U.S.A.)

Characterization of Rat Brain Ribonucleic Acids
Density of Brain Polyribosomes
O. Callaghan, P. Gordon and B. Ronsen, Chi-
Organizational Contributions to the UV Optical

by Agar Gel Electrophoresis
Z. S. Tencheva and A. A. Hadjiolov, Sofia (Bulgaria)
An *in vivo* Determination of the Levels of Cytidine and Uridine in Rat Brain
F. N. Minard and D. S. Grant, Chicago (U.S.A.)
Isolation and Characterization of Active and Inactive Chromatin from Cerebral and Hepatic Nuclei
H. Koenig, C. Y. Lu and F. A. Dolbeare, Chicago (U.S.A.)
RNA Synthesis in Stellate Nerve and Ganglion of the Squid
L. Casola and A. Giuditta, Naples (Italy)
RNA Synthesis in Developing Brain
S. K. Sharma and U. N. Singh, New Delhi (India)
The Changes of Desoxyribonucleic Acid Content in Developing Brain
Y. Tsukada, T. Noguchi and M. Nomura, Tokyo (Japan)
Nuclear Nucleoproteins of the Developing Rat Brain
M. R. V. Murthy and E. J. Jacob, Quebec (Canada)
Metabolism of (U-^{14}C) Ribose in Rat Brain *in vivo*
T. Arnfred and M. K. Gaitonde, Carshalton (England)
Changes with Age in the Metabolism of (U-^{14}C) Ribose in Rat Brain
M. K. Gaitonde and T. Arnfred, Carshalton (England)
Thymidine Metabolism and Deoxyribonucleic Acid Synthesis in Developing Rat Brains
K. Mori, S. Yamagami and Y. Kawakita, Osaka (Japan)
In vivo Effects of Some Hormones and Antimetabolites on Nucleic Acid Content in the Neurons, Neuroglia and Ependymal Cells
L. Z. Pevzner, Leningrad (U.S.S.R.)
Some Relationships between Acetylcholine and Catecholamine Effects on RNA Metabolism in the Nervous Tissue
N. N. Doemin, G. A. Nechayeva and N. L. Roobinskaya, Leningrad (U.S.S.R.)
The Effect of Thioacetamide on RNA Content in Cell Nuclei of Cerebellar Cortex
M. R. Kazakhasvili and G. A. Zurabishvili, Tbilisi (U.S.S.R.)

Protein identification, structure and biosynthesis (S 2)

Chairmen: E. Kreps (U.S.S.R.)
P. Angeletti (Italy)

Application of Exclusion Chromatography for the Molecular Weight of Random-Coil Encephalitogenic Polypeptide
L. P. Chao and E. R. Einstein, San Francisco (U.S.A.)
Comparative Disc Electrophoresis of Peripheral Nerve Proteins
I. Held and I. J. Young, Downey (U.S.A.)
Purification and Characterization of an Acidic Protein from Mammalian Brain
A. Grasso, T. Cicero and B. W. Moore, St. Louis (U.S.A.)
The Solubilization and Electrophoretic Analysis of Membrane Proteins from Mouse Brain
T. V. Waehneldt, R. M. Grossfeld and E. M. Shooter, Stanford (U.S.A.)
The Fractionation of Mitochondrial Basic Proteins from Rat Brain
R. S. Piha and P. Lähdesmäki, Oulu (Finland)
Neurostenin, an Actomyosin-Like Protein Isolated from Mammalian Brain
S. Berl and S. Puszkin, New York (U.S.A.)
Fractionation of Soluble Proteins of Neurons, Glia and Various Nuclei from the Brain Stem of the Rabbit
N. G. Aleksidze, Tbilisi (U.S.S.R.)
Purification and Properties of Proteolipid Proteins from Mammalian Nerve Tissue and Subcellular Fractions of Nerve Tissue
L. C. Mokrasch, Belmont and Boston (U.S.A.)
Aidic Protein and Lipoprotein in Cerebral and Hepatic Nuclei. Isolation, Characterization, «*in vivo*» Binding of Actinomycin D and Basic Dyes.
H. Koenig and C. Y. Lu, Chicago (U.S.A.)
Purification and Characterization of γc Globulins from Cerebrospinal Fluid
C. F. C. MacPherson and F. Feldmuller, Montreal (Canada)
Distribution and Analysis of Different Components of S100 Protein Fraction
G. Gombos, G. Vincendon and K. Uyemura, Strasbourg (France)
Studies on the Trypsin Resistant Brain Protein Residue (TRPR)
J. A. Leston and M. B. Lees, Belmont (U.S.A.)
Binding Energy of a Rare Gas in a Protein:

Xe Binding to Met-Myoglobin
E. Rothstein, San Francisco (U.S.A.)
Amperometric and Spectrophotometric Methods of Detection of Cholinoreceptive Protein in a Tissue Homogenate
T. M. Turpaev and S. N. Nistratova, Moscow (U.S.S.R.)

Protein identification, structure and biosynthesis (S 3)

Chairmen: R. Wurtman (U.S.A.)
G. Tettamanti (Italy)

On Some Peculiarities of Proteins Soluble in Acidified Organic Solvents
H. G. Gotsiridze and A. I. Chichua, Tbilisi (U.S.S.R.)
Glycoproteins in Neural Tissue
E. G. Brunngraber, Chicago (U.S.A.)
Studies on Organ-Specific Antigen from Rat Brain Microsomes
Y. Tsukada and T. Noguchi, Tokyo (Japan)
Rat Brain Glycoproteins. Isolation and Characterization of Specific Brain Glycoproteins
C. Di Benedetta and E. G. Brunngraber, Naples (Italy) and Chicago (U.S.A.)
Aminoacid and Protein Composition of Pacinian Corpuscles
M. Santini and S. Berl, New York (U.S.A.)
Chemico-Physical Properties of the Nerve Growth Factor
V. Bocchini, Rome (Italy)
Aspects of the Dissociation Equilibria between 7S NGF and its Subunits
E. M. Shooter, A. P. Smith, L. Greene and S. Varon, Stanford and La Jolla (U.S.A.)
Chemical and Biological Properties of the Nerve Growth Factor from Naja Naja Venom
R. Hogue Angeletti, Rome (Italy)
Biochemical Properties of the Nerve Growth Factor: Screening of Pure Preparations for Various Enzymatic Activities
P. U. Angeletti, Rome (Italy)
Some Characteristics of Highly Purified Bovine Brain Arylamidase
A. S. Brecher and J. B. Suszkiw, Washington (U.S.A.)
On a Neutral Proteinase in Squid Axoplasm
F. Orrego, Santiago (Chile)
Macro Molecular Protein in Human Nervous System
D. Karcher, N. Chamoles and A. Lowenthal, Berchem (Belgium)
On the 'Heterogeneity' of the Beef Brain S100, A Specific Nervous Tissue Protein
P. Calissano and G. Rusca, Rome (Italy)
Difference in Glycoprotein Composition of Cat Submaxillary Gland Saliva after Stimulation of Sympathetic and Parasympathetic Nerves
Z. Dische, N. Kahn, C. Rothschild, A. Danilchenko, J. Licking and S. C. Wang, New York (U.S.A.)

Protein identification, structure and biosynthesis (S 4)

Chairmen: R. O. Brady (U.S.A.)
F. Pocchiari (Italy)

Structure of an Encephalitogenic Protein
R. F. Kibler and R. Shapira, Atlanta (U.S.A.)
Brain Protein 10B: Structural Studies and State in Neural Excitation
S. Bogoch, Boston (U.S.A.)
Synthesis of N-Acetyl-Asparty-Peptides from N-Acetyl-Aspartate and Amino Acids in Mouse Brain
K. L. Reichelt, E. Wedege and E. Kvamme, Oslo (Norway)
Protein Synthesis in Synaptosomal Fractions from Immature Rat Brain
I. G. Morgan and L. Austin, Victoria (Australia)
Protein Synthesis in Immature Brain: a Comparison of the Nascent Proteins Synthesized on the Free and the Nascent Proteins Synthesized on the Free and the Membrane-Bound Polysomes
O. Z. Sellinger, W. G. Ohlsson and A. J. Frankel Ann Arbor (U.S.A.)
The Onset of Brain Nitrogen Metabolism in Mammals and Birds
Z. G. Gershenovic, A. A. Krychevskaya and V. A. Kheruvimova
Rostov-On-Don (U.S.S.R.)
Protein Metabolism in the Axon Terminal
J. J. Bray, K. A. C. James, I. G. Morgan and L. Austin, Victoria (Australia)
Studies on Protein Metabolism and Mitochondria in Bulk Prepared Cell Enriched Fractions from Brain
A. Hamberger and C. Blomstrand, Göteborg (Sweden)
Turnover of Protein in Nerve Endings as Re-

vealed by Electron Microscopic Radioautography
B. Droz and H. L. Koenig, Paris (France)
The Influence of Prenatal X-Irradiation on Activation of Amino Acids by sRNA-Aminoacyl Synthetases in the Developing Rabbit Brain
M. Wender and B. Zgorzalewicz, Poznan (Poland)
Inhibitory Effects of Promazine on *in vitro* Cerebral Protein Synthesis
E. Raghupathy, N. A. Peterson and C. M. McKean, Eldrige (U.S.A.)
The Influence of Adenosine 3′,5′-Monophosphate on N-Acetyl-Aspartate-Peptide Synthesis in Brain
E. Wedege, K. L. Reichelt and E. Kvamme, Oslo (Norway)
Reserpine and Cycloheximide Inhibition of Protein Biosynthesis in Mouse Brain
P. K. Seth, F. Ungar, L. J. Saidel and S. G. A. Alivisatos, Chicago (U.S.A.)

Regulation of nucleic acid and protein synthesis (S 5)

Chairmen: S. Roberts (U.S.A.)
V. Andreoli (Italy)

RNA Polymerase and Ribonuclease in Brain Nuclei
D. Munoz and P. Mandel, Strasbourg (France)
Autoradiographic Studies on RNA Synthesis in Embryonic Sensory Ganglia during Axonal Growth Stimulated by NGF
P. Amaldi and G. Rusca, Rome (Italy)
Acetylcholine as Possible Regulator of RNA Synthesis in Nerve Endings
R. N. Glebov, Moscow (U.S.S.R.)
The Role of Calcium Ions as a Possible Link between the Membrane Depolarization and the Intracellular Protein and RNA Metabolism
M. O. Huttunen, Helsinki (Finland)
On the Topographical Differences in the Distribution of Acid Phosphatase and 5-Nucleotidase in Various Nerves and Tracts of Different Regions of Fore-Brain of Frog
H. B. Tewari and P. P. Sood, Udaipur (India)
Polyribonucleotide Polymerizing Activity in Neuronal, Glial and Liver Nuclei
M. T. Kato and M. Kurokawa, Tokyo (Japan)
The Effects of Neuronal Activity on the Protein Synthesis in the Synaptosomes
S. Sved, Québec (Canada)
Effects of Hypophysectomy on RNA Metabolism in the Brain Stem of the Rat
W. H. Gispen, D. De Wied, P. Schotman and H. S. Jansz, Utrecht (Netherland)
The Role of Thyroid Hormone on Cerebral Cortical Ribosomal RNA Synthesis during Development
S. Geel, T. Valcana, G. Fox and P. S. Timiras, Berkeley (U.S.A.)
H^3-Lysine Incorporation into Protein in the Young Chick Brain: Effects of an Imprinting Procedure
S. P. R. Rose, G. Horn and P. P. G. Bateson, London and Cambridge (England)
Changes in Neurochemistry and Learning after Deuteron Irradiation of the Brain in Mice
J. M. Ordy and T. Samorajski, Cleveland (U.S.A.)
Learning Behavior-Related Drug Effects on Polyribosomes of Rat Brain
P. Gordon, B. Ronsen and O. Callaghan, Chicago (U.S.A.)
Inhibitors of Protein Synthesis which Affect Memory Processes: a Study of their Effects of the Sympathetic Ganglion Isolated *in vitro*.
P. Paggi and G. Toschi, Rome (Italy)
Developmental Changes in Protein Synthesis and Stability of Messenger RNA-Ribosome Complexes of Rat Brain
C. E. Zomzely, S. Robert and S. Peache, Los Angeles (U.S.A.)

Lipids (S 6)

Chairmen: G. Rouser (U.S.A.)
C. Galli (Italy)

Incorporation of Specifically Labeled Glucose into Brain Cholesterol
J. J. Kabara and B. Chapman, Pontiac (U.S.A.)
Effect of Geometry and Position of Ethylenic Bond(s) upon AcylCoA-Cholesteryl Acyltransferase.
D. S. Sgoutas, Urbana (U.S.A.)
Radioautographic Localization of Synthesized Cholesterol into the Adult Rat Brain
F. Chevallier and C. Gautheron, Saclay (France)
Reutilization of Cholesterol-1,2-^{3}H in the Regeneration of Peripheral Nerve: an Autoradiographic Study
F. A. Rawlins, E. T. Hedley-Whyte, G. Villegas and B. G. Uzman, Boston (U.S.A.)
The Metabolism of Cholesterol Esters in the Human Brain
H. S. Mickel, San Antonio (U.S.A.)

Metabolism of 3-Keto-5β-Cholanoic Acid and Related Compounds by Brain Tissue *in vitro*.
S. H. Mujtaba Naqvi and H. J. Nicholas, St. Louis (U.S.A.)
Occurrence and Significance of Sterols with Unsaturated Side Chain in Human Brain and Brain Tumors
F. Cattabeni, G. Gall, E. G. Paoletti and P. Paoletti, Milan (Italy)
Studies on the Origin of Choline in the Brain
G. B. Ansell and S. G. Spanner, Birmingham (England)
The Incorporation of Me-^{14}C Choline into the Lecithin of Rat Cerebral Cortex *in vitro*.
G. G. Lunt and E. G. Lapetina, Buenos Aires (Argentina)
The Half-Life on the Lecithin of Rat Cerebral Cortex Membranes
E. G. Lapetina and G. G. Lunt, Buenos Aires (Argentina)
Incorporation of Doubly Labeled Lecithin into the Brain Lipids at Different Developmental Stages of Rats
J. Hoelzl and H. P. Frank, München (Germany)
The Role oh Hypothermia in the Depression of Brain Phospholipid Metabolism in Hypoxia
D. A. Chetverikov, V. Y. Dvorkin and S. V. Gasteva, Leningrad (U.S.S.R.)
Effect of Potassium Ions on Glucose and Phospholipid Metabolism in Rat Cervical Sympathetic Ganglia with and without Axotomy
Y. Nagata and Y. Tsukada, Tokyo (Japan)
Estimation of Cholesterol and Phospholipids in Four Lobes of Rabbit Brain in Experimental Neurofibrillary Degeneration
G. D. Cherayil and A. E. Cyrus, Jr., Milwaukee (U.S.A.)

Lipids (S 7)

Chairmen: G. B. Ansell (England)
E. Grossi Paoletti (Italy)

Biosynthesis of Lactosylceramide in Rat Brain
J. Hildebrand and G. Hauser, Boston (U.S.A.)
Metabolism of Sphingosines
W. Stoffel, Köln-Lindenthal (Germany)
The Occurrence of C_{20}-Sphingosine in the Sphingolipids of Human Brain
R. T. C. Huang and E. Klenk, Köln-Lindenthal (Germany)
Compositional Variation in Sphingolipids of Developing Human Brain Stem
E. A. Moscatelli and E. Isaacson, Dallas (U.S.A.)
Metabolism of Polyphosphoinositides in the Kidney
A. Sheltawy, Leeds (England)
Incorporation of ^{32}P *in vitro* into the Phosphoinositides of Rat Sympathetic Ganglia, Vagus Nerve and Sciatic Nerve
J. N. Hawthorne and Y. Yagihara, Birmingham (England)
The Turnover of Mouse Brain Ethanolamine Phosphoglycerides (EPG)
L. A. Horrocks, Columbus (U.S.A.)
The Cytidine Triphosphate: Cholinephosphate Cytidylytransferase of Peripheral Nerve: A Study of its Activation by Phospholipids
G. Porcellati, Pavia (Italy)
Nerve Growth Factor and Lipids in the Nervous System
A. Liuzzi, F. H. Foppen and G. D'Agnolo, Rome (Italy)
The Distribution of Membrane Lipid Degradative Enzymes in Brain Subcellular Particles
N. G. Bazan, Toronto (Canada)
Partition of Cations during Extraction of Brain Lipids and Proteins
F. N. Le Baron and M. W. Nasby, Albuquerque (U.S.A.)
Fatty Acid Composition of Brain and Body Phospholipids of the Salmon O. Nerka from Fresh-Water and Marine Habitat
E. M. Kreps, M. A. Chebotarëva and V. N. Akulin, Leningrad (U.S.S.R.)
Fatty Acid Elongation during Brain Development
F. M. Yatsu and S. Moss, San Francisco (U.S.A.)
The *in vivo* Incorporation of Palmitic Acid into Mouse Brain Lipids
G. Y. Sun and L. A. Horrocks, Cleveland (U.S.A.)

Lipids (S 8)

Chairmen: J. F. Mead (U.S.A.)
M. M. Usardi (Italy)

Monounsaturated Fatty Acid Isomers in Adult and Newborn Rat Brain
M. W. Spence, Montreal (Canada)
Elongation of Long Chain Fatty Acids in Developing Chick Brain
J. Bernsohn, L. M. Stephanides and H. Norgello,

Hines and Chicago (U.S.A.)
Brain Lipid Alterations in Male and Female Rats during EFA Deficiency
H. B. White, Jr., C. Galli and R. Paoletti, Milan (Italy)
Effects of Maternal Essential Fatty Acid Deficiency on Neonatal Rat Brain: Fatty Acid Composition of Total Lipid and Phosphatidyl Ethanolamine
A. B. Steinberg, G. B. Clarke and P. W. Ramwell, Shrewsbury (U.S.A.)
The Turnover of Brain Fatty Acids following Decapitation or Convulsions
N. G. Bazan and M. Cummings, Toronto (Canada)
The Site and Synthesis of Lignoceric and Nervonic Acids
S. C. Boone, Durham (U.S.A.)
Transfer of N-Acetyl Neuraminic Acid (NANA) to Desialoalkaline Phosphatase from Sheep Brain
S. Saraswathi and B. K. Bachhawat, Vellore (India)
Gas-Liquid Chromatographic Assay of Lipid-Bound Sialic Acid
R. K. Yu and R. Leeden, Bronx (U.S.A.)
Characteristics of the Fatty Acid Composition of the General Type Gangliosides and Specific Activity of Brain Ganglioside Patterns
M. I. Prokhorova, G. P. Sokolova and S. U. Tumanova, Leningrad (U.S.S.R.)
Ganglioside of Peripheral Nerve
J. R. Wherrett, V. H. MacMillan and A. J. Yates, Toronto (Canada)
Biosynthesis of Fatty Acids of Brain Galactolipids in Normal and Mutant Mice
S. A. Pollet, J. M. Bourre and N. A. Baumann, Paris (France)
G_5-Ganglioside Variant of Systemic Late Infantile Lipidosis
B. W. Volk, M. Adachi and L. Schneck, New York (U.S.A.)
Neuraminidase and Gangliosides in the Nerve Endings of Rabbit Brain
G. Tettamanti, A. Lombardo, A. Preti and S. Di Donato
Milan (Italy)
Comparative Study of Brain Gangliosides in Vertebrates
N. F. Avrova and S. A. Zabelinsky, Leningrad (U.S.S.R.)

Lipids (S 9a)

Chairmen: F. Chevallier (France)
F. N. Le Baron (U.S.A.)

Fatty Acid Composition of the Phospholipids in Neurons and in Glial Cells Isolated from Rat Cerebral Cortex
L. Pomazanskaya, L. Freysz and P. Mandel, Strasbourg (France)
Gangliosides in Brain of two Mutant Mice «Quaking» and «Jimpy»
D. Kostic, J. L. Nussbaum and N. Neskovic, Strasbourg (France)
Brain Lipid Alterations in a Mutant Strain of Mice (Jimpy Mice)
C. Galli, Milan (Italy)
Brain Lipid Analysis of the «Quaking» Mouse
N. A. Baumann, C. M. Jacque and M. L. Harpin, Paris (France)
Glycolipid Metabolism in Myelination Disorder of «Jimpy» Mice
J. L. Nussbaum, N. M. Neskovic, D. M. Kostic and P. Mandel, Strasbourg (France)

Myelin (S 9b)

Chairmen: M. E. Smith (U.S.A.)
F. Clementi (Italy)

Preparation and Properties of the Two Myelin Basic Proteins of the Rat Central Nervous System
R. E. Martenson, G. E. Deibler and M. W. Kies, Bethesda (U.S.A.)
Preparation and Study of Brain Proteolipid Apoprotein
J. Folch-Pi and G. Sherman, Belmont (U.S.A.)
Further Studies on Myelin Metabolism *in vitro*
M. E. Smith, L. F. Eng, M. S. Stirton and C. H. Hasinoff, Palo Alto (U.S.A.)
In vitro Formation of Myelin Figures from Folch-Lees Proteolipid
J. J. Vanderhaeghen, L. F. Eng and B. Gerstl, Palo Alto (U.S.A.)
Inhibition of Myelin Protein Synthesis by Phenylalanine
H. C. Agrawal, A. H. Bone and A. N. Davison, London (England)
A Neurological Mutation of the Mouse with a Deficiency of Myelin Synthesis
H. Meier and M. M. Dickie, Bar Harbor (U.S.A.)
Characterization of a Low-Density Myelin Membrane Fraction from Brain

L. F. Eng, B. Gerstl, J. Friedewald and P. Bond, Palo Alto (U.S.A.)

Myelin (S 10)

Chairmen: F. Vandenheuvel (Canada)
R. Fumagalli (Italy)

Biochemical Studies on early Myelin
M. Spohn, N. L. Banik, H. C. Agrawal and A. N. Davison, London (England)

Distribution of Cholesterol-1,2-^{3}H retained in Mouse Peripheral Nerve from Myelination to Maturity, an Autoradiographic Study
E. T. Hedley-Whyte, F. A. Rawlins, M. M. Salpeter and B. G. Uzman, Boston (U.S.A.)

The Effect of Hypocholesteremic Agents on Myelinogenesis
R. Fumagalli, M. E. Smith, G. Urna and R. Paoletti, Milan (Italy) and Palo Alto (U.S.A.)

Developmental Changes in Myelin Composition of Rat Brain in Normal and Vitamin A Deficient Animals
J. Clausen, Copenhagen (Denmark)

The Comparative Metabolism of Phosphatidyl Choline and Sulfatide during Myelin Formation
J. A. Benjamins, N. Herschkowitz and G. M. McKhann, Baltimore (U.S.A.)

The Biosynthesis of Phospholipids in Myelin Fractions of Rat Brain
A. Radominska-Pyrek and T. Chojnacki, Warszawa (Poland)

On the Biosynthesis of the Plasmalogens of Brain during Myelination
H. Debuch, H. Friedemann and J. Muller, Köln-Lindenthal (Germany)

Formation and Turnover of Myelin Ganglioside
K. Suzuki, Philadelphia (U.S.A.)

The Monogalactosyl and Digalactosyl Diglycerides of Brain: their Metabolism and Possible Function in Myelination
R. A. Pieringer, K. S. Rao and D. A. Wenger, Philadelphia (U.S.A.)

Interactions of Purified Lipids with a Membrane Structural Protein from Myelin
P. E. Braun and N. S. Radin, Ann Arbor (U.S.A.)

Biochemical Maturation of the Myelin
E. R. Einstein, K. B. Dalal and J. Csejtev, San Francisco (U.S.A.)

2′,3′-Cyclic Nucleotide 3′-Phosphohydrolase: a New Marker of Myelin
T. Kurihara, J. L. Nussbaum, D. Kostic and P. Mandel, Strasbourg (France)

Esterase Activity in Purified Myelin Preparations
P. J. Riekkinen and M. G. Rumsby, Copenhagen (Denmark)

Purification and Fractionation of Myelin Proteins by Gel Filtration and Electrophoresis
F. Wolfgram, Los Angeles (U.S.A.)

Amino acids and GABA (S 11)

Chairmen: A. Lajtha (U.S.A.)
G. Porcellati (Italy)

Different Effects of Sodium, Potassium, Calcium and Inorganic Phosphate on α-Alanine Formation in Rat Brain Hemispheres
M. Ruscak and E. Macejova, Bratislava (Czechoslovakia)

Synthesis of Asparagine by Brain Extracts
M. Benuck and A. Lajtha, New York (U.S.A.)

Cerebral Amino Acid Exchange *in vitro*
L. Battistin and A. Lajtha, Padova (Italy) and New York (U.S.A.)

Tryptophan Transport Across Nerve Cell Membrane
D. G. Grahame-Smith, A. Parfitt, M. Warnock and M. Taylor, London (England)

Effect of Extracellular Amino Acids on the Metabolism of Glutamic Acid Carbons in the Rat Superior Cervical Ganglion
J. D. K. Klingman and W. McBride, New York (U.S.A.)

^{3}H-Lysine Accumulation in Spinal Cord Grey Matter and Ventral Horn Motor Neurons in the Rat as related to Age and Neuronal Cytoplasmic Volume
D. H. Ford and R. K. Rhines, New York (U.S.A.)

An *in vivo* Study of the Maturational Changes and Sex Differences in Lysine-^{3}H Accumulation by the Rat Brain
R. Kartzinel, D. H. Ford and R. K. Rhines, New York (U.S.A.)

Aromatic Amino Acids, Cerebral Excitability and Maturation
B. B. Gallagher, New Haven (U.S.A.)

The Actions of Microiontophoretically Applied Amino Acids on Bulbar Reticular Neurones
L. Hösli, and A. K. Tebecis, Basel (Switzerland)

Proximo-distal Distribution of Peptide Hydrolases and Amino Acids in Peripheral Nerve
N. Marks, New York (U.S.A.)

Free Amino Acids in Cat Neocortex under Dif-

ferent Conditions of Excitability
N. Mison-Crighel, C. Pintilie, A. Kreindler and E. Crighel, Bucharest (Romania)
Amino Acid Metabolism and Functional State of Rodent C.N.S.
A. P. Reynolds and J. C. Watkins, Carshalton (England)
Some Aspects of Tyrosine Metabolism in Rat Brain
J. Mark, H. Pugge and P. Mandel, Strasbourg (France)

Amino acids and GABA (S 12)

Chairmen: E. Roberts (U.S.A.)
E. Gori (Italy)

Effect of Thyroid Hormone on the Development of Metabolic Compartmentation of Glutamate in Rat Brain
A. J. Patel, R. Balazs and D. Richter, Carshalton (England)
The Effects of NaCl and KCl on the Uptake of U-^{14}C-Glutamate by Brain Mitochondria
H. Weinstein, Duarte (U.S.A.)
The Two Glutamate Pools in the Brains of Immature and Adult Mice
C. J. Van Den Berg, Amsterdam (The Netherlands)
Effects of Glutamic Acid on Post Anoxic Cerebral Metabolism
M. M. Cohen, R. Catanzaro and F. Pocchiari, Chicago (U.S.A.) and Rome (Italy)
Properties of Pig Brain Glutaminase
G. Svenneby, Oslo (Norway)
Some Properties of Glutamate Decarboxylase Activity in Brain of Three Vertebrate Species
R. Tapia, H. Pasantes and G. Massieu, México, D.F. (México)
Influence of Audiogenic Convulsions on Glutamine-Synthetase Activity in the Rat's Brain
I. Haulica, V. Rosca, L. Ababei and A. Haulica, Iasi (Romania)
The *in vitro* Stimulation by γ-Aminobutyric Acid (GABA) of an Early Step in the Protein Synthetic Pathway
C. F. Baxter and S. Tewari, Sepulveda, Duarte and Los Angeles (U.S.A.)
The Gamma-Aminobutyric Acid (GABA) is an Inhibitory Transmitter of Nervous System
I. A. Sytinsky, Leningrad (U.S.S.R.)
GABA Synthesis in Purkinje Axon Terminals in Cat
F. Fonnum, J. Storm-Mathisen and F. Walberg, Kieller and Oslo (Norway)
GABA Metabolism and Mitochondrial Oxidations in the Brain of Pyridoxine Deficient Neonate Rat
K. Dakshinamurti, M. C. Stephens and C. Bhuvaneswaran, Winnipeg (Canada)
Gamma-Amino-Butyric Acid Level, Nucleotides and Inorganic Phosphate in Pre- and Post-Convulsive Periods
T. Tursky, I. Pechan and B. Liska, Bratislava (Czechoslovakia)
The Effect of Gamma-Aminobutyric acid on Brain Monoamines
N. H. Yessaian, A. R. Armenian and H. C. Buniatian, Yerevan (U.S.S.R.)
The Selective *in vivo* Action of Hydrozinopropionic Acid on GABA Metabolism
N. M. van Gelder, Montreal (Canada)

Amino acids and GABA (S 13a)

Chairmen: L. L. Ross (U.S.A.)
S. Ferri (Italy)

The Formation of Ammonia From Amino Acids through Deamino-NAD in Mitochondria of Brain and Liver
H. C. Buniatian and S. G. Movcessian, Yerevan (U.S.S.R.)
Metabolism of Dicarboxylic Amino Acids and Ammonia Formation in Rat Brain Mitochondrial Fractions during Post-Natal Development
H. C. Buniatian, G. V. Aprikian and W. A. Shahinian, Yerevan (U.S.S.R.)
Changes of Free Amino Acids in Various Brain Regions of REM Sleep Deprived Cats and during Recovery Period
D. Micic, V. Karadzic and L. M. Rakic, Belgrade (Yugoslavia)
Experimental Hyperprolinaemic Monkeys and Cystathionine Contents in Brain Tissues
S. Hirano, Tokyo (Japan)

Central mediators: catecholamines, serotonin (S 13b)

Chairmen: S. Garattini (Italy)
L. L. Iversen (England)

Incorporation of the Aldehyde Derivative of Serotonin in Mouse Brain
S. G. A. Alivisatos, F. Ungar and P. K. Seth,

Chicago (U.S.A.)
Effects of Immobilisation on Rat Brain 5-Hydroxytryptamine
C. Curzon and A. R. Green, London (England)
Effects of Harmalin on Striatal Serotonin and Acetylcholine
I. J. Bak, M. Kurokawa, R. Hassler and J. S. Kim, Frankfurt (Germany) and Tokyo (Japan)
5-hydroxyindolepyruvic Acid: *In vivo* Studies of its Contribution and Significance to Cerebral 5-Hydroxyindole Metabolism
E. M. Gal, S. J. Geyer and S. A. Millard, Iowa City (U.S.A.)
Decrease of Cerebral Serotonin caused by L-α-Methyltryptophan in the Rat
T. L. Sourkes, K. Missala and R. Papeschi, Montreal (Canada)
A Sensitive Flourescence Method for the Demonstration of Tryptamine at the Cellular Level
O. H. Bjorklund Anders, Lund (Sweden)
Pineal Gland: Stimulation of Melatonin Production by Harmine
D. C. Klein, Rochester (U.S.A.)

Cholinergic mechanisms (S 14)

Chairmen: L. S. Wolfe (Canada)
G. C. Pepeu (Italy)

The Hydrolysis of Acetylcholine in Single Nerve Cells Isolated from the Guinea Pigs 1-240 Days Old
R. Pavlin, Ljubljana (Yugoslavia)
Uptake of Acetylcholine in the Pre-Synaptic Region
R. M. Marchbanks, Cambridge (England)
Effects of Potassium and Levorphanol in Brain Slices on the Release Acetylcholine and its Synthesis from Radioactive Choline
J. A. Richter and R. M. Marchbanks, Cambridge (England)
Neurotransmittor Synthesis in Excitatory and Inhibitory Synapses of Rat Hippocampus
J. Storm-Mathisen and F. Fonnum, Kjeller (Norway)
The Biochemical Aspects of Cholinergic Nerve Excitatory Process
A. Goudot, Paris (France)
The Effects of Anticholine-Esterase on the Production of Unesterified Fatty Acid in Brain
G. G. Lunt and C. E. Rowe, Birmingham (England)
Cholinesterase Activity of Sympathetic Ganglia From Neonatal Rats
G. I. Klingman, New York (U.S.A.)
A Radiometric Study of Brain: Acetylcholinesterase and Pseudocholinesterase
M. G. Filbert, M. A. Lochner and A. N. Siakotos, Edgewood Arsenal (U.S.A.)
The Effects of Substrate Concentration *on in Situ* Cholinesterase
G. A. Buckley, C. E. Heading and J. Heaton, Liverpool (England)
Effect of Hemicholinium (HC-3) on Lecithin Synthesis in Dog Brain
M. V. Gomez, E. F. Domino and O. Z. Sellinger, Ann Arbor (U.S.A.)
Light Scattering Effect of Atropine Sulphate on the Receptor Proteolipid of the Cerebral Cortex
E. De Robertis, J. G. Rodriguez and D. N. Teller, Buenos Aires (Argentina)
Studies on the Action of Hemicholinium (HC-3) in the Rat Cerebral Cortex
G. R. De Lores Arnaiz, L. M. Zieher and E. G. Lapetina, Buenos Aires (Argentina)
Lipid Interaction and Anticholinergic Effects of Glycolates
E. Heibronn, L. Albanus, H. Edström and L. Larsson, Södertälje (Sweden)

Central mediators: catecholamines, serotonin (S 15)

Chairmen: J. Glowinski (France)
G. L. Gessa (U.S.A. and Italy)

Observations on Extraadrenal Chromaffin Tissue
M. Costa, Turin (Italy)
Immunofluorescent Staining of Adrenergic Neurones with Antibodies to Chromogranins
L. B. Geffen and B. G. Livett, Victoria (Australia)
Monoamine-Containing Neurones in the Developing and Adult Albino Rat
L. A. Loizou, Birmingham (England)
La Barriere Enzymatique pour la L-Dopa au Niveau des Capillaires du Cerveau et son Abolition
R. Tissot, A. Pletscher, G. Bartholini and J. Costantinidis, Geneve (Switzerland)
Biochemical Characteristics of Brain Nerve Endings in Lower Vertebrates
E. Y. Chenykaeva, V. I. Krasilnikova and E. E. Kruglova, Leningrad (U.S.S.R.)
Subcellular Fractionation of Hypothalamus and

Pituitary Stalk of the Bull: Morphological Study and Serotonin-Norepinephrine Distribution
F. Clementi, V. M. Andreoli, B. Ceccarelli, E. Cerati and M. L. Demonte, Milan (Italy)
Effect of Adrenalectomy on the Ultrastructure and Catecholamine Fluorescence of the Nerve Endings in the Median Eminence of the Rat
U. K. Rinne and M. Hyyppä, Turku (Finland)
The Influence of Internal Na and K on the Uptake of Noradrenaline by Synaptosomes
T. D. White and P. Keen, Bristol (England)
Monoamine Release from Electrically Stimulated Brain Slices
T. N. Chase, R. I. Katz and T. J. Kopin, Bethesda (U.S.A.)
Recovery of Noradrenaline Levels after Reserpine and Axonal Down-Transport of Newly Formed Amine Storage Granules
J. Häggendal, Göteborg (Sweden)
Release of Newly Synthesized Dopamine (DA) and Norepinephrine (NE) in the Central Nervous System
M. J. Besson, A. Cheramy and J. Glowinski, Paris (France)
Catecholamine Metabolism as a Factor of Neural and Neuroendocrine Regulation
A. M. Utevsky and V. O. Osinskaya, Kharkov (U.S.S.R.)
The Functional Activity of the Hypophyseal-Adrenocortical System and the Noradrenaline Level in the Rat Brain
M. I. Mityushov and V. G. Shalyapina, Leningrad (U.S.S.R.)
Storage and Renewal of Tritiated Norepinephrine and α-Methyl-Norepinephrine in Catecholaminergic Neurons of the Central Nervous System. A Radioautographic Study
L. Descarries and B. Droz, Gif-Sur-Yvette (France)
Acetylcholinesterase and Primary Catecholamines in the Hypotalamus of Growing Rats
M. Hyyppä and U. K. Rinne, Turku (Finland)

Central mediators: catecholamines, serotonin (S 16)

Chairmen: M. R. Murray (U.S.A.)
F. Berti (Italy)

Modifications of the Sympathetic Nervous System Activity and Audiogenic Seizures in Mice
A. G. Lehmann, Jouy-en-Josas (France)
Dopamine Variations in the Head of the Caudate Nucleus following Contralateral Lesion
J. A. Chandu-Lall, D. Zivanovic and E. G. Szekely, Philadelphia (U.S.A.)
Ontogenesis of Catecholamine Binding and Soluble Proteins in Microsomes of Adrenergically Innervated Organs
B. L. Mirkin, Minneapolis (U.S.A.)
Monoamine Biosynthesis in Isolated Regions of Autonomic Nervous System
L. Coté, H. H. Benitez and M. R. Murray, New York (U.S.A.)
The Ouabain Induced Enhancement of Catecholamine Biosynthesis in Rat Brain Cortex Slices
B. Anagnoste, Y. Ohi, T. Backstrom and M. Goldstein, New York (U.S.A.)
Influence of Norepinephrine on the Thiol Groups of three Brain Areas
S. K. Sharma and G. P. Talwar, New Delhi (India)
Changes in the Turnover of Noradrenaline and 5-Hydroxytryptamine in the Rat Hypathalamus during Exposure to Heat or Cold
M. A. Simmonds and L. L. Iversen, Cambridge (England)
The Effects of Sodium γ-Hydroxybutyrate on Brain Dopamine and Peripheral Catecholamines
P. F. Spano, A. T. Tagliamonte, L. Vargiu and G. L. Gessa, Cagliari (Italy)
Pharmacology of the Response of Brain-Stem Neurones to Noradrenaline
R. J. Boakes, P. B. Bradley, N. Brookes and J. H. Wolstencroft, Birmingham (England)
The Presence and Distribution of P-Tyramine in Rat Brain
A. A. Boulton and L. Quan, Saskatoon (Canada)
Multiple Forms of Rat Brain Monoamine Oxidase
M. B. H. Youdim, G. G. S. Collins and M. Sandler, London (England)
Subcellular Distribution of Harmaline, a Reversible MAO Inhibitor, in Rat Brain
J. Bruinvels and D. G. Streefkerk, Utrecht (The Netherlands)
Regional Daily Rhythms of Norepinephrine and Serotonin in Cat Brain and Spinal Cord
D. J. Reis, New York (U.S.A.)
Ultrastructual Cytochemistry and Pharmacology of 5-Hydroxytryptamine Storage in Adrenergic

Nerve Endings
G. Jaim-Etcheverry and L. M. Zieher, Buenos Aires (Argentina)

ATPase (S 17)

Chairmen: E. Egana (Chile)
A. Bertelli (Italy)

Properties and Functional Changes of Brain ATPase
L. J. Tähepold, U. S. Tarve, V. A. Lilleleht, E. K. Tiigimäe, D. A. Enno, E. B. Nurmiste, Tartu (U.S.S.R.)

Bound Cations and the Na, K-Activated ATPase of Cerebral Membrane Fragments
R. Rodnight, D. Carrera and P. S. G. Goldfarb, London (England)

Interdependence of Membrane ATPase with ACh Esterase and Electron Transport Systems
Z. Kometiani, Tbilisi (U.S.S.R.)

Activity of Sodium-Potassium Activated Adenosinetriphosphatase in Rabbit Spinal Cord After Section of Plexus Brachialis
L. Venkov, Sofia (Bulgaria)

Influence of Undernutrition on ATPase Activity of Developing Rat Brain
J. L. Davrainville, Nancy (France)

The Relation of Inhibition of ATPase by Copper Salts to that by Ouabain in Brain Microsomes
R. A. Peters and M. Shorthouse, Cambridge (England)

Interaction of Ouabain with the Na^+-K^+-ATPase System
N. M. Polyakova, V. K. Lishko, M. K. Malysheva, Kiev (U.S.S.R.)

Distribution of ATPase Activities in the Chick Embryo Hemispheres and their Induction by Hydrocortisone
F. Stastny, Prague (Czechoslovakia)

Neuropharmacologic Drug Action: Possible Involvement of Catalytic and Allosteric Sites of Brain Microsomal ATPase
J. J. Ghosh, S. K. Ghosh, B. K. Pal, S. Bhaduri and D. Nag, Calcutta (India)

The Conformational Cycle on NaATPase: Evidence from the Action of Cardioactive Steroids
R. W. Albers and G. J. Koval, Bethesda (U.S.A.)

Chemoarchitectonics of ATPases in Cerebral Cortex: Normal Human and Alzheimer's Disease
L. J. Embree and H. H. Hess, Belmont and Boston (U.S.A.)

Effect of Alcohol on Na-K ATPase of Nerve Ending Particles Isolated from Guinea Pig Brain
A. Y. Sun, Cleveland (U.S.A.)

Biochemical Pharmacology (S 18)

Chairmen: S. S. Parmar (India)
A. Allegranza (Italy)

Selective Inhibition of Metabolic Compartments in Rat Brain
J. E. Cremer, Carshalton (England)

Effect of Triperidol on Processes Involving Acetylcholine in Rat Brain Cortex *in vitro*
H. Michalek, J. Antal, G. L. Gatti and F. Pocchiari, Rome (Italy)

The Effect of Chlorpromazine on Dopamine Synthesis by the Caudate Nucleus *in vitro*
H. L. Klawans, Jr., Chicago (U.S.A.)

Reserpine-like Action of Chlorpromazine on Rabbit Basal Ganglia
A. Tagliamonte, P. Mazzucato and G. L. Gessa, Cagliari (Italy)

The Effects of Different Doses and Routes of Application of Phenothiazines in Rat Brain
I. Hanbauer, Wien (Austria)

The Cumulative Effect of Electroshock-Induced Seizures and Anti-Depressant Drugs on Rat Brain Amine Concentrations
E. F. Marshall and M. Roth, Newcastle (England)

Passage of Imipramine Metabolites across Biological Membranes at Different pH-Gradients
L. F. Gram, J. Christiansen, B. Kofod and O. J. Rafaelsen, Copenhagen (Denmark)

Evidence for a Cholinergic Mechanism in Brain Involved in the Tetrabenazine Reversal by Thymoleptic Agents
J. Scheel-Krüger, Roskilde (Denmark)

Effect of Prolonged Lithium Administration on Cerebral Monoamines in the Rat
H. Corrodi, K. Fuxe and M. Schou, Stockholm (Sweden) and Risskov (Denmark)

Lithium Action on the Carbohydrate Metabolism in Rat Brain, Muscle and Liver
P. Plenge, E. T. Mellerup and O. J. Rafaelsen, Copenhagen (Denmark)

Lithium and Some Other Psychopharmaca. Effect on Electrolyte Distribution and Excretion in Rat
C. F. Gotfredsen, E. T. Mellerup and O. J. Rafaelsen, Copenhagen (Denmark)

Mechanism of Action of Lithium Studied on an Isolated Stretch Receptor Neuron Prepara-

tion (SRN)
M. Stepita-Klauco, E. Giacobini and S. Hovmark, Stockholm (Sweden)
Blocking Action of Some Tricyclic Psychotherapeutic drugs on H^3NE Uptake and Guanethidine-Induced Effects
B. K. Koe and J. W. Constantine, Groton (U.S.A.)

Biochemical Pharmacology (S 19)

Chairmen: P. Mantegazza (Italy)
P. C. Marchisio (Italy)

The Effect of Drugs on Central Nervous System Electrolytes as Reflected in the Cerebrospinal Fluid: the Theory and its Clinical Application in Humans
C. Neblett, J. Claghorn, I. Kraft and G. Farrel, Houston (U.S.A.)
Physiological Disposition of (H^3)-IDPN (β-β^1-Iminodipropionitrile) in Rats: Metabolic and Autoradiographic Studies
S. M. Chou, Morgantown (U.S.A.)
Drug-Induced Variation of Pyridoxal-5′-Phosphate and of the Activity of Pyridoxal-5′-Phosphate-Dependent Enzymes in Rat Brain
K. F. Gey, Basle (Switzerland)
LSD-Binding Protein of Synaptosomal Membranes
E. Mehl and H. Demus, Munich (Germany)
The Effect of LSD-25 on Vitamin B_6 Metabolism and Brain Amine Levels in Mice
C. Colombini, E. E. McCoy and T. C. Westfall, Charlottesville (U.S.A.)
Cannabis Metabolites in Urine after Oral Administration
J. Christiansen and O. J. Rafaelsen, Copenhagen (Denmark)
Interaction of Dopamine and Mescaline with Synaptosomes from the Basal Ganglia
A. J. Friedhoff, J. Coupet and M. G. Hadfield, New York (U.S.A.)
The Mechanism of a Serotonin Receptor in the Brain and Its Interaction with Hallucinogenic Drugs
J. R. Smythies, F. Bennington and R. D. Morin, Edinburg (Scotland) and Birmingham (U.S.A.)
Uptake of C^{14}-Metrazol by Developing Rat Brain
J. Brink, L. Galipeau, N. Cariglia, P. Mahon and D. Stein, Worcester (U.S.A.)
Binding of Dimethyl ^{14}C-D-Tubocurarine and Proteolipids in Rat Cerebral Cortex during Maturation
C. J. Gomez, J. M. Pasquini, E. F. Soto and E. De Robertis, Buenos Aires (Argentina)
Lecithin as a Site of Action of Anesthetics
L. Galzigna, Montpellier (France)
Nerve Action Potential Depression by Puromycin
N. A. Dahl, Lawrence (U.S.A.)
The Effects of Centrally Acting Drugs on Tremor in Monkeys
M. Goldstein, A. F. Battista, S. Nakatani and B. Anagnoste, New York (U.S.A.)

Biochemical changes in development and ontogenesis (S 20)

Chairmen: A. Pope (U.S.A.)
F. Sereni (Italy)

Cell Migration in Cultured CNS Tissues
E. Tyszka and P. S. Timiras, Berkeley (U.S.A.)
Isolation and Growth of Single Neurones from Spinal Ganglia
Z. Lodin, J. Booher and F. H. Kasten, Prague (Czechoslovakia)
Cultivation of Neurons Dissociated from Spinal Ganglia
M. Sensenbrenner, J. Treska, Z. Lodin, M. Jacob and P. Mandel, Strasbourg (France)
Metabolic Development in Embryonic Sympathetic Ganglia
M. G. Larrabee, L. M. Partlow and W. T. Brown, Baltimore (U.S.A.)
A Morphological Study of the Developing, Mature and Aging Rat Brain
M. C. Diamond, R. Johnson and C. Ingham, Berkeley (U.S.A.)
Composition of the Developing Brain of Human Fetuses
K. K. Chatterjee and K. L. Mukherjee, Calcutta (India)
Labile Substrates in Brain of Newborn Mice
C. I. Mayman and M. L. Tijerina, Boston (U.S.A.)
Inhibition of Pyruvate Oxidation by Acetoacetate in Presence of Infant and Adult Rat Brain «*in vitro*»
T. Itoh and J. H. Quastel, Vancouver (Canada)
Developmental Aspects of Mediated Cerebral Amino Acid Transport *'in vitro'*
G. Levi and M. G. Lattes, Rome (Italy)
Brain Proteins in Ontogeny

A. V. Palladin, Kiev (U.S.S.R.)
Brain Glycoproteins during the Development of Rats at Different Nutritional Levels
L. A. Cioffi, B. De Luca and C. Di Benedetta, Naples (Italy)
The Appearance of the Human Brain-Specific Protein in Ontogenesis
K. Warecka, Lübeck (Germany)
The Uptake of Radioactive Copper and Zinc by Developing Rat Brain
D. Ryan and P. J. Warren, London (England)
Polysome and Light Ribosome in Developing Rat Brains
S. Yamagami, K. Mori and Y. Kawakita, Osaka (Japan)

Biochemical changes in development and ontogenesis (S 21)

Chairmen: H. C. Buniatian (U.S.S.R.)
G. Toschi (Italy)

Human Brain Neuraminidase during Development
R. Ohman, Göteborg (Sweden)
Acetylcholinesterase and Monoamine Oxidase in Spinal and Sympathetic Ganglia of Chick Embryo
G. Giacobini, P. C. Marchisio and E. Giacobini, Turin (Italy) and Stockholm (Sweden)
Changes in Brain D(−)-β-Hydroxybutyrate Dehydrogenase Activity with Development and during Adaptation to Altered Substrate Supply
A. Smith, S. H. Satterthwaite and L. Sokoloff, Bethesda (U.S.A.)
Enzyme Changes in Immature Rat Brain after Food-Deprivation
K. F. Swaiman and R. N. Wolfe, Minneapolis (U.S.A.)
ADH (1.1.1.1) Activity during CNS Development in 40th-41st «Alcoholic Generation» Rats
R. Rodrigo and E. Egana, Santiago (Chile)
Oxidative Phosphorylation in a Mitochondrial Fraction of Developing Chick Brain
J. Gayet and C. Barberis, Nancy (France)
Metabolism of Acetate, Propionate, Butyrate and Glucose by Young and Mature Bovine Cerebral Cortex Slices
K. G. Raju, Alabama (U.S.A.)
Some Aspects of the Organisation and Regulation of the Energetic Function of the Mitochondria in Ontogenesis
Z. D. Pigareva, Moscow (U.S.S.R.)
Phosphocreatine and Creatine Uptake of Developing Rat Brain
H. H. Berlet, Heidelberg (Germany)
Cerebral Energy Metabolism in Developing Rats Subjected to Hypothermia
S. S. Oja, H. S. S. Sarajas and H. Oja, Oulu and Helsinki (Finland)
Gamma (Co^{60}) Whole Body Irradiation and Biochemical Indexes of Developing CNS Mitochondria
E. Egana, B. San Martin and B. Oporto, Santiago (Chile)
Effects of Ouabain upon some Physiological Properties of Developing Brain Tissue in Chick Embryos
J. Sedlacek, Prague (Czechoslovakia)
Hyperphenylalaninemia and the Developing Rat Brain
J. A. Lowden, J. T. R. Clarke, M. J. Stockwell and M. A. La Ramée, Toronto (Canada)
Monolateral Optic Deafferentation and Choline Acetyltransferase Activity in Developing Chick Optic Centres
P. C. Marchisio, Turin (Italy)
Extracellular Compartments and Water in Brain Slices during Development
G. Levi and M. G. Lattes, Rome (Italy)

Hormonal effects on the C. N. S. (S22)

Chairmen: H. McIlwain (England)
F. Fraschini (Italy)

New Neurohormones of the Hypothalamus
A. A. Galoyan, Yerevan (U.S.S.R.)
Hormonal Sensitivity of Embryonic Neural Growth in Culture
A. Vernadakis, Denver (U.S.A.)
A Study on the Variability of Corticotropin Releasing Factor (CRF) Concentration in the Hypophyseal Portal System
D. Borensztajn and A. Malkin, Toronto (Canada)
On the Subcellular Distribution of Corticotrophin-Releasing Factor (CRF) in the Median Eminence of the Rat
A. H. Mulder, Utrecht (The Netherlands)
Studies on the Role of Cyclic 3′,5′-AMP as Mediator of Neurohormones in the Brain
G. Krishna, J. D. Forn and G. L. Gessa, Bethesda (U.S.A.)
Studies on the Behavioral Changes Induced by

Injection of Derivatives of Cyclic 3′,5′-AMP into Various Areas of Brain
G. Krishna, J. D. Forn and G. L. Gessa, Bethesda (U.S.A.)
Studies on the Role of Cyclic AMP in Pituitary Hormone Release
C. Y. Bowers, G. A. Robison, A. V. Schally and F. De Balbian Verster, New Orleans and Nashville (U.S.A.)
Inhibition of Cerebral Adenylcyclase by Calcium
W. P. Burkard and K. F. Gey, Basle (Switzerland)
Comparative Uptake of Sex Hormones in the Brain of Female Rats
K. R. Laumas, A. Farooq, J. P. Uniyal, G. S. Koshti, S. K. Roy, Jr., P. Dhawan and V. Laumas, New Delhi (India)
The Effect of Insulin on the Incorporation of Blood Glucose into the Free Amino Acids of Rat Brain
K. Konitzer and S. Voigt, Berlin (Germany)
Brain Glycogen after Intracisternal Injection of Insulin and Corticosteroids in Rats
E. T. Mellerup and O. J. Rafaelsen, Copenhagen (Denmark)
Uptake and Metabolism of Corticosteroids by Perfused Rat Brain
B. I. Grosser and D. J. Reed, Salt Lake City (U.S.A.)
Serotonin Changes in the Hypothalamus after Local Implants of Hydrocortisone Acetate
R. S. Ulrich, A. Yuwiler and E. Geller, Los Angeles (U.S.A.)
Effect of Cortisol and Epinephrine on the Biochemical Differentiation of Cloned Glial Cells in Culture and of the Developing Rat Brain
J. De Vellis and D. Inglish, Los Angeles (U.S.A.)

Hormonal effects on the C. N. S. (S 23a)

Chairmen: L. Sokoloff (U.S.A.)
N. Miani (Italy)

The Evolution of Reactivity of the Sympathoadrenal System in Ontogenesis and the Variations of Catecholamines Radio Induced by Changes in Some Environmental Factors
S. Simionescu, Bucharest (Romania)
Postnatal Cell Formation in Rat Brain: Effects of Thyroid Hormones
R. Balazs, S. Kovacs, W. A. Cocks and J. T. Eayrs, Carshalton and Birmingham (England)
Effects of Thyroid Hormones on the Incorporation of (1-^{14}C) Leucine into the Proteins of Rat Hypothalamus
S. Kovacs, W. A. Cocks and R. Balazs, Carshalton (England)
Interactions of Thyroxin with Developing Central Nervous System: Observations in the Neonatal Rat
M. B. Dratman and H. Kuhlenbeck, Philadelphia (U.S.A.)
Effects of Triiodothyronine and Bovine Growth Hormone on the Concentration of Nucleic Acids and Enzyme Activities of the Cerebral Cortex and the Cerebellum of Neonatally Thyroidectomized Rats
C. J. Gomez, L. Krawiec, C. Garcia Argiz and J. M. Pasquini, Buenos Aires (Argentina)

Biochemical factors and functional activity (S 23b)

Chairmen: P. Mandel (France)
M. Motta (Italy)

The Effects of Suppressing the Paradoxical Phase of Sleep on the Metabolism of Cerebral Ammonia
I. Haulica, L. Ababei, C. Teodorescu, C. Costan, V. Rosca, M. Moisiu and C. Haler, Iasi (Romania)
Molecular Basis of Sleep Induced by Butyrate
A. A. Rizzoli and L. Galzigna, Montpellier (France)
The Effect of Limbic System Stimulation on Gastric Acid
D. H. Reigel, A. Sances, Jr. and S. J. Larson, Milwaukee (U.S.A.)
Isolation and Characterization of Glycosaminoglycans in Spinal Cord and Peripheral Nerve of Monkey
E. V. Chandrasekaran, M. Singh and B. K. Bachhawat, Vellore (India)
Cerebral Metabolism of Glucose Anomers in Human Subjects *in vivo*
W. Sacks and S. Sacks, Orangeburg (U.S.A.)
The Brain Glycogen in Different Functional Conditions
L. M. Rakic and B. B. Mrsulja, Belgrade (Yugoslavia)
Control at Pyruvate Kinase Step of Aerobic Glycolysis in Cerebral Tissue
G. Takagaki, Tokyo (Japan)

Biochemistry of sensory organs (S 24)

Chairmen: A. Ruffo (Italy)
N. Canal (Italy)

Oxygen Uptake and Aggregation of Neural Retina Cells
K. Kraul and J. E. Richmond, Berkeley (U.S.A.)

Activity and Histochemical and Cytochemical Localization of Cholinesterase in Fish Retina
M. Brzin and B. Drujan, Ljubljana (Yugoslavia) and Caracas (Venezuela)

Study of ATPase Activity in Retinal Photoreceptors
M. A. Ostrovsky, I. B. Fedorovich, Moscow (U.S.S.R.)

Enzymatic Conversion of Retinylidene Schiff Bases by Retinoldehydrogenases in the Retina
J.J.H.H.M. De Pont, Nijmegen (The Netherlands)

Photoreception and Protein Synthesis in Lateral Eye of Limulus
M. Burnel, M. S. Hertweck and W. J. Moore, Bloomington (U.S.A.)

Inorganic Phosphate Content of the Outer Segment of the Rat Retina Photoreceptor Cells
A. Pellegrino De Iraldi and E. Flajszer, Buenos Aires (Argentina)

Sodium and Potassium in Outer Segments of Retina Photoreceptor Cells
R. N. Etingof, A. L. Berman, V. G. Leontev and V. I. Govardovsky, Leningrad (U.S.S.R.)

Light and Retinaldehyde Stimulated Ion Movements in Frog Rod Outer Segments
G. Duncan, Nijmegen (The Netherlands)

The Rapid Lipid to Protein Chromophore Transfer in the Photolysis of the Visual Pigment Membrane
E. W. Abrahamson, Cleveland (U.S.A.)

Glutamate Release from the Retina during Spreading Depression
A. V. Harreveld and E. Fifkova, Pasadena (U.S.A.)

Ganglioside Patterns of Ocular and Brain Tissue
H. Bernhelmer, Wien (Austria)

Internal Protonation in Retinylidene Phosphatidylethanolamine and the Red Shift in Rhodopsin
F. J. M. Daemen, Nijmegen (The Netherlands)

Phospholipids and Rhodopsin in Cattle Rod Outer Segments
J.M.P.M. Borggreven, Nijmegen (The Netherlands)

Anatomical and Biochemical Maturation of the Normal and Dystrophic Mouse Retina
R. N. Lolley and J. O. Erickson, Sepulveda and Los Angeles (U.S.A.)

Proteins of the Guinea Pig Auditory Pathway
W. E. Davies, Birmingham (England)

Chemical pathology of the nervous tissues (S 25)

Chairmen: J. Cumings (England)
G. Bianchi Porro (Italy)

Changes in ATP and Creatine Phosphate (CP) in Mouse Cerebellar Layers during Ischemia
H. S. Maker, G. M. Lehrer, D. J. Silides and C. Weiss, New York (U.S.A.)

Metabolic Maturation of the Brain in Relation to Asphyxia Neonatorum
M. D. Faro, New York (U.S.A.)

Metabolic Adaptive Changes in the Rat Brain Caused by Hypoxia and Anoxia in the early Life Period
L. Jilek, S. Trojan and E. Travnickova, Praha (Czechoslovakia)

Brain Glycogen Content of Monkey Newborns and Juveniles Recovering from Asphyxia and Circulatory Arrest Respectively
A. Rivera, Jr., A. W. Brann, Jr., J. R. Miller and R. E. Myers, San Juan (Puerto Rico)

Synthesis of Adenine Nucleotides, RNA and Proteins in Brain and Kidney during Post-Anoxic Recovery
E. Gerlach, P. Marko, I. Pechan, H. G. Zimmer, D. R. H. Gourley, C. Trendelenburg and T. Cremer, Freiburg (Germany)

Lactate Dehydrogenase in Transected Peripheral Nerves
S. Niemierko and K. Kowalska, Warsaw (Poland)

Cholesterol Esters and Cholesterol Esterase Activity in the Chick Sciatic Nerve during Development and Wallerian Degeneration
C. Mezei, Halifax (Canada)

Increased Cerebrospinal Fluid (CSF) Total Protein—a Sign of Blood-CSF-Barrier Damage
H. Link and O. Zettervall, Lund (Sweden)

Amyotrophic Lateral Sclerosis: Reduced Amino Acid Concentration in the Liquor Cerebrospinalis and in Blood Serum
M. Simanyi and E. Gründig, Wien (Austria)

Central Neurosiderosis: Possible Pathogenetic

Role of Iron in Amyotrophic Lateral Sclerosis (ALS)
C. N. Still, R. H. Gadsden and W. D. Hiers, Columbia and Charleston (U.S.A.)
Qualitative Alterations of Cerebrospinal Fluid *Immunoglobulin* G (CSG-IgG) in Multiple Sclerosis (MS)
O. Zettervall and H. Link, Lund (Sweden)
Lipid and Protein Studies on Multiple Sclerosis White Matter
B. Gerstl, L. F. Eng, M. Tavaststjerna and I. K. Smith, Palo Alto (U.S.A.)
Differences in Fatty Acid Composition of Myelin Subfractions in Multiple Sclerosis
M. A. Moscarello and J. A. Lowden, Toronto (Canada)
Fatty Acids and Aldehydes in Choline and Ethanolamine Phosphoglycerides and in Cholesterol Esters in the White Matter of Multiple Sclerosis Brains
L. Amaducci, A. Arnetoli and P. Borri, Florence and Perugia (Italy)

Chemical pathology of the nervous tissues (S 26)

Chairmen: C. L. Cazzullo (Italy)
C. Fieschi (Italy)

Biochemical and Ultrastructural Studies of Leukodystrophy with Failure of Myelinization
L. Schneck, M. Adachi and B. W. Volk, Brooklyn (U.S.A.)
Developmental Aspects of Experimental Phenylketonuria in the Rat
E. Geller and A. Yuwiler, Los Angeles (U.S.A.)
Amino Acid Excretion in Urine of Normal Children and Children with Various Psychiatric Diseases. A Thin-Layer Chromatographic Study
O. S. Jorgensen, B. Kofod, E. T. Mellerup and O. J. Rafaelsen, Copenhagen (Denmark)
A New Metabolic Error: Hyperarginemia
J. Schwenk, H. G. Terheggen, J. P. Colombo, M. Van Sande and A. Lowenthal, Köln (Germany), Bern (Switzerland) and Berchem (Belgium)
Oxygen Electrode Studies of Rat Brain Respiration in Uraemic and Hepatic Coma
L. E. Claveria and P. T. Lascelles, London (England)
Recherches Chromatogrophiques dans un Group Familial avec Anomalie du Metabolisme de l'Urée
F. Colucci D'Amato, Naples (Italy)
Electrolyte Metabolism in Head Injuries
K. Khalifa, S. El-Safouri and M. M. Salama, Mansoura, Egypt (U.A.R.)
Studies of Serum Lactate Dehydrogenase (LDH) Activity in Rabbits Inoculated for Induction of Experimental Allergic Encephalomyelitis (EAE)
A. E. Kaplan and L. V. Brown, La Jolla (U.S.A.)
L-Dopa and Cerebrospinal Fluid Homovanillic Acid in Parkinsonism
M. L. Klawans, Jr., and W. Wenier, Chicago (U.S.A.)
Disturbance of Amino Acid Metabolism in the CNS in Parkinsonism
E. Gründig, Wien (Austria)
Further Experimental Data about the Disturbances of Porphyrin Metabolism in Schizophrenia
I. Huszak and I. Durko, Szeged (Hungary)
Serum Pseudocholinesterase Activity in Schizophrenia
B. Parveen, M. A. Rahman and Z. Hassan, Karachi (Pakistan)
Studies of «Epileptic» Cortical Foci Induced with Ouabain
E. Lewin, Denver (U.S.A.)

Chemical Pathology of the nervous tissues (S 27)

Chairmen: P. Paoletti (Italy)
G. M. Cornio (Italy)

Studies on the Effects of Diphenylhydantoin and Pneumoencephalography on the Serum Coeruloplasmin Level, 5-HIAA Excretion and Clinical Findings in Epilepsy
T. Domzal and W. Pakszys, Warsaw (Poland)
Body Fluids Distribution in Manic and Depressed Patients Treated with Lithium Carbonate
A. Mangoni, V. Andreoli, F. Cabibbe and V. Mandelli, Milan (Italy)
Brain Catecholamine Metabolism in Acute Hepatic Ischemia
F. A. Reichle, M. P. Brigham, R. R. Tyson, R. M. Reichle and G. P. Rosemond, Philadelphia (U.S.A.)
Changes in Acid Metabolites of Dopamine and 5-Hydroxytryptamine in Lumbar C.S.F. of Patients Treated with L-Dopa
I. A. Pullar, J. M. Weddel, A. Hanieh, R. Ahmed

and F. J. Gillingham, Edinburgh (Scotland)
Metabolic Abnormalities in the Hereditary Ataxic Rabbit
N. Robinson, London (England)
Biochemical, Histochemical and Morphological Study on a Case of Kufs' Disease
B. Berra, L. Matturi and G. Coggi, Milan (Italy)
Metabolic Stability of DNA in Normal and Scrapie-Affected Mouse Brain
R. H. Kimberlin, Compton (England)
Defective Pyruvic Decarboxylation in a Child with an Intermittent Movement Disorder
J. Blass, J. Avigan and W. Uhlendorf, Bethesda (U.S.A.)
The Effect of Cortisone on the Neurotoxicity of Niacine-Adenine Nucleotide in Mice
G. G. Haydu, New York (U.S.A.)
Fucosidosis: Generalized Storage of Antigenic Fucosyl Derivatives
M. Philippart, Los Angeles (U.S.A.)
Enzyme Patterns and Protein Profiles of Infant and Adult Brain Tumors
M. Wollemann, A. Nagy, F. Katona and E. Paraicz, Budapest (Hungary)
Energy Metabolism of Malignant Brain Tumors: Chemotherapeutic Implications
W. M. Kirsch, J. W. Leitner, D. Schulz and J. W. Buskirk, Denver (U.S.A.)

Biochemical factors and functional activity (S 28)

Chairmen: A. N. Davison (England)
E. Chiesara (Italy)

Use of Zonal Rotor in the Separation of Subcellular Brain Constituents
G. Brante, Lund (Sweden)
Quantitative Histochemistry of Hypothalamic Magnocellular Nuclei
J. F. Jongkind, Amsterdam (The Netherlands)
Relation of Mitochondria Aspartate Aminotransferase Localization with the Energetical State of the Mitochondria
A. Waksman and A. Rendon, Strasbourg (France)
On the Functional Significance of the Presence of Hydrolytic Enzymes in the Brain, Peripheral Nerves and Cutaneous Sense Organs of a Fish, «Saccobranchus Fossilis»
V. K. Rajbanshi and H. B. Tewari, Udaipur (India)
Enzyme Measurements in Lipofuscin-Rich Portions of Individual Neurons
H. E. Hirsch, Los Angeles (U.S.A.)
Distribution and Biochemical Properties of Brain Hexokinase
D. Biesold, P. Teichgraber, V. Bigl, Leipzig (Germany)
Immunochemical Specificity of Creatine Phophokinase Isoenzymes in Nervous Tissue, CSF and Muscle
A. Sherwin and J. Bulcke, Montreal (Canada)
The Enzymology of the Molecular and Granular Cell Layers of the Rabbit Cerebellum
O. Z. Sellinger, Z. Lodin and J. M. Azcurra, Ann Arbor (U.S.A.) and Prague (Czechoslovakia)
Maturation and Topographic Variations in Enzymatic Equipment of Vessel Walls in the N.S. (Histochemical Study)
E. Farkas, Fontenay-AuxRoses (France)
Enzymes in Glial Cells and in Neurons: a Comparison of Intracellular Distribution Patterns
J. M. Azcurra, Z. Lodin and O. Z. Sellinger, Ann Arbor (U.S.A.) and Prague (Czechoslovakia)
Central Nervous System and Peripheral Nerve Carboxylic Acid Esterases in Humans
K. D. Barron, J. Bernsohn and A. R. Hess, Hines (U.S.A.)
Study on Mitochondrial Profiles in Different Regions of the Central Nervous System
C. G. Honegger, M. Schardt and E. S. Gander, Basle (Switzerland)
Ultracytochemical Evidence for the Functional Heterogeneity of Mitochondria in the Nervous System
F. Hajos and S. Kerpel-Fronius, Budapest (Hungary)
Some Biochemical Characteristics of Neuroglia
M. S. Promyslov, Moscow (U.S.S.R.)
Activation of the Giant Neuron in Mollusc 'Limnaea Stagnalis' Due to an Insertion of Microelectrode
E. N. Sokolov, G. G. Arakelov and A. Pakula, Moscow (U.S.S.R.)

Biochemical factors and functional activity (S 29)

Chairmen: R. B. Rodnight (England)
F. Di Jeso (Italy)

Metabolites in Layers of Mouse Cerebral Cortex and Subjacent White Matter and Changes during Ischaemia and Anesthesia

J. Folbergrova, J. V. Passonneau and O. H. Lowry, Prague (Czechoslovakia) and St. Louis (U.S.A.)
The Subcellular Distribution of Acid Mucopolysaccharides in Rabbit Brain
J. Vos, Amsterdam (The Netherlands)
Functional and Chemical Organization of Giant Neurons and Neuroglia of Tritonia Diamedia Berg's
S. M. Bezruchko, T. A. Ajimolaev and A. N. Mezentsev, Moscow (U.S.S.R.)
Chemical Organization of Excitated and Inhibited State of Nerve Cell
A B. Kogan, Rostov-On-Don (U.S.S.R.)
Biochemical Parameters for the Investigation of Neural Influences on Skeletal Muscle
R. W. Albers, L. Guth and F. J. Samaha, Bethesda (U.S.A.)
Effect of Cholinergic and Adrenergic Blocking Agents on Heterosynaptic Facilitation in Aplysia Californica
R. J. Von Baumgarten and T. Hukuhara, Ann Arbor (U.S.A.)
Effects of Serotonin, LSD and Related Compounds on Potentials Evoked *in vitro* in Thin Sections from the Superior Colliculus
N. Kawai and C. Yamamoto, Maebashi, Gunma-Ken (Japan)
The Effect of Imidazoleacetic Acid on Glucose Metabolism in Mouse Brain *in vivo*
J. T. Rick, J. M. Clifford and G. A. Kerkut, Southampton (England)
Biogenic Amine Levels and Locomotor Activity in Drosophila Melanogaster
K. J. Connolly and J. T. Rick, Sheffield (England)
Effect of L-Dihydroxyphenylalanine on Glucose Metabolism in Brain
G. M. Tyce, E. V. Flock and C. A. Owen, Jr., Rochester (U.S.A.)
Studies on the Ammonia Formation of Brain Slices
H. Weil-Malherbe, Washington (U.S.A.)
Synaptic Potentials in Brain Slices and the Level of ATP
C. Yamamoto and M. Kurokawa, Tokyo (Japan)
Some Data on the Pattern of Energy Metabolism in the Nervous Tissue of a Cephalopod Mollusc, the Squid (Ommatostrephes Sloanei Pacificus)
N. A. Verzhbinskaya and M. V. Savina, Leningrad (U.S.S.R.)
Neurochemical Characteristics of Evoked Neurone Activity in Cerebral Cortex
G. N. Oleinik and I. V. Orlov, Moscow (U.S.S.R.)

Electrolytes, transport and axonal flow (S 30)

Chairmen: W. H. Sweet (U.S.A.)
F. Piccinini (Italy)

Ultrastructure and Variable Aperture Pore Function of Hexagonal Subunits in Plasma Membranes
R. D. Schultz, S. K. Asunmaa and F. D. Kleist, Newport Beach (U.S.A.)
Characterization of Ordered Water in Hydrophilic Membrane Pores
R. D. Schultz, S. K. Asunmaa, G. A. Guter and F. E. Littman, Newport Beach (U.S.A.)
Sodium-Dependent Transport of Calcium and Glutamate in Invertebrate Nerve
P. F. Baker, Cambridge (England)
Sodium and Potassium Distribution in Puffer Fish Supramedullary Nerve Cell Bodies
R. Katzman, G. M. Lehrer and C. E. Wilson, New York (U.S.A.)
Potassium Effects on Amino Acid Fluxes in Rat Brain Slices
T. Arnfred and L. Hertz, Copenhagen (Denmark)
Potassium Effects on «Swelling» and Sodium Concentrations in Rat Brain Slices
L. Hertz and Lund-Andersen, Copenhagen (Denmark)
Potassium Effects on Sucrose and Inulin Spaces in Rat Brain Slices
A. Schousboe and L. Hertz, Copenhagen (Denmark)
The Osmotic Behaviour of Synaptosomes in Various Electrolyte Solutions
P. Keen and T. D. White, Bristol (England)
Regulatory Properties of Potassium and Ouabain on a K^+-dependent Phosphohydrolase in Rat Brain Synaptosomes
B. Formby and J. Clausen, Copenhagen (Denmark)
Are Sulfatides Involved in Sodium Ion Transport?
K. A. Karlsson, B. E. Samuelsson and G. O. Steen, Göteborg (Sweden)
The Role of Thiamine in Membrane Transport
J. R. Cooper and J. Itokawa, New Haven (U.S.A.)

Active Transport Regulation of Intracellular «pH» in the Brain
A. Kjällquist, K. Messeter and B. K. Siesjö, Lund (Sweden)
Ion Binding by Phospholipids Isolated from Guinea-Pig Heart Mitochondria
A. Chiarra, C. Galli, F. Piccinini and F. Villani, Milan (Italy)
Nervous Control Mechanism on the Inward Flux of Phosphate Ions in Rat Skeletal Muscle
G. L. A. Graff, Bruxelles (Belgium)

Electrolytes, transport and axonal flow (S 31)

Chairmen: S. Ochs (U.S.A.)
J. O. Karlsson (Sweden)

Amino Acid Transport Mechanisms and their Probable Sites in the Cerebrospinal Fluid Compartment
A. V. Lorenzo, S. R. Snodgrass and R. W. P. Cutler, Boston (U.S.A.)
Kinetics of Aminoacid Uptake by Rat Cerebral Cortex Slices
P. Joanny, J. Corriol and H. Hillman, Marseille (France) and London (England)
Glutamate Fluxes in Peripheral Nerves
F. V. DeFeudis, Montreal (Canada)
Rapid Axonal Migration of Proteins to the Synaptic Endings in the Retino-Tectal Neurons of the Pigeon
M. Cuenod and J. Schonbach, Zürich (Switzerland)
Axonal Flow in Terminal and non-Terminal Portions of Adrenergic Fibres
M. Costa and G. Gabella, Turin (Italy)
Changes in Protein Efflux from Unmyelinated Nerve *in vitro*
J. F. Hines and D. M. Easton, Tallahassee (U.S.A.)
Some Aspects of Axoplasmic Flow in the Tibial Nerve after different Methods of Anastomosis
M. Czochra and T. Borkowski, Lublin (Poland)
Axoplasmic Transport in the Optic Nerve and Tract of the Rabbit
J. Sjostrand and J. O. Karlsson, Göteborg (Sweden)
Somal Synthesis and Fast Transport of Labelled Materials in Nerve Fibers
S. Ochs and M. I. Sabri, Indianapolis (U.S.A.)
Influence of Colchicine on Axoplasmic Transport in Crushed Peripheral Nerves
L. Lubinska, Warsaw (Poland)
Ca^{2+} and Synaptic Events in the Sensory Cortex
R. G. Grenell and E. Romero, Baltimore (U.S.A.)
Chloride in the Central Nervous System: Kinetics and Role in Edema
R. S. Bourke, H. L. Gabelnick, O. M. Young and D. B. Tower, Bethesda (U.S.A.)

DEVELOPING BRAIN

No. 31 February, 1969

In accordance with our desire to change the format and increase the usefulness of the DEVELOPING BRAIN newsletter we are making two innovations. The first is the inclusion of a very short review on some topic of current interest in each newsletter. The purpose of this review will be to point up recent important references in various special fields. In this issue it has been written by Dr. Michael Plaut who is working actively on studies of pre and postnatal influence on the young. I have asked various experts in other fields to prepare similar short reviews for the succeeding newsletters. If you would like to contribute please send me material and we will use it in the first vacant spot that turns up. The second innovation is the division of the references into animal and clinical studies. Hopefully this change will make the reference lists more usable.

PSYCHOPHYSIOLOGICAL EFFECTS OF PRENATAL AND EARLY POSTNATAL EXPERIENCE

A series of studies worthy of note—especially considering the current interest in the ontogeny of aggressive and violent behavior—comes from the laboratory of Dr. V. H. Denenberg, who finds that rearing mice in the presence of female rats reduces aggressive response and affects adrnal reactivity (Denenberg, et al., *Nature,* 1969, **122**: 73–74). Other effects of manipulation of mother-litter interactions on offspring development have also been reported (Grota, *Physiol. Behav.,* 1969, **4**: 105).

Two studies have shown effects of prenatal maternal handling of rodents on gestation period length and adult offspring behavior (Ader & Plaut, *Psychosom. Med.,* 1968, **30**: 277–286; Werboff, et al., *Physiol. Behav.,* 1968, **3**: 35–39). The first of these papers also reported effects on plasma corticosterone response to stimulation and susceptibility to gastric erosions.

At least three laboratories have been involved in studies of the relationship between infantile stimulation and plasma corticosterone response (e.g., Ader, *J. comp. physiol. Psychol.,* 1968, **66**: 264–268; Levine, *Develop. Psychobiol.,* 1968, **1**: 67–70; Zarrow, et al., *Nature,* 1968, **218**: 1264–1265). The extent to which other neurological and endocrinological factors mediate the influences of prenatal and early postnatal experiences on behavior have received comparatively little attention. A recent exception was the finding of morphological differences in rat brain as a result of handling in infancy (Altman, et al., *Develop. Psychobiol.,* 1968, **1**: 10–20); a suggestion, perhaps, that research of the next few years will find early environmental effects to be more extensive and complex than has often been supposed.

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NEW BOOKS:

"Ontogenesis of the Brain" edited by L. Jilek and S. Trojan, Universita Karlova, Praha, 1968.

"The Biochemistry of Memory" edited by S. Bogoch, Oxford University Press, New York, 1968.

"Brains of Rats and Men" edited by C. J. Herrick, Hafner Inc., New York, 1963.

REFERENCES:

ANIMAL STUDIES:

(1) Robinson, N. and Eayrs, J. T. Histochemical study of the cerebral cortex in rats thyroidectomised at birth. Brain Res., 9:351, 1968. (2) Swaiman, K. F., Hosfield, W. B. and Lemieux, B. Elevated plasma phenylalanine concentration and lysine incorporation into ribosomal protein of developing brain. J. Neurochem., 15:687, 1968. (3) Wang, K.-M. Comparative study of the development of enzymes involved in carbohydrate and amino acid metabolism from brain, heart, liver and kidney of chick embryo. Comp. Biochem. Physiol., 27:33, 1968. (4) Zamenhof, S., van Marthens, E., and Margolis, F. L. DNA (cell number) and protein in neonatal brain alteration by maternal dietary protein restriction. Science, 160:322, 1968. (5) Wegelin, I. and Manzoli, F. A. Free nucleotides in the chick embryo brain during development. J. Neurochem., 14:1161, 1967. (6) Kulkarni, A. S. and Shideman, F. E. Catecholamine accumulation in the brains of infant and adult rats after monoamine oxidase inhibition. Europ. J. Pharmacol., 3:269, 1968. (7) Carubelli, R. Changes in rat brain neuraminidase during development. Nature, 219:955, 1968. (8) Bridgers, W. F. Serine transhydroxymethylase in developing mouse brain. J. Neurochem., 15:1325, 1968. (9) D'Adamo, A. F., Jr. and D'Adamo, A. P. Acetyl transport mechanisms in the nervous system. The oxoglutarate shunt and fatty acid synthesis in the developing rat brain. J. Neurochem., 15:315, 1968. (10) Dellweg, H., Gerner, R. and Wacker, A. Quantitative and qualitative changes in ribonucleic acids of rat brain dependent on age and training experiments. J. Neurochem., 15:1109, 1968. (11) Altman, J., Anderson, W. J. and Wright, K. A. Differential radiosensitivity of stationary and migratory primitive cells in the brains of infant rats. Exp. Neurol., 22:52, 1968. (12) Sims, K. L., Witzitum, J., Quick, C. and Pitts, F. N., Jr. Brain 4-aminobutyrate: 2-oxoglutarate aminotransferase: Changes in the developing rat brain. J. Neurochem., 15:667, 1968. (13) D'Adamo, A. F., Jr., Gidez, L. I. and Yatsu, F. M. Acetyl transport mechanisms. Involvement of N-acetyl aspartic acid in de novo fatty acid biosynthesis in the developing rat brain. Exp. Brain Res., 5:267, 1968. (14) Nievel, J. G., Robinson, N. and Eayrs, J. T. Protein synthesis in the brain of rats thyroidectomized at birth. Experientia, 24:677, 1968. (15) Bleyer, W. A. and Rosen, M. G. Meperidine-induced changes in the maternal and fetal electroencephalograms of the guinea pig. Electroenceph. clin. Neurophysiol., 24:249, 1968. (16) Mathews, J. Effect of feeding L-tyrosine to pregnant rabbits on the tyrosine oxidising activity of their offspring. Biol. Neonat., 12:282, 1968. (17) Eberle, E. D. and Eiduson, S. Effect of pyridoxine deficiency on aromatic L-amino acid decarboxylase in the developing rat liver and brain. J. Neurochem., 15:1071, 1968. (18) De Vellis, J. Glycolysis in rat brain tissue slices following neonatal head x-irradiation: relation of regional differences to the LDH:GPDH ratio. J. Neurochem., 15:1057, 1968.

CLINICAL STUDIES:

(1) Rosenberg, L. E., Lilljeqvist, A.-Ch. and Hsia, Y. E. Methylmalonic aciduria. An inborn error leading to metabolic acidosis, long-chain ketonuria and intermittent hyperglycinemia. New Engl. J. Med., 278:1319, 1968. (2) Sastry, P. S. and Stancer, H. C. Blood gangliosides in infantile amaurotic idiocy. Clin. Chim. Acta, 20:487, 1968. (3) Sjaastad, O. and Halvorsen, S. Histaminuria in Hartnup disease. Acta Paediat. Scand., 57:289, 1968. (4) Carey, M. C., Donovan, D. E., Fitzgerald, O. and McAuley, F. D. Homocystinuria. I. A clinical and patholo-

gical study of nine subjects in six families. Am. J. Med., 45:7, 1968. (5) Carey, M. C., Fennelly, J. J. and Fitzgerald, O. Homocystinuria. II. Subnormal serum folate levels increased folate clearance and effects of folic acid therapy. Am. J. Med., 45:26, 1968. (6) Schulte, F. J., Michaelis, R., Linke, I. and Nolte, R. Motor nerve conduction velocity in term, preterm, and small-for-dates newborn infants. Pediatrics, 42:17, 1968. (7) Frankenburg, W. K., Duncan, B. R., Coffelt, R. W., Koch, R., Coldwell, J. G. and Son, C. D. Maternal phenylketonuria: implications for growth and development. J. Pediat., 73:560, 1968.

No. 32 April, 1969

We are in process of revising our mailing list for the newsletter. We have made changes in addresses to correspond with the last directory of the FASEB and the AMERICAN ACADEMY OF NEUROLOGY. We would, however, appreciate it if you would send to us a cardwith your name and current address, if you wish to have the newsletter continued.

DRUG ACTION IN YOUNG ANIMALS

It is a truism that the field of pharmacology is constantly progressing as new drugs are developed for new uses. But what has been laboriously achieved for adults cannot necessarily be applied without additional animal and clinical investigations to the fetus, the newborn and during childhood. This restriction applies with most force in the field of psychopharmacology because of several factors: 1) the bloodbrain barrier, most permeable to some substancese in the fetus and the newborn. Thus, psychopharmacological agents tend to assume greater concentrations in the brain of the newborn than the adult, for example, morphine. 2) Another important factor is that of the growth of the various enzyme systems, especially those active in the detoxication processes. The latter may be regarded as practically nonexistent in the fetus and in the neonate but undergo more rapid development during childhood. Newborns are more susceptible to short-acting barbiturates than adults (J. Lab. Clin. Med., 32: 540, 1947). Perhaps in the newborn the hepatic microsomal enzymes responsible for the detoxication of the short-acting barbiturates are not sufficiently developed. The neonate is also more susceptible than the adult to long-acting barbiturates due to impaired excretion of these substances and their metabolites resulting from the immaturity of the neonatal kidneys. In childhood the adaptive mechanisms are developing rapidly but even then we need for practical purposes more precise information as to dosage. We do have general rules that serve, but only as guideposts, for example, the administration of drugs according to weight or surface area. But actual empirical information must be at hand before we can have any surety of precisely described dossages.

In our laboratory we have been studying the effects of psychopharmacological agents on the sleep-wakefulness cycle of growing kittens. Chlorpromazine and imipramine in the newborn kitten, as in the adult, depress wakefulness but this starts only after the newborn has attained the age of 16–18 days. Slow wave and activated sleep on the contrary came on some time after the first, second or third day of extrauterine life (RECENT ADVANCES IN BIOLOGICAL PSYCHIATRY, 10: 257, 1968). In the neonates, however, amphetamine (Psychopharmacologia, Berlin, 13: 161–169, 1968) exerts effects which are the reverse of those of the adult, but only on slow wave sleep for

slow wave sleep is decreased in the adult cat but prolonged in the young kitten, starting 1–3 days after birth. We did not consider teratological effects of drugs here because they are too well known to require emphasis.

Harold E. Himwich, M.D.
Thudichum Psychiatric Research Laboratory

CALLING ATTENTION TO: MEETINGS 1969 & 1970

9th International Embryological Conference, Moscow, Russia, August 25–29.
2nd International Meeting of the International Society for Neurochemistry, Milan, Italy, September 1–5.
3rd International Conference on Congenital Malformations, The Hague, The Netherlands, September 8–12.
7th International Congress of E.E.G. and Clinical Neurophysiology, San Diego, California, September 13–19.
9th International Congress of Neurology, New York, New York, September 20–27.
5th International Meeting of Neurobiologists, Oslo, Norway.
2nd Congress of the International Association for the Scientific Study of Mental Deficiency, Warsaw, Poland, August 25-September 1, 1970.

Many friends of Dr. Theodore C. Schneirla were grieved to hear of his death on August 20, 1968. His loss will be widely felt in the biological and behavioral science fields.

REFERENCES:

CLINICAL STUDIES:

(1) Hrbek, A., Hrbkova, M. and Lenard, H. G. Somato-sensory evoked responses in newborn infants. Electroenceph. clin. Neurophysiol., 25: 443, 1968. (2) Hutt, S. J., Hutt, C., Lenard, H. G., Bernuth, H. v. and Muntjewerff, W. J. Auditory responsivity in the human neonate. Nature, 218:888, 1968. (3) Hutt, C., Bernuth, H. v., Lenard, H. G., Hutt, S. J. and Prechtl, H. F. R. Habituation in relation to state in the human neonate. Nature, 220:618, 1968. (4) Prechtl, H. F. R. and Lenard, H. G. A study of eye movements in sleeping newborn infants. Brain Res., 5:477, 1967. (5) Prechtl, H. F. R., Vlach, V., Lenard, H. G. and Grant, D. K. Exteroceptive and tendon reflexes in various behavioural states in the newborn infant. Biol. Neonat. 11:159, 1967. (6) Lenard, H. G., Bernuth, H. v., and Prechtl, H. F. R. Reflexes and their relationship to behavioural state in the newborn. Acta Paediat. Scand., 57:177, 1968. (7) Lucey, J., Ferreiro, M. and Hewitt, J. Prevention of hyperbilirubinemia of prematurity by phototherapy. Pediatrics, 41:1047, 1968. (8) Prechtl, H. F. R. Problems of behavioral studies in the newborn infant. In ADVANCES IN THE STUDY OF BEHAVIOR, 1:75, Academic Press, Inc., New York, 1965. (9) Scriver, C. R. Inborn errors of aminoacid metabolism. Brit. Med. Bull., 25:35, 1969. (10) Sung, S.-C. DNA synthesis in the developing rat brain. Can. J. Biochem., 47:47, 1969.

ANIMAL STUDIES:

(1) Mueller, R. A., Thoenen, H. and Axelrod, J. Adrenal tyrosine hydroxylase: Compensatory increase in activity after chemical sympathectomy. Science, 163:468, 1969. (2) Sugrue, M. F. A study of the role of noradrenaline in behaviournal changes produced in the rat by psychotomimetic drugs. Brit. J. Pharmacol., 35: 243, 1969. (3) Purpura, D. P. and Pappas, G. D. Structural characteristics of neurons in the feline hippocampus during postnatal ontogenesis. Exp. Neurol., 22:379, 1968. (4) Ounsted, M. and Ounsted, C. Factors affecting the rate of intrauterine growth. Nature, 220:599, 1968. (5) McDonald, W. I. and Sears, T. A. Technique for producing focal demyelination. Nature, 221: 182, 1969.

No. 33 June, 1969

We have been very pleased by the prompt and enthusiastic response we have had from many of you in answering our request to renew your name on our mailing list. For those of you who have not yet sent in a card with your name and current address it will be assumed that you are no longer interested in receiving the newsletter.

AMINO ACIDS AND EARLY DEVELOPMENT

The work of Curtis and Watkins (1960, Inhibition in the Central Nervous System and Gamma-Aminobutyric Acid) and Krnjevic and Phillis (1963, J. Physiol. **165**: 274–304) on the possible excitatory-inhibitory role of amino acids in the CNS led to an increase in the investigations of amino acids in the developing brain. Recent studies have shown that immature rats fed a diet containing an excess of certain amino acids caused an increased cerebral excitability leading to convulsions by lowering the threshold for hexafluorodiethyl ether (Gallager, 1969, J. Neurochem. **16**: 701–706). Gallager concluded that this was due to the high level of tryptophan, phenylalanine, tyrosine or methionine and not to increased penetration of the convulsive agent into the brain. Removal of the amino acid from the diet eliminated the toxic effect. Adult rats were not affected by this treatment.

The alteration of the concentration of cerebral amino acids in fetal rats when the mothers were injected with branch chained amino acids suggests a change in the overall structural-functional relationship of the developing CNS (Carner, 1969, J. Neurochem. **16**: 113–116). The degree to which particular amino acids can affect the young brains has been well shown by Clarke and Lowden (1969, Can. J. Biochem. **47**: 291–295) in which less galactolipid and cholesterol was present as well as a decrease in weight. These rats were injected with phenylalanine. Further studies on the metabolism of amino acids in the young CNS of rats by Swaiman and Lemieux (1969, J. Neurochem. **16**: 385–388) indicates that phenylalanine and its metabolites, O-tyrosine, and phenylpyruvic acid in a labeled glucose medium has no effect on oxygen uptake and carbon dioxide formation.

A systematic division of the effects of excessive amino acids on growth depression into four groups (1) very toxic; methionine, cystine, phenylalanine, tryptophan, (2) toxic; histidine, tyrosine, lysine, (3) slightly toxic; glycine, proline, valine, arginine and (4) nontoxic; serine, isoleucine, leucine, alanine, aspartic and glutamic acids was done by Daniel and Waisman (1968, Growth, **32**: 255–265). Methionine appeared to have the most striking effect on weanling rat brain amino acid metabolism (Daniel and Waisman, 1969, J. Neurochem. **16**: 787–795).

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Thudichum Psychiatric Research Laboratory

NEW BOOKS:

The Neuropsychology of Development. A Symposium. Robert L. Isaacson, Ed., Wiley, New York, 1968, Reviewed in SCIENCE, **164**: 1157, 1969.

Applied Neurochemistry. A. N. Davison and J. Dobbing, Eds., Blackwell Scientific Publications, Oxford and Edinburgh, 1968.

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CALLING ATTENTION TO:

Two recent symposiums on development have been reviewed in the Meetings Section of SCIENCE, **164**: 1191 for June 6, 1969. One, is the report on a conference of "Hormones in Development" held in Nottingham University, Nottingham, England 9–12 September 1968, and the other a symposium on "Fetal Growth and Development" in San Diego, 16–20 November 1968.

The National Institute of Child Health and Development and the U.S.-Japan Cooperative Science Program will hold a meeting at Palo Alto, California on "Neuropsychological Methods for Assessment of Impaired Brain Function in the Malnourished Child" on June 22–27, 1969.

REFERENCES:

CLINICAL STUDIES:

(1) Buck, C., Valentine, G. H. and Hamilton, K. A study of microsymptoms in the parents and sibs of patients with Down's syndrome. Am. J. Ment. Def., 73:683, 1969. (2) Busch, H. F. M. Unusual collateral circulation in a child with cerebral arterial occlusion. Psychiat. Neurol. Neurochir., 72:23, 1969. (3) Fuller, R. N. and Shuman, J. B. Phenylketonuria and intelligence: trimodal response to dietary treatment. Nature, 221:639, 1969. (4) Gross, H. P. and Schulte, F. J. Über vermehrte spindelaktivität im Schlaf-EEG bei kindern mit phenylketonurie. Z. Kinderheilk. 105:324, 1969. (5) Hambraeus, L., Wranne, L. and Lorentsson, R. Biochemical and therapeutic studies in two cases of homocystinuria. Clin. Sci., 35:457, 1968. (6) Hardy, J. B., McCracken, G. H., Jr., Gilkeson, M. R. and Sever, J. L. Adverse fetal outcome following maternal rubella after the first trimester of pregnancy. J. Am. Med. Assoc., 207:2414, 1969. (7) Hirt, H. R. Beitrag zur symptomatologie der zentralnervösen residualschäden durch icterus gravis neonatorum. Z. Kinderheilk., 104:168, 1968. (8) Jackson, B. T. and Egdahl, R. H. The performance of complex fetal operations in

utero without amniotic fluid loss or other disturbances of fetal-maternal relationships. Surgery, 48:564, 1960. (9) Jorgenson, O. S., Mellerup, E. and Ole, J. R. Amino acid screenings of urine in children with psychiatric diseases. Acta Psychiat. Scand., (Suppl. 203), pg. 97, 1968. (10) Nolte, R., Schulte, F. J., Michaelis, R., Weisse, U. and Gruson, R. Bioelectric brain maturation in small-for-dates infants. Develop. Med. Child Neurol., 11:83, 1969. (11) Palo, J. and Saifer, A. Free amino acids in Tay-Sachs and normal human brain grey matter. Clin. Chim. Acta, 22:327, 1968.

GENERAL REFERENCES: ANIMAL STUDIES:

(1) Berthold, C.-H. A study on the fixation of large mature feline myelinated ventral lumbar spinal-root fibres. Acta Soc. Med. Upsal., 73(9):1, 1968. (2) Berthold, C.-H. Ultrastructure of the node-paranode region of mature feline ventral lumbar spinal-root fibres. Acta Soc. Med. Upsal., 73:37, 1968. (3) Berthold, C.-H. Ultrastructure of postnatally developing feline peripheral nodes of ranvier. Acta Soc. Med. Upsal., 73:145, 1968. (4) Berthold, C.-H. and Skoglund, S. Histochemical and ultra-structural demonstration of mitochondria in the paranodal region of developing feline spinal roots and nerves. Acta Soc. Med. Upsal., 72:37, 1967. (5) Berthold, C.-H. and Skoglund, S. Post-natal development of feline paranodal myelin-sheath segments. II. Electron microscopy. Acta Soc. Med. Upsal., 73:127, 1968. (6) Buckingham, S., Sommers, S. C. and Sherwin, R. P. Lesions of the dorsal vagal nucleus in the respiratory distress syndrome. Am. J. Clin. Pathol., 48:269, 1967. (7) Dennis, R. A., Jacoby, R. O. and Griesmer, R. A. Intrauterine techniques for studying development of the immune response of the fetal dog. Lab. Animal Care, 18:561, 1968. (8) Diamond, M. C., Johnson, R. E., Ingham, C. and Stone, B. Lack of direct effect of hypophysectomy and growth hormone on post-natal rat brain morphology. Exp. Neurol., 23:51, 1969. (9) Foote, J. L. and Tao, R. V. P. The effects of p-chlorophenylalanine and phenylalanine on brain esterbound fatty acids of developing rats. Life Sci., 7:1187, 1968. (10) Grota, L. J. The effects of maternal strain, fetal strain, and mode of delivery on maternal responsiveness and offspring development. Physiol. Behav., 4:105, 1969. (11) Honova, E., Miller, S. A., Ehrenkranz, R. A. and Woo, A. Tyrosine transaminase: development of daily rhythm in liver of neonatal rat. Science, 162:999, 1968. (12) Jouvet-Mounier, D. and Astic, L. Etude de l'évolution du sommeil du raton au cours du premier mois post-natal. Compt. Rend. Soc. Biol., 162:119, 1968. (13) Woodward, D. J., Hoffer, B. J. and Lapham, L. W. Post-natal development of electrical and enzyme histochemical activity in purkinje cells. Exp. Neurol., 23:120, 1969. (14) Tuchmann-Duplessis, H. Influence of environmental agents on mammalian foetal development. Proc. roy. Soc. Med., 61:1289, 1968. (15) Phemister, R. D., Shively, J. N. and Young, S. The effects of gamma irradiation on the postnatally developing canine cerebellar cortex. II. Sequential histogenesis of radiation-induced changes. J. Neuropath. Exp. Neurol., 28:128, 1969. (16) Oja, S. S., Uusitalo, A. J., Vahvelainen, M.-L. and Piha, R. S. Changes in cerebral and hepatic amino acids in the rat and guinea pig during development. Brain Res., 11: 655, 1968. (17) Shonbach, J., Hu, K. H. and Friede, R. L. Cellular and chemical changes during myelination: histologic, autoradiographic, histochemical and biochemical data on myelination in the pyramidal tract and corpus callosum of rat. J. Comp. Neur., 134:21, 1968. (18) Ward, C. O. Screening methods in teratology, Drug. Intelligence, 2:324, 1968. (19) Altman, J., Anderson, W. J. and Wright, K. A. Reconstitution of the external granular layer of the cerebellar cortex in infant rats after low-level X-irradiation. Anat. Rec., 163:453, 1969. (20) Bass, N. H., Netsky, M. G. and Young, E. Microchemical studies of postnatal development in rat cerebrum. 1. Migration and differentiation of cells. Neurology, 19:258, 1969. (21) Cumar, F. A., Barra, H. S., Maccioni, H. J. and Caputto, R. Sulfation of glycosphingo-lipids and related carbohydrates by brain preparations from young rats. J. Biol. Chem., 243:3807, 1968. (22) Delhaye-Bouchaud, N. and Laget, P. Développement de certaines relations tectales chez le jeune Lapin. II. Evolution des réponses tecto-corticales et tecto-cérebelleuses. C. R. Soc. Biol., 160:1193, 1966. (23) Geloso, J. P., Hemon, P., Legrand, J.,

Legrand, C. and Jost, A. Some aspects of thyroid physiology during the perinatal period. Gen. Comp. Endocrinol., 10:191, 1968. (24) Harper, L. V. The effects of isolation from birth on the social behaviour of guinea pigs in adulthood. Anim. Behav., 16:58, 1968. (25) Hinds, J. W. Autoradiographic study of histogenesis in the mouse olfactory bulb. I. Time of origin of neurons and neuroglia. J. Comp. Neurol., 134: 287, 1968. (26) Hinds, J. W. Autoradiographic study of histogenesis in the mouse olfactory bulb. II. Cell proliferation and migration. J. Comp. Neurol., 134:305, 1968. (27) Houston, M. L. The early brain development of the dog. J. Comp. Neurol., 134:371, 1968. (28) Jackson, O. F. Congenital abnormalities in kittens. Vet. Rec., 84:76, 1969. (29) Jost A. Full or partial maturatin of fetal endocrine systems under pituitary control. Perspect. Biol. Med., 11:371, 1968. (30) Laget, P. and Delhaye-Bouchaud, N. Développement de certaines relations tectales chez le jeune Lapin. I. Evolution des réponses colliculaires à la stimulation optique. C. R. Soc. Biol., 160:1150, 1966. (31) Maenpaa, P. H. and Raiha, N. C. R. Effects of anoxia on energy-rich phosphates, glycogen, lactate and pyruvate in the brain, heart and liver of the developing rat. Ann. Med. exp. Fenn., 46:306, 1968. (32) Néverlée, H. and Laget, P. Modifications des potentiels évoqués somesthésiques et visuels au cours de la "spreading depression" corticale, chez le Lapin en cours de développement. C. R. Soc. Biol., 160:1198, 1966. (33) Phemister, R. D. and Young, S. The postnatal development of the canine cerebellar cortex. J. Comp. Neurol., 134: 243, 1968. (34) Roffi, J. Évolution des quantités d'adrénaline et de noradrénaline dans les surrénales des foetus et des nouveau-nés de Rat et de Lapin. Ann. Endocrinol., 29:277, 1968. (35) Westergaard, E. The cerebral ventricles of the guinea-pig during growth. Acta Anat., 70:382, 1968. (36) Sheltawy, A. and Dawson, R. M. C. The deposition and metabolism of polyphosphoinositides in rat and guinea-pig brain during development. Biochem. J., 111:147, 1969. (37) Silver, A. A method for demonstrating acetylcholinesterase and choline acetylase in foetal brain. Experientia, 25:63, 1969. (38) Boyd, J. S. Radiographic appearance of the centres of ossification of the limb bones in the feline foetus. Brit. Vet. J., 124:365, 1968. (39) Franck, G. and Gerebtzoff, M. A. Maturation structurale et maturation biochimique de la névroglie chez le Rat. C. R. Soc. Biol., 162:580, 1968. (40) Rose, G. H. and Lindsley, D. B. Development of visually evoked potentials in kittens: specific and nonspecific responses. J. Neurophysiol., 31:607, 1968. (41) Purpura, D. P. and Pappas, G. D. Structural characteristics of neurons in the feline hippocampus during postnatal ontogenesis. Exp. Neurol., 22:379, 1968. (42) Rose, G. H. Immature secondary electro-cortical responses to photic stimulation in kittens. Brain Res., 7:465, 1968. (43) Purpura, D. P., Prelevic, S. and Santini, M. Postsynaptic potentials and spike variations in the feline hippocampus during postnatal ontogenesis. Exp. Neurol., 22:408, 1968. (44) Susbielle, H., Harding, F. and Jacquot, R. Influence de l'etat gravide sur l'utilisation de l'azote et du soufre alimentaires. Arch. Sci. Physiol., 23:135, 1969. (45) Susbielle, H. Aspect du catabolisme protéique chez la ratte gestante: composition azotée de l'urine. Arch. Sci. Physiol., 20:83, 1966. (46) Jackson, B. T., Piasecki, G. J. and Egdahl, R. H. Experimental vascular disease. Experimental production of coarctation of the aorta in utero with prolonged postnatal survival. Surg. Forum, 14:290, 1963. (47) Sedlácek, J. and Dousová, M. Effect of membrane inhibitors on the brain tissue during the ontogenesis. Activ. Nerv. Superior, 10:323, 1968. (48) Blackwell, B.-N., Blackwell, R. Q., Yu, T. T. S., Weng, Y.-S. and Chow, B. F. Further studies on growth and feed utilization in progeny of underfed mother rats. J. Nutr., 97:79, 1969. (49) Brooks, C. C. and Davis, J. W. Changes in hematology of the perinatal pig. J. Animal Sci., 28:517,* (50) Cohan, S. L. and Ford, D. H. The effect of neonatal X-irradiation on the accumulation of (^{3}H) by the central nervous system of the rat following injection of (^{3}H)-5-uridine. Acta Neurol. Scandinav., 45:53, 1969. (51) Chow, B. F. and Sherwin, R. W. Fetal parasitism? Arch. Environ. Health, 10:395, 1965. (52) Chow, B. F., Blackwell, Q., Blackwell, B.-N., Hou, T. Y., Anilane, J. K. and Sherwin, R. W. Maternal nutrition and metabolism of the offspring: studies in rats and man. A.J.P.H., 58:668, 1968. (53) Chow, B. F., Blackwell, R. Q., Blackwell, B.-N., Sherwin, R. W., Hsueh, A. M., and Lee,

C.-J. Studies on the progeny of underfed mothers. Proc. 7th Int. Cong. Nutr., 4:3, 1966. (54) Daniel, R. G. and Waisman, H. A. The effects of excess amino acids on the growth of the young rat. Growth, 32:255, 1968. (55) Field, E. J., Hughes, D. and Raine, C. S. Electron microscopic observations on the development of myelin in cultures of neonatal rat cerebellum. J. Neurol. Sci., 8:49, 1968.
* Year for reference 49 is 1969.

編 集 後 記

■しばらく Frankfurt に行っておられた黒川さんがおかしな(?)“海外だより”を編集部に送ってこられました。ドイツ人とつき合われて強烈な印象をもたれたようです。ドイツの研究体制のことなど，もっと普通な海外だよりをのちに頂ける予定ですから，そのintroduction としてお読み下さい。

■さて，本号にはミラノの第2回国際神経化学会のプログラムをのせました。2年前のストラスブルグのときとくらべて，ほぼ2倍の規模だそうです。シンポジウムと round table のプログラムをみますと，今日の神経化学の研究の世界的動向がほぼわかるようです。この国際神経化学会をいつかは日本で開催してほしいという要望が海外の研究者のなかにあります。遠くない将来にそのようなことが実現すれば，うれしいことだと思われます。

■先日の理事会で本年度の神経化学会のプログラム編成ができました。すでにお手許に送られていることと存じます。神経系の疾患の生化学に関する発表が非常に多いようです。この学会は懇話会的に発展することが要望されていますが，臨床畑の方々と生化学畑の方々との活発な意見交換を期待したいと思います。

■その理事会では，議事が終了したのちに，大学紛争の話に話題が集中しました。各大学で事情は大いに異っているようでした。しかし本質的には共通の問題に根ざしており，学会のあり方とも関連したこととして意見がたたかわされました。この日本神経化学会としては，どのように活動をつづけるべきか，深く考えなければならない問題が多いのであります。

（8月11日，高垣記）

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1. 神経化学領域の研究報告論文（原著）の投稿をうけつける。神経系の化学的研究に直接貢献する論文をうけつけるほか，臨床報告・短信をも含めて広く神経系の化学に関連の深い論文を歓迎する。
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12. 用語および略語：物質名および生化学用語（単位など）の記載のならびに略語の使用は，原則として Biochem. J. の規定に準拠する。薬剤名，慣用の略語を用いるときは，その最初に用いられるところに脚註として説明を加える。

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