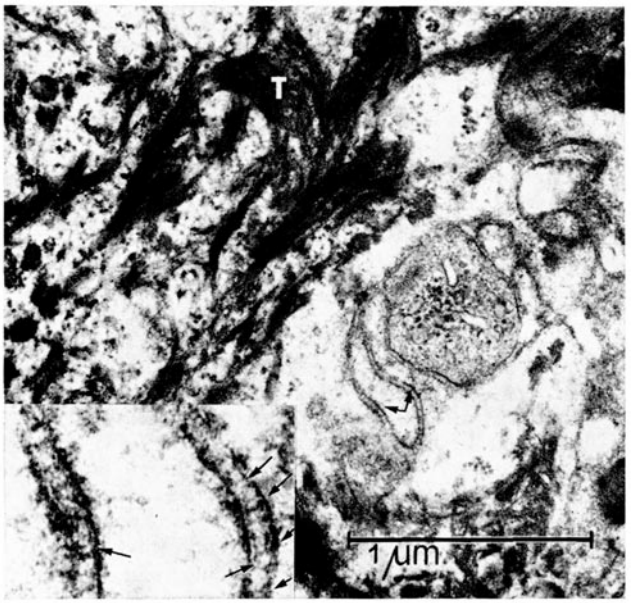
Septiert aussehende Zwischenzellkontakte in normaler menschlicher Epidermis

Septierte Desmosomen[1] wurden bisher nur bei Wirbellosen beobachtet ([1-3] u.a.). Sie sind wohl als eine Variante der bei Vertebraten bekannten Zwischenzellkontakte aufzufassen[4]. KELLY[5] hat kürzlich im Bereich typischer Desmosomen bei *Taricha torosa* eine Kontinuität der kontrastarmen Zone des Plasmalemms mit der entsprechenden Zone der senkrecht verlaufenden Septen abgebildet. Dabei entstehen gewisse Parallelen mit dem ultrastrukturellen Aussehen septierter Desmosomen. Es haben übrigens schon HORSTMANN und KNOOP[6] auf eine mögliche Querstreifung der Kittsubstanz hingewiesen.



Septierte Zwischenzellkontakte. Die Septen sind deutlich zu erkennen (↑). Tonofilamente (T). Einsatz: Detail. Septen, bei denen eine Kontinuität mit dem Plasmalemm sehr wahrscheinlich ist (←↑). × 210000.

Die hier beschriebene Beobachtung bezieht sich auf die normale menschliche Epidermis.

Wir konnten in unserem Material zwischen den benachbarten Zellen senkrecht verlaufende Septen nachweisen (Figur). Diese sind in ungefähr gleichen Abständen anzutreffen. Ihre Innenstruktur ist stellenweise homogen, elektronendicht, oder es lassen sich – wie bei dem Plasmalemm auch – eine mittlere kontrastarme und zwei periphere kontrastreiche Schichten erkennen. Stellenweise ist eine Kontinuität des äusseren Blattes des Plasmalemms mit der entsprechenden Schicht der Septen als sehr wahrscheinlich zu bezeichnen. Ein diskontinuierliches Plasmalemm (dazu WIENER et al.[3]) haben wir nicht beobachten können.

Dieser bisher isolierte Befund deutet darauf hin, dass Zwischenzellkontakte, die ultrastrukturell septierten Desmosomen ähneln, nicht ausschliesslich bei Avertebraten zu erwarten sind[7,8].

Summary. A description is given on septate intercellular contacts in the normal human epidermis.

M. RUPEC und O. BRAUN-FALCO

Dermatologische Klinik und Poliklinik der Universitäten Marburg/Lahn und München (Deutschland),
16. April 1968.

[1] R. L. WOOD, J. biophys. biochem. Cytol. *6*, 343 (1959).
[2] M. LOCKE, J. Cell Biol. *25*, 166 (1965).
[3] J. WIENER, D. SPIRO und W. R. LOEWENSTEIN, J. Cell Biol. *22*, 587 (1964).
[4] L. T. THREADGOLD, *The Ultrastructure of the Animal Cell* (Pergamon Press, Oxford, London, New York, Paris 1967).
[5] D. E. KELLY, J. Cell Biol. *28*, 51 (1966).
[6] E. HORSTMANN und A. KNOOP, Z. Zellforsch. mikrosk. Anat. *47*, 348 (1958).
[7] Durchgeführt mit Unterstützung der Deutschen Forschungsgemeinschaft.
[8] Für die technische Assistenz sei Frl. R. BRÜHL gedankt.

Growth of Follicular Cells in Aphids. A Cytophotometric and Autoradiographic Study

The aim of this work was to study endomitosis and nuclear volume growth in follicular cells of Aphids. Cytophotometric measurements have been carried out on Feulgen stained follicular epithelium fragments removed from oocytes. Autoradiographic processes have been carried out on 5 μ slices, obtained by cutting amphigonic specimens of *Megoura viciae* injected with 0.003 μC of tritium labelled thymidine (Amersham: sp. act. 500 mC per m*M*). Specimens were fixed in Carnoy at varying periods of time after injection. Kodak NTB2 emulsion was used.

Cytophotometric analysis. Follicular cells in oocytes up to an average diameter of 90 μ are diploid. They multiply actively by mitosis. Afterwards mitosis can no longer be observed and the nuclei, spherical, begin to grow by endomitotic processes. In the following stages, the volume growth in the nuclei is accompanied by a distortion of the shape which first becomes ellipsoidal and later discoidal. In one and the same follicle, the nuclear volumes show almost continuous variations (Figure 1). This is especially observed in the follicles with discoid-shaped nuclei. The extinction values measured amongst the different nuclei in the same follicle are more or less constant. The mean extinction value increases according to the follicle size although the nuclei in the largest follicles are flatter. This can be attributed to a more closely packed chromatin-rod structure. The DNA-amount expressed in conventional units obtained by multiplying the extinction value by the surface area also shows continuous variations in 2 classes of ploidy in the same follicle. We have estimated the maximum ploidy level which can be reached by the nuclei as 64 by comparing the DNA-content of the largest nuclei in the biggest follicles with that obtained for some diploid nuclei.

Autoradiographic analysis. In the examples fixed 10 min after the injection, one can already observe a great percentage of labelled nuclei. Labelling affects the nuclei in different ways, some of them being labelled to a lesser extent than others. One can therefore observe some nuclei in which labelling is restricted to certain areas. Frequently only the chromatin ring structure around the nucleolus is

labelled (Figure 2). This is so in follicles of every size up to an average diameter of 500 μ. In the following stages labelled nuclei are not observed. Labelling affects a greater percentage of nuclei in specimens fixed at later intervals (Figure 3) and after 3 h from injection affects almost every nucleus.

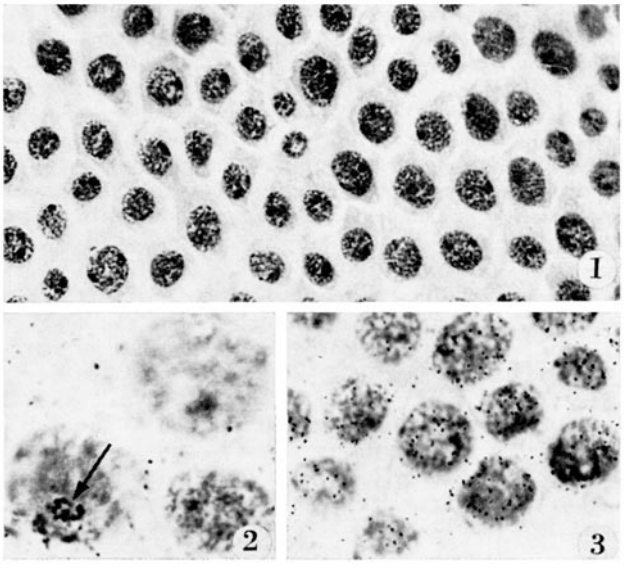


Fig. 1. Nuclei of variable size in follicular epithelium. Feulgen. × 400.

Fig. 2. 10 min after injection. The arrow indicates a labelled area around the nucleolus. Feulgen. × 1320.

Fig. 3. 45 min after injection. A high percentage of nuclei are labelled. Feulgen. × 760.

Conclusions. From cytophotometric measurements it appears that more or less continuous variations in DNA-amounts among different nuclei of one and the same follicle exist. This can be explained if one assumes the DNA synthetic period to be much longer than the inter-synthetic one. This hypothesis is supported by the high number of nuclei which, on autoradiographic analysis, show labelling even a short time after injection. The DNA synthetic period which is long compared with the non-synthetic interphase, might be caused by a remarkable degree of asynchrony in DNA-synthesis existing among the various chromatin elements in the same nucleus. This is also supported by the localized uptake of H^3-thymidine which is observed in some nuclei.

Riassunto. I nuclei delle cellule follicolari degli Afidi mostrano nell'ambito di uno stesso follicolo variazioni pressochè continue nel contenuto di DNA. Dopo brevi intervalli di tempo dall'iniezione di timidina tritiata, una elevata percentuale di questi nuclei risulta marcata. È stata fatta l'ipotesi che ogni ciclo di poliploidizzazione in questi nuclei si componga di un lungo periodo di sintesi di DNA seguito da uno breve di intersintesi. La lunghezza del periodo sintetico è dovuta presumibilmente all'asincronia nella sintesi di DNA che esiste tra i vari elementi cromatici in uno stesso nucleo.

E. Orlando and R. Crema

Istituto di Zoologia dell'Università di Modena (Italy), 29 April 1968.

Influence of Halogenated Deoxyuridines on the Radiation Sensitivity of *Escherichia coli*

It has been shown that iodine containing compounds such as iodoacetamide[1], iodoacetic acid[2] and potassium iodide[3], when added to phosphate buffer suspensions of radioresistant bacteria can sensitize their inactivation by ionizing radiation. The mechanism of action of these compounds is believed due to short-lived radicals[2,4] formed by the reaction of the halogenated compounds with the radiolytic products of water, having the form[5] $RI + OH^{\cdot} \rightarrow ROH + I^{\cdot}$ with the iodine atom being responsible for enhanced bacterial killing. If this is the case, then other iodine containing organic compounds would be expected to act as radiation sensitizers when present in the medium during irradiation. The halogenated thymidine analogs are powerful mutagens when incorporated in cellular DNA, and also enhance the radiation sensitivity of a variety of cells when incorporated in their DNA[6]. We decided to examine the effect of the halogenated deoxyuridines upon bacterial radiosensitivity when merely present in the irradiation medium, rather than incorporated in the DNA, particularly 5'-iododeoxyuridine.

Materials and methods. 5'-Bromodeoxyuridine (BUDR), 5'-fluorodeoxyuridine (FUDR) and 5'-iododeoxyuridine (IUDR) were obtained from Calbiochem, Los Angeles, California, and freshly prepared as $10^{-3}M$ solutions in saline-phosphate buffer (pH 6.8). This concentration was shown to have no toxic effect on either unirradiated or irradiated bacteria. Iodoacetamide (IA) and potassium iodide (KI) used in some experiments for comparison with IUDR were reagent grade chemicals. The radiation resistant *Escherichia coli* B/r (CSH), having a D_0 or dose to inactivate 63% of the population (anoxic) of 23 krads, was grown from a loop in nutrient broth (Difco) with aeration at 37 °C to the middle or end of log phase (4 h) yielding an approximate titer of 5×10^8 cells/ml. The cells were refrigerated overnight, spun down, washed, resuspended in

1 C. J. Dean and P. Alexander, Nature *196*, 1324 (1962).
2 J. S. Lee, W. A. Anderson and P. R. Elliker, Radiat. Res. *19*, 593 (1963).
3 C. J. Dean and P. Alexander, Prog. Biochem. Pharmac. *1*, 46 (1965).
4 D. L. Dewey and B. D. Michael, Biochem. biophys. Res. Commun. *21*, 392 (1965).
5 L. Mullenger, B. B. Singh, M. G. Ormerod and C. J. Dean, Nature *216*, 372 (1967).
6 W. Szybalski, in *Research in Radiotherapy* (Publ. 888, Natn. Acad. of Sciences, National Research Council, Washington, D.C. 1961).