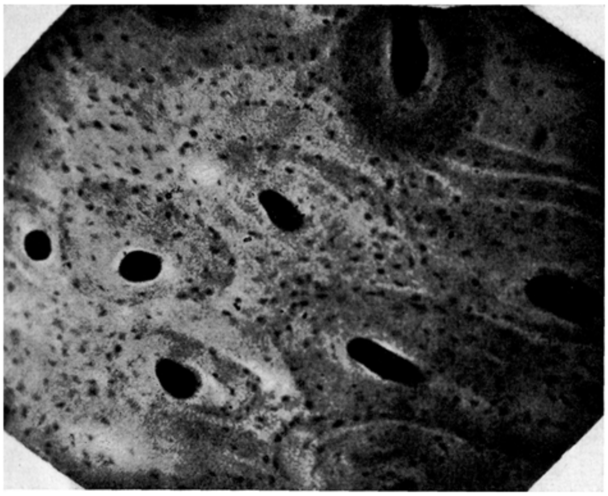
The origin of an ovarian dermoid is supposed by some authors to be one of the ova of the ovary. Another theory supposes the dermoid cyst to arise from one of the original blastomeres formed by the primary segmentation of the ovum, which has become separated and included in the ovary[1].



Bone tissue in an ovarian dermoid cyst has been studied by a microradiographic technique. Sections of about $30\mu$ have been exposed to X-rays of the wavelength 2·4–4 Å. (A Machlett tube AEG 50 with 1 mm Be filter, has been used.) Within these limits calcium has one of its absorption edges (K-edge at 3·06 Å). Other components of bone show here a very slight absorption. Because of this the microradiogram shows the calcium distribution in the specimen. (Film used: Kodak Spectroscopic Plate 649.)

The figure demonstrates that there is well differentiated bone tissue in the dermoid cyst. Compact regions with Haversian systems of different ages are to be seen. Systems which are old show a higher degree of mineralization (light in figure) than those which are young (darker in figure). Regions also appear with a more spongy structure. The figure shows a microradiogram of bone tissue in an ovarian dermoid cyst from a woman of 40 years of age.

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*Zusammenfassung*

Die Verteilung von Kalzium im Knochengewebe in ovarialen Dermoidzysten wurde mit Hilfe der mikroradiographischen Technik studiert. Dabei konnten Havers'sche Systeme in verschiedenen Mineralisierungsstadien, die eine gut differenzierte Entwicklung des Knochengewebes andeuten, gesehen werden.

[1] R. AMPRINO and A. ENGSTRÖM, Acta Anat. *15*, 1 (1952). – W. A. D. ANDERSON, *Pathology* (Mosby Co., St. Louis 1953). – B. ENGFELDT and A. ENGSTRÖM, Acta orthoped. Scand. *24*, 85 (1954). – A. ENGSTRÖM and L. WEGSTEDT, Acta Radiol. *35*, 345 (1951). – J. D. KOUCKY, Ann. Surg. *81*, 821 (1925).

## Evidences of Cytological Basis of Differentiation

Recently, with the discovery of the endopolyploid nature of differentiated cells[1], attention has been directed towards chromosomal control of differentiation. But it is yet problematic how different degrees of polyploidy can account for qualitative differences between different organs.

Investigations on this problem, carried out on plants of different groups in this laboratory[2], have revealed the presence of chromosome numbers different from the normal $2n$ ones in differentiated organs. Of the numerous plants so far worked out, the results obtained from three species of *Menispermaceae* are discussed here. The particular differentiated organ studied in the present case was the leaf.

The $2n$ chromosome number, as studied from the root-tip cells, is twenty-six in *Tinospora cordifolia*. In the meristematic region of the stem-tips of this species, varying chromosome numbers have been observed, namely, twelve, thirteen, fourteen and twenty-six, the last number occurring with the highest frequency. The occurrence of such varying numbers in the meristematic portion seems to involve somatic reduction, as in a number of cases, clear thirteen and thirteen chromosomes (not chromatids) in anaphase could be seen. In the leaf, on the other hand, thirteen chromosomes are found to be the number present in all the cells. The thirteen chromosomes of the leaf do not represent the haploid complement, as is clear from a glance at their chromosome morphology. The lower numbers in the stem-tip do not represent the haploid set, implying thereby that the reduction in number occurs at random.

In *Stephania hernandifolia*, the numbers in the stem-tip vary from eighteen, twenty to twenty-two and the number present in the leaf-tip is twenty. In *Cocculus villosus*, similar variant chromosome numbers have been found in the stem-tip, such as, eighteen, twenty and twenty-two and the leaf-tip number is eighteen. The reported $2n$ numbers of both the species, as counted from root-tip cells, is twenty-two. For a study of the chromosomes of leaf and stem-tip, a special technique[3] had been devised, which is awaiting publication.

In order to have a check of the chromosome number at the meristematic regions of the roots of all the three species, they were carefully reinvestigated. It was found that there too, although the reported numbers occur in the highest frequency in most of the cells, cells with other numbers are present, although with lower frequency.

The chromosomal control of differentiation is, therefore, clear from these investigations. It may be considered that the meristematic regions have the potentiality of differentiating into different organs. The differentiation is effected through the entrance of different chromosome numbers into specific organs of the plant body. There must be a screening or selective mechanism operating within the body, which is yet to be explored.

It may be postulated, therefore, that:

(1) Differentiation is controlled through chromosomes.

[1] L. GEITLER, Chromosoma *3*, 271 (1948). – C. L. HUSKINS and L. M. STEINITZ, J. Hered. *39*, 67 (1948). – E. THERMAN, Ann. Acad. Sci. Fenn. *4*, 5 (1951).

[2] A. K. SHARMA and S. K. SARKAR, Sci. Cult. *22*, September (1956).

[3] A. K. SHARMA and ARCHANA SHARMA (nee MOOKERJEA), 1956 (in press).

(2) The different mature organs of the individuals, belonging to a species, contain different chromosomes complex specific to each organ, depending on the number and type of chromosomes responsible for their differentiation.'

Similar results are being obtained in a large number of plants and a detailed paper is being sent for publication.

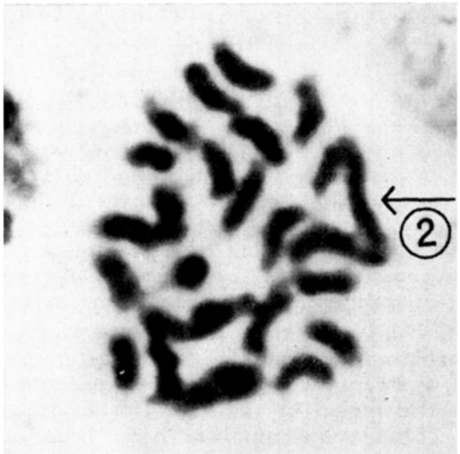


Fig. 1

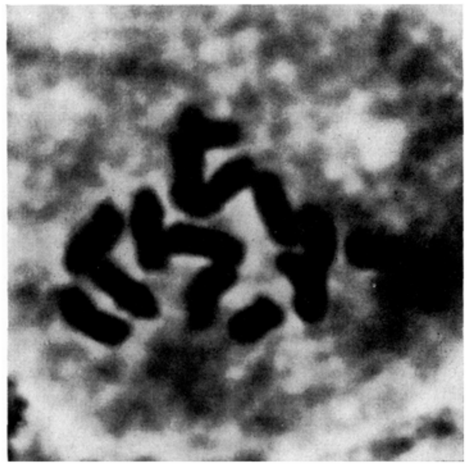

Fig. 4

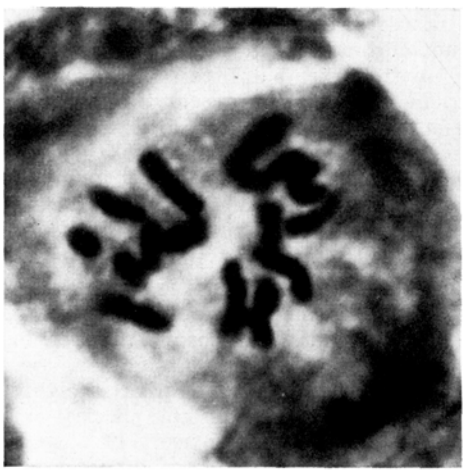

Fig. 2

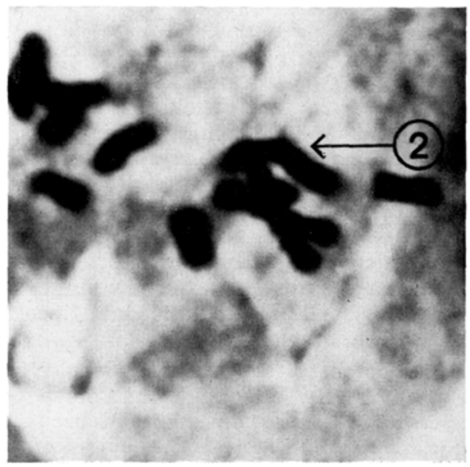


Fig. 5

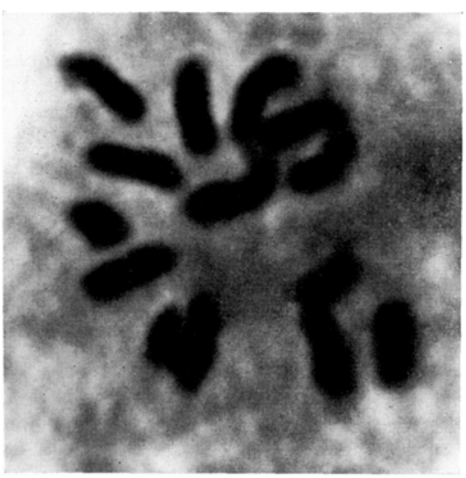

Fig. 3

Fig. 6

As regards the origin of such varying numbers from the normal complement, somatic reduction seems to be principally responsible in the present case. In a previous communication on palms[2] from this laboratory, where the differentiated organ studied was the basal portion of the stem, evidences were gathered showing that 'partial endomitosis of chromosomes was responsible for differentiation of that particular organ'. A normal resting nucleus was found to lie beside the dividing smaller one with lesser chromosome number in the basal portion of the stem. This organ, as is well-known, can revert back to meristematic activity and give rise to lateral roots at times, obviously due to the regained activity of this normal nucleus. It is, therefore, clear that the means of origin of such varying numbers, whether through somatic reduction or partial endomitosis, is controlled by the fact of whether or not the organ concerned is to retain its potentiality of giving rise to normal meristematic nuclei at times of necessity. In the present case, as the organ concerned is the leaf, which is not endowed with the potentiality of giving rise to roots under any condition, the origin of such varying number is through somatic reduction.

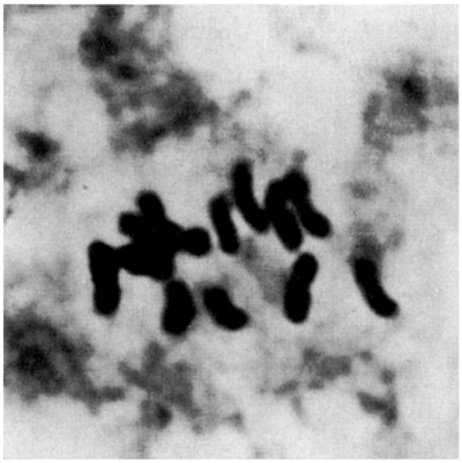

Fig. 7

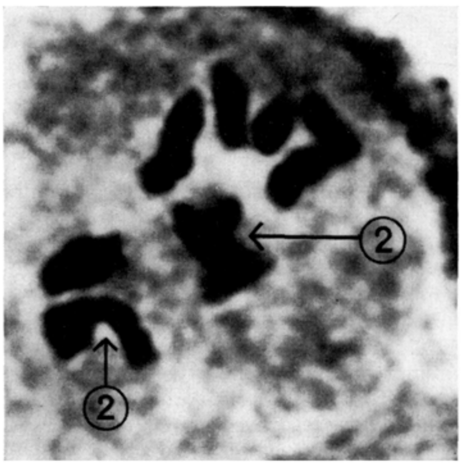


Fig. 8

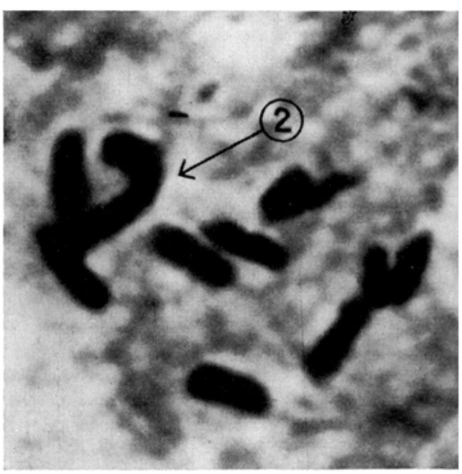


Fig. 9

Explanation of Figures: Stem-tip and Leaf-tip cells of *Tinospora cordifolia* showing varying number of chromosomes.

2←—— indicates two overlapping chromosomes.

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*Zusammenfassung*

Bei verschiedenen Pflanzenarten werden die Variationen der Chromosomenzahlen im Vegetationspunkt des Stammes untersucht. Für Blattzellen ist eine konstante Zahl charakteristisch. Die Resultate weisen darauf hin, dass in der Wachstumsspitze spezifische Chromosomenzahlen in die einzelnen Organe übergehen und so die Differenzierung gesteuert wird. Die normale $2n$-Zahl kommt in den meisten Zellen vor.

## Sur les caractéristiques histologiques des petits vaisseaux pulmonaires

Nous avons insisté récemment sur la nécessité d'améliorer par une technique appropriée les bases morphologiques de nos connaissances dans le domaine de la circulation du sang[1]. Certains résultats histologiques acquis dans des conditions de préparations optimales, nous ont permis, en effet, de confronter immédiatement des détails structuraux de la paroi vasculaire mis en évidence sur une coupe fixée avec les observations cinématographiques de la circulation dans des organes transparents.

Il existe, cependant, une région circulatoire qui fait obstacle à une telle confrontation, puisque, d'une part, elle n'est pas accessible à l'examen cinématographique, et, d'autre part, les vaisseaux s'y trouvent sous l'influence de pressions, mécaniques extramurales les plus variables: c'est la circulation pulmonaire. Il faut se rendre compte que même en évitant les artéfacts dûs aux manipulations préparatoires non convenables et à un prélèvement tardif du matériel, il reste ceux provoqués par la forme de l'agonie de l'organisme à l'instant même du prélèvement. Ce sont ces difficultés qui expliquent pourquoi, en dépit de tous les efforts poursuivis depuis près d'un siècle, l'histologie normale des petits vaisseaux pulmonaires est encore aujourd'hui une *terra incognita*.

Au cours des études s'attachant à certaines observations physiologiques de LECOMTE *et al.* sur le choc anaphylactique au niveau de la circulation pulmonaire[2], nous

[1] S. HIRSCH, Exper. *11*, 369 (1955); Acta med. Scand. *152*, 379 (1955); Presse méd. *62*, 978 (1954).

[2] J. LECOMTE, C. r. Soc. Biol. *150*, 593 (1956). – J. LECOMTE et J. HUGHES, Arch. int. Allergy *8*, 72 (1956).