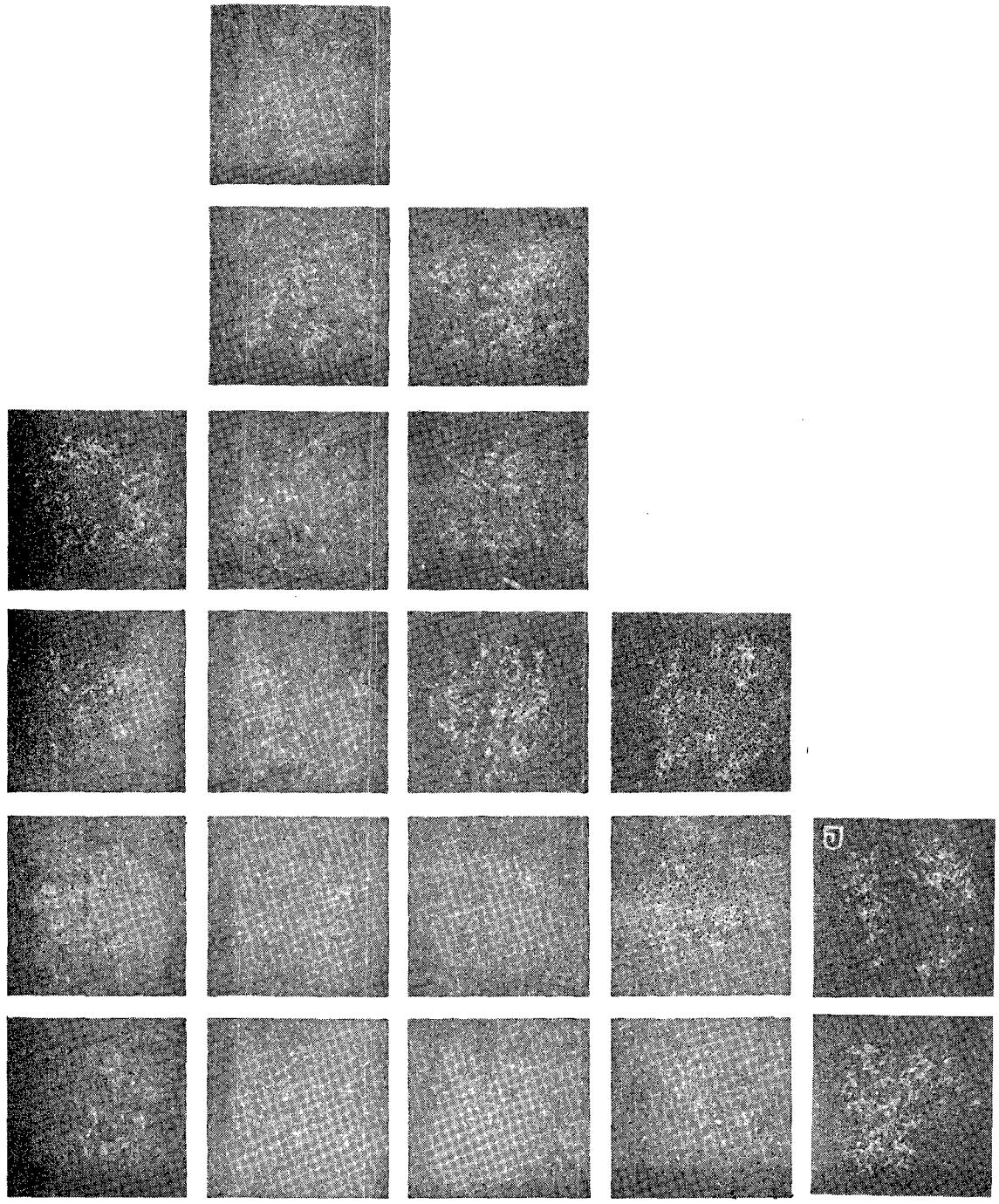
神経化学

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神 経 化 学 懇 話 会



——資　料——

2つのAnnual Reviewsから

1：Annual Review of Biochemistry, Vol. 32, 1963

Annual Review of Biochemistry, Vol.32, 1963のNeurochemistry (Roberts E. & Baxter C. F.) p.513-552.の項には最近数年の神経化学領域の綜説とシンポジウム発表論文の一覧表がかゝげられている。それは文献欄と対照しながら利用するようになっている。こゝには，その一覧表を更に利用しやすいものとするため，各綜説・論文の表題・著者を記し，分野別に，また年度順に記載した。主な綜説とシンポジウム発表論文のみであるが，各分野の重要な傾向は知ることができ，その分野の専門の研究者のためには，知識の整理に，専門外の方には，文献調査の手引として，役立つものと思われる。

page

A. Historical Background ····· 140

B. Chemical Architecture, Histochemistry and Developmental Changes ····· 140

C. Nerve Activity: Excitation, Inhibition and Transmission ····· 142

D. Barriers, Fluids, and Transport Phenomena ····· 144

E. Ionic Movement, Electrolytes and Minerals ····· 145

F. Mineral Metabolism ····· 146

G. General Metabolism ····· 147

H. Carbohydrates and Carbohydrate Metabolism ····· 148

I. Nitrogen Metabolism: Amino Acids, Peptides and Proteins ····· 149

J. Nucleotides and Nucleic Acids ····· 153

K. Lipids ····· 154

L. Biogenic Amines, Indoles and Acetylcholine ····· 156

M. Vitamins and Cofactors ····· 158

N. Hormones ····· 159

O. Pharmacology and Toxicology ····· 160

P. Diseases of the Nervous System ····· 162

Q. Biochemical Lesions(Hereditary Disorders) ····· 164

R. Nutrition and Tissue Culture ····· 165

S. General Chemistry, Surveys, and Methodology ····· 165

T. Avant-grade Reading ····· 166

A. Historical Background

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(P 167よりつづく)

減じ，ラベルしたRNAのprecursorのとりこみもまた著しく減ずるのである。

RNAと記憶

Retained memory（学習）では神経の相互連鎖の再配列が行われると同時に，ある化学的変化が脳で実際に起っているにちがいないと考えるのは，少くとも生化学者にとってはほとんど公理のようなものである。実際に起っている変化の少くとも1つとしてRNAの変化があるかもしれないと言う可能性は注目すべきである。Planariaについて，またラットについて今までに得られている根據は非常にprovocativeなものである。Planariaについての実験がはじめて発表されたのはすでに数年まえで，条件づけされたplanariaの個体を2つに切りはなすと，それから再生して生じた新しい個体もまた条件反応をもっていることを示したものであった[1]。条件づけされた個体を2つに切って，その尾のほうをRNAaseで処理するともはや条件反応をもった個体には再生しないが，頭のほうからはRNAaseで処理してもやはり条件反応をもった個体に再生することも示された。このことは，化学的に特殊なRNAが重要であるばかりでなく，ニューロン相互間の連関もまた重要であることを物語るものである。[1][2] 条件づけされたplanariaをすりつぶして別のplanariaにたべさせると条件づけが容易になることもまた知られている。[1]

Hydén とEgyházi[3]が示したところの学習中および学習後にはニューロンのRNAに化学的な変化が認められると言う事実は，planariaの成績を確めるものであろう。即ち，核のRNAのadenine：uracil 比が高くなり，細胞1個当りのRNAの量が高まるのである。細胞形質のRNAには変化を認めることができなかったが，それは必ずしも量の少い“messenger” RNA[4]に全く変化がないことを示すものだと理解すべきでないであろう。DingmanとSporn[5]はRNAの形成を阻害する8-azaguanineを用いラットの学習を低下させることができたのである。

RNAが記憶に影響を及ぼすものであると言う，こゝにのべた可能性に示唆をうけて，Allan Memorial Instituteでは1958年から老人についての興味ある精神医学的研究がすすみつつある。勿論，このような臨床の成績ではその効果を定量的に判断するのがむずかしいのであるが，Cameronおよび共同研究者は特に記憶障害の軽度な患者では，RNAの投与が有効であることを指摘している[6][7]

2：Progress in Neurologg and Psychiatry, 18, 1963

今年のProgress in Neurology and Psychiatry にはHimwich W.A. が綜説をかいている。

Progress in neurology and psychiatry, Vol. XVIII. E.A. Spiegel, ed. Grune & Stratton, New York, 1963

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Developing brain
Mental deficiency
Human-brain composition
Blood-brain barrier
Cerebral metabolic rate and blood flow
Compartmentalization in brain metabolism
Subcellular distribution of brain constituents
Species comparison
Amino acids and cerebral electrical activity
Role of neuroglia
RNA and memory

そのなかで最近のトピックである最後の2項目を次に紹介する。

神経膠の機能

神経膠はニユーロンよりも機能的に重要でないものだとされ，事実単にニユーロンの支持組織にすぎないとさえ考えられていた。このように考えられた理由は，グリアの機能を研究する方法がなかったためでもある。今や，その方法が開発されつつあるので，中枢神経系の機能と代謝におけるグリアの役割について急速に関心が高まってきた。

例えば，Galambos[1]は脳機能のglia-neural説を提出して，ニユーロンとグリアは互に共同して行動を示すのであろうとのべた。その意味では，グリアはニユーロンの行動をorganizeしprogramする機能をもっていると言えよう。同じような考え方はHyden[2]によってものべられ，ニユーロンとグリアのあいだには密接な関連があって，グリアはニユーロンの電気化学的過程を統合する有効なfeed-back機能をなすものであると考えたのである。

組織培養のastrocyteが非常にのろい電気的反応を示すこと[3]，またこれと同じようなポテンシャルがネコの皮質でも認められると言う事実[4]から，脳の電気的現象にグリア細胞が関与していることは確かなようである。

グリアの機能と代謝を研究するのに問題となることの1つは，in vivoで全く純粋でニユーロンや軸索のまざらないグリアの培養をつくりだすことが困難だと言うことであった。Koch とその共同研究者[5]は，これを解決するためにネコを使って視覚領を偏側剔除し，両側の眼球剔出を行って外側膝状体の変性を起させた。4ケ月以内にニユーロンはほとんど全く消失してしまった。そこでそののちに，その部分の生化学的特徴を研究した。このグリア細胞ではナトリウム及びクロールの濃度は高いが，カリウムの濃度はニユーロンとおよそ同じであった。脳には細胞外液はほとんどないからナトリウムにしろカリウムにしろ細胞内に分布しているにちがいないとして，Katzman[6]もやはり同じ結論をのべている。イオンの分布については2つの可能性が考えられる。即ち(1)ナトリウムとカリウムはすべての細胞内に均一に分布していて，狭い細胞間隙は単に膜の電気化学的勾配を保つのに役立つにすぎないのか，もしくは(2)グリア細胞あるいは少くともその一部のものが機能的には細胞間隙として電気化学的勾配を保っているのかであろう。もし後者のようであるならば，グリア細胞のナトリウム濃度は高い筈だと言うことになる。

Koenig, BungeおよびBunge[7]はネコの脊髄での脱髄とその修復過程におけるグリアの機能を示した。損傷を加えた直後には，その部分の細胞でのラベルしたRNAのとりこみが低下していた。早期に現れてくる格子状細胞(gitter cell) ではラベルしたprecursorが活発にRNAにとりこむのが認められた。myelinが再生されるまえに，oligodendrogliaでDNAがラベルされるのが活発であった。同時にまた，細胞形質および核のRNAが著しく増加し，ラベルレたRNAおよびタンパクのprecursorを活発にとりこんでいた。この損傷を電子顕微鏡でみたときには，これらの細胞は反応性のmacrogliaとして認められる。それが損傷の部分にはいりこんでゆき新しいmyelin鞘を形成する。この時期には構造的にも，組織化学的にも，代謝的にも，その特徴は未熟なoligodendroglia と同じである。myelin の再生が完成したときには，その細胞は線維性の astrocyte となり，細胞形質の RNA は著しく

(P166につづく)

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Table des matières

I. BIOCHIMIE
Some current views on brain monoamines (Brodie B.B. & Costa E.) 13-49
Monoamine oxidase (Zeller E.A.) 51-57
Biochemistry and pharmacology of serotonin in the central nervous system (Garattini S. & Valzelli L.) 59-88
DOPA analogues as tools for the study of dopamine and noradrenaline in brain (Carlsson A. & Lindqvist M.) 89-92
The amine incorporating system(Transglutaminase) (Waelsch H.) 93-104
Drug-induced alterations of the metabolism of cerebral monoamines (Pletscher A. & Gey K.F.) 105-115

II. NEUROPHYSIOLOGIE
Actions neurophysiologiques des mobilisateurs des monoamines et des inhibiteurs de la monoamine-oxydase (Leusen I.) 119-131
Monoamines et systèmes de projections diffuses (Dell P.) 133-142
Monoamines and conditioned behavior (Dews P.B.) 143-151
Amines in relation to behavior: Some problems and approaches (Elkes J.) 153-166

III. CORRELATION CLINIQUE
Connaissances expérimentales sur les monoamines et quelques syndromes psychiatriques (Tissot R.) 169-207
Clinical assessment of the value of monoamine oxidase inhibitors in the treatment of mental disorders (Gottfries C.G.) 209-214
Monoamines, médicaments psychotropes et nosographie psychiatrique (Deniker P.) 215-232

Déductions tirées de nos connaissances sur les inhibiteurs de MAO par rapport à la classification classique des psychoses (Kielholz P. & Labhardt F.) 233-238
Retentissement des connaissances expérimentales des monoamines sur les classifications nosographiques classiques (Cazzullo C. C.L., De Martis D. & Terranova R.) 239-246
Les catécholamines dans la maladie de Parkinson (Barbeau A., Sourkes T.L. & Murphy G.F.) 247-262

RESUMES (Kety S.S., MacLean P.D. & de Ajuriaguerra J.) 263-293

The chemistry of thinking, by Humphrey G. & Coxon R.V.
C.C. Thomas, Springfield, Ill., 1963. pp. 148

CONTENTS

Part I. Psychological considerations
I. A general statement. A. Introductory; B. Integration as the fundamental process in thinking; C. Sherrington: Hebb; D. The organic system
II. Problems of motivation. Direction of thought; Trial and error
III. Past experience -- Memory
IV. Thought and the environment
V. Consciousness
VI. Conclusions

Part II. Chemical considerations
I. Physiological background. Integration of neuronal activity in extracerebral systems; Physical and chemical events associated with neuronal and synaptic excitation; Genesis of resting potential in nerve; Transmission of excitation within a neurone: the action potential; Restoration of resting state; Synaptic transmission
II. Phosphate bonds and cellular energy. Techniques for the study of intermediary metabolism; Coupled phosphorylation
III. Relation between nerve impulses, thoughts and memories
IV. Learning and memory. Embryological approach; Possible "chemical specification" of neuronal connexions; Theory of self-exciting circuits compared with other possible bases for memory; Chemical coding as exemplified by genetic information; Immunological "memory"; A possible biochemical basis for learning
V. Psychopharmacology

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神経化学　VOL. 2　NO. 5

目　次

〔資　料〕

2つの Annual Reviews から

1 : Annual Review of Biochemistry,

Vol. 32, 1963……139

2 : Progress in Neurology and Psychiatry,

Vol. 18, 1963……167

〔書　架〕……169

緒方書店刊