profoundly influence our conception of the role of molecular evolution in the development of endocrine systems, and we must look forward eagerly to further advances in this rapidly-developing field[36].

Résumé. On sait que chez les vertébrés la structure moléculaire de certaines hormones, telles que les hormones thyroïdiennes, est restée sans changement pendant l'histoire évolutionnaire du groupe. L'auteur discute la fixation par les protochordés des iodures marqués, et la signification pour l'origine des hormones thyroïdiennes de la localisation des combinaisons organiques d'^{131}I dans la tunique des urochordés et dans l'endostyle de ceux-ci et de l'amphioxus.

Si on considère le groupe d'hormones avec molécules protéiques ou polypeptidiques, on trouve parmi elles des différences qui indiquent l'existence de quelques caractéristiques individuelles. Quant aux plus grandes molécules, elles diffèrent les unes des autres par les propriétés antigeniques et les poids moléculaires, peut-être par rapport au développement de specificité protéique. Les plus petites molécules polypeptidiques, telles que les polypeptides hypothalamiques, montrent des différences en ce qui concerne les acides aminés. Ces variations sont accompagnées par des différences qui constituent en théorie une base pour l'évolution adaptive, mais il n'est pas facile de faire une corrélation entre elles et les caractères physiologiques des divers groupes.

On doit donc admettre que le cours d'évolution ne dépend pas seulement des variations moléculaires des hormones, mais que des hormones déjà existantes sont utilisées pour établir de nouvelles fonctions. Pour comprendre alors la pleine signification des variations moléculaires des hormones, il faut chercher d'autres fonctions; on doit aussi étudier beaucoup d'autres espèces, surtout parmi les vertébrés inférieurs.

[36] *Acknowledgments.* This article is based upon some lectures given by invitation to the Zoology Departments of the University of London, and I am grateful for being allowed that opportunity to review some problems of comparative endocrinology. I am indebted for permission to reproduce Figures to Dr. I. HARRIS, Dr. J. G. PHILLIPS, Academic Press, The British Council, and CH. C. THOMAS. My colleague, Dr. A. K. KENT, has been kind enough to read the manuscript.

Brèves communications – Kurze Mitteilungen – Brevi comunicazioni – Brief Reports

Momentum Distribution for Deuteron Clusters in Li^6

Quasi-elastic proton scattering at intermediate energies has proved itself a useful tool for studying the structure of light nuclei. Symmetrical quasi-elastic proton scattering on Li^7, B^{10}, B^{11}, and C^{12} is quite well understood in the simple shell model[1]. On the contrary, the quasi-elastic scattering on Li^6 cannot be entirely reproduced with the shell model. In a recent article it was shown that this can be partially done using a simple cluster model[2]. Here the result of a similar calculation is reported: the momentum distribution for deuteron clusters in Li^6 is calculated in the same model and compared with experimental data[1,3] from the reaction Li^6 (p, pd) He^4.

In this case the $p - d$ correlation cross section for symmetrical outgoing proton and deuteron (the scattering angle $\vartheta = \vartheta_p = \vartheta_d$) in the impulse-approximation takes the form

$$d\sigma/dp\, d\Omega_p\, d\Omega_d = \text{const}\, g^2(q), \qquad (1)$$

where $p = |\boldsymbol{p}_p| = |\boldsymbol{p}_d|$ is the momentum of the outgoing proton and deuteron, $q = |\boldsymbol{q}|$ is the momentum of the deuteron cluster in the Li^6 nucleus before scattering, and $g^2(q)$ is the momentum distribution of bound deuteron clusters in nuclei before scattering.

In the Born-approximation the form factor $g(q)$ for the considered reaction reads ($\hbar = 1$)

$$g(q) = \int d\tau\, \varphi_f^*(\boldsymbol{r}_1, \ldots, \boldsymbol{r}_6) \exp(-i\, \boldsymbol{q}\, \boldsymbol{R}_d)\, \varphi_i(\boldsymbol{r}_1, \ldots, \boldsymbol{r}_6), \qquad (2)$$

where $\boldsymbol{r}_1, \ldots, \boldsymbol{r}_6$ are the position vectors of the six nucleons in the Li^6 nucleus, further $d\tau = d^3r_1, \ldots, d^3r_6$, and φ_i and φ_f are the wave functions for the initial and final nuclei, respectively.

For the initial nuclear wave function one takes according to PEARLSTEIN, TANG, and WILDERMUTH[4]

$$\varphi_i = (\boldsymbol{R}_\alpha - \boldsymbol{R}_d)^2 \exp\Big(-\tfrac{1}{2}\alpha_1 \sum_{i=1}^{4} r_{i\alpha}^2 - \tfrac{1}{2}\bar{\alpha}_1 \sum_{i=5}^{6} r_{id}^2 - \tfrac{2}{3}\beta_1 (\boldsymbol{R}_\alpha - \boldsymbol{R}_d)^2\Big). \qquad (3)$$

Here $\boldsymbol{r}_{i\alpha}$ and $\boldsymbol{r}_{id}$ are the relative vectors in the α-particle and deuteron cluster, respectively,

$$\boldsymbol{r}_{i\alpha} = \boldsymbol{r}_i - \boldsymbol{R}_\alpha \;(i = 1, 2, 3, 4); \quad \boldsymbol{r}_{id} = \boldsymbol{r}_i - \boldsymbol{R}_d \;(i = 5, 6)$$

and $\boldsymbol{R}_\alpha$ and $\boldsymbol{R}_d$ the corresponding center-of-mass vectors

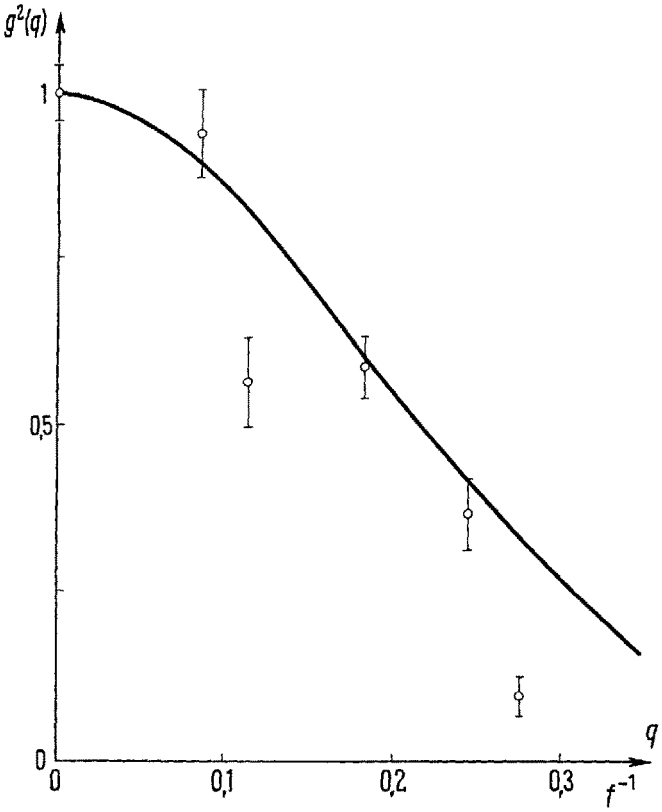
$$\boldsymbol{R}_\alpha = \tfrac{1}{4} \sum_{i=1}^{4} \boldsymbol{r}_i \quad ; \quad \boldsymbol{R}_d = \tfrac{1}{2} \sum_{i=5}^{6} \boldsymbol{r}_i \quad .$$

[1] J. P. GARRON, J. C. JACMART, M. RIOU, C. RUHLA, J. TEILLAC, and K. STRAUCH, Nucl. Phys., to be published.
[2] J. STRNAD, Phys. Rev., to be published.
[3] M. RIOU, private communication.
[4] L. D. PEARLSTEIN, Y. C. TANG, and K. WILDERMUTH, Phys. Rev. *120*, 224 (1960).

For the final nuclear wave functions we take

$$\varphi_f = \exp\left(-\tfrac{1}{2}\alpha_2 \sum_{i=1}^{4} r_{i\alpha}^2 - \tfrac{1}{6}\alpha_2 \sum_{i=5}^{6} r_{id}^2\right) , \qquad (4)$$

where $r_{i\alpha}$ and r_{id} have the defined meaning.



The calculated curve $g^2(q) = (1 - (1/3\,q^2)/q_0^2)^2 \exp(-q^2/q_0^2)$ (5) and experimental points[1,3] for the momentum distribution for deuteron clusters in Li^6. The following values are used for the parameters[4] $\alpha_1 = \alpha_2 = 0.43\,f^{-2}$, $\beta_1 = 0.33\,f^{-2}$, $q_0 = 0.35\,f^{-1}$. Both distributions are normalized to unity at $q = 0$.

In fact, one would have to take the antisymmetrized wave functions φ_i and φ_f. Not taking antisymmetrization into account corresponds to the statement that the α-particle and the deuteron cluster in the Li^6 nucleus are well separated. This is rigorously not the case since there does exist some overlap[4]. However, owing to the way of measurement, one would expect that not taking antisymmetrization into account is a good approximation.

Inserting the wave functions (3) and (4) in the expression (2) for the form factor $g(q)$, and introducing the fact that the initial nucleus is at rest before scattering, one obtains

$$g(q) = \text{const}\ {}_1F_1\left(\tfrac{5}{2},\tfrac{3}{2};\ -\tfrac{1}{2}\,q^2/{q_0}^2\right) , \qquad (5)$$

where ${}_1F_1$ is the confluent hypergeometric function and[5]

$${q_0}^2 = 3\,\beta_1 - \alpha_1 - \alpha_2 .$$

The result (5) is compared with the measured $p - d$ correlation cross section (1) where the scattering angle ϑ had been expressed through energy and momentum conservation with the momentum of the deuteron cluster q. In spite of the simplifications used, the agreement seems to be nearly satisfactory[6].

Zusammenfassung. Die Impulsverteilung der Deuteronen-Cluster in Li^6 wurde mittels eines einfachen Cluster-Modells mit Werten für Parameter von PEARLSTEIN et al. berechnet. Die Rechnungsergebnisse werden mit Messergebnissen von GARRON et al. bei der Reaktion $Li^6(p, pd)$ verglichen. Das einfache Cluster-Modell gibt brauchbare Resultate, wie das für die Impulsverteilungen der Protonen in Li^6 teilweise der Fall war.

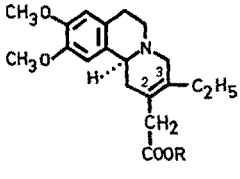
J. STRNAD

Institute of Physics of the University Ljubljana (Yugoslavia), February 5, 1962.

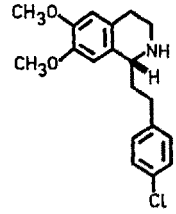
[5] In (2) the recoil of the α-particle is neglected. Taking this into account one has to replace the exponential factor in (2) by $\exp i\,\boldsymbol{q}\,(\boldsymbol{R}\alpha - \boldsymbol{R}_d)$. This only alters q_0 to $q_0' = 2q_0/3$, so the curve on the Figure becomes somewhat steeper. However, the modification thus introduced is not greater than the spread of experimental points.

[6] *Acknowledgement.* Thanks are due to M. RIOU for submitting results[1] of the Saclay group prior to publication.

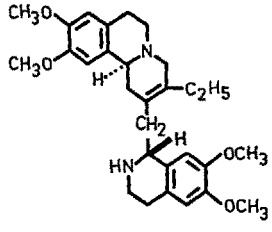
Synthese und absolute Konfiguration von (-)-2-Dehydroemetin[1]



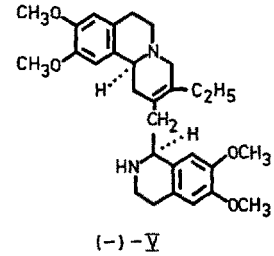
(−) − I , R = −CH_3
(−) − II , R = −H



(+) − III



(−) − IV



(−) − V

Aus dem rac. Methylester I[2], in dem die 2,3-Stellung der Doppelbindung durch das NMR-Spektrum bestätigt wird, konnten durch optische Spaltung die beiden Antipoden (−)- und (+)-I gewonnen werden. Basierend auf Arbeiten von HARDEGGER et al.[3], BAN et al.[4], VAN TAMELEN et al.[5] und BATTERSBY et al.[6] besitzt (−)-I die in der Formel eingezeichnete absolute Konfiguration. Die saure Hydrolyse der öligen Methylester (−)-I und (+)-I führt ohne Racemisierung[7] zu den kristallinen Carbon-

[1] Über die Darstellung der in dieser Mitteilung erwähnten vier optisch aktiven 2-Dehydroemetin-Isomeren und das Resultat ihrer chemotherapeutischen Untersuchung wird in Helv. chim. Acta ausführlich berichtet werden.

[2] A. BROSSI, M. BAUMANN, L. H. CHOPARD-DIT-JEAN, J. WÜRSCH, F. SCHNEIDER und O. SCHNIDER, Helv. chim. Acta *42*, 772 (1959).
[3] H. CORRODI und E. HARDEGGER, Helv. chim. Acta *39*, 889 (1956).
[4] Y. BAN, M. TERASHIMA und O. YONEMITSU, Chemistry and Ind. *1959*, 568.
[5] E. E. VAN TAMELEN, P. E. ALDRICH und J. B. HESTER jr., J. Amer. chem. Soc. *81*, 6214 (1959).
[6] A. R. BATTERSBY und S. GARRATT, Proc. chem. Soc. London *1959*, 86. – A. R. BATTERSBY, R. BINKS und T. P. EDWARDS, J. chem. Soc. *1960*, 3474.

[7] Die $(\alpha)_D$-Werte wurden in Methanol (c = 1) gemessen.