CYTOLOGY NOTES

Zoo 125

(Zoo 226)

J. E. Johnson
University of Wisconsin

1942
See Fig. 6, p. 23. Wilson. The Cell, general notes.

Required Literature:
- Edgeworth's Ergi
- Whittington's Economics
- E. F. B. O. O. Mac
- Kitano's Influence
- Tae 137, X
- Brown, Ann. Rec. 38 (1939)
- Rome, 132, Tschacerlisch
- Zinda, quae, nectar

Note: Still is difficult.
- Marginalia sp. will be
- Anno 1858, sp. of...
- Ficus, large green, long, round.
- Blackberries with berries.
- Blackberries: Huckleberries
- Blackberries: fruit trees
- Anno: squash

Notation: Occurrence
- Mrs.
...In vitellogenesis at low pH there is a suppression of granule formation, a swelling of the nucleus and a diffuse staining of the cytoplasm. The stain effects are probably through pH changes as pH is administrated.
Granule defined as something

Granular: The ultimate unit is a granule, the smaller
pieces are called granules, many of which are now recog-
nized as mitochondria. Continuous phase might be

Schwelle between these divided and enclosed mem-

brane granules. The biologists hypothetically as the
same as Lewin's pangenesis and Weismann's inheritance.

When Weismann's work became his work was discovered
U. Doer.

Wilson, Am. Nat., 60, protein, etc. and long molecules. The deleted structure

Fenchel, Proc. The Fine Structure

of Biological Systems, 1931

Pollutae indicate the mitochondrial orientation parallel to

Polaromyces. Mitochondria always indicates parallel to

orientation of long molecules and the exclusion of mitochondria

from the lines of flow. These are similar relations of

Bowen, J. Cell. 39, 123 (1939)

Androcentric and diatropic even in plant cells

where the actin is not visible.

Schmidt, Protophytologia, Monogr., 11 (1937)

Brightening phenomena studied: indicate orientation

in asperis, spindles, chromosomes (?). No orientation inside

the actin.

Early considerations are superseded. New attack on

molecular level.
The centriole is frequently found at the anterior center of the cell. This fact readily seen at metaphase, where the astral-spindle poles point at it out.

In 1877, Van Beneden and Boron recognized its independent existence. The whole organelle is called a centrosome (Van Beneden, 1877). The polepores of the spindle anastase may form more heavily and obscure the centriole. It is the centriole, the centrosome is embedded, the consequence of astal cells.

The superficially obvious function of the centriole is as the spindle regulatior, as mitosis.

Some Heidenhein (1924) all cells have 2 centrioles. The function of non-divisional cells is as an organizing center.

In epithelial cells, polarity is frequently determined by the position of centriole.

If the centriole has a generally constant position, may have a general function? (Kohn, 1873)

Of epithelial cells, reserve their polarity, the centriole moves, as in the cerebral organ.

Between 1870 and 1910, a large literature on centrioles.

In epithelial cells, the distal centriole frequently bears a flagellum.
Centrioles: characterized by position, form, staining.

Stain techniques are not too valuable.

Fenoggin negative (earlier?)

But precipitation pools and components usually is common.

Kovalev, 1927-1928, cited with nucleic acids being present.

May be protein, probably not lipoid.

In intestinal epithelium, stain like cement substance,
which is probably poly saccharide.

Still open question.

Proved functions:

1. Organismic action.

Helicoid with multiple centrioles, each develops an active for the second division. Actin
covers orientation protein molecules.


An flagellated cells rather widespread. Spur flagellum is
infrequently seen.

Kowarski, 1905, 351 (1914).

Kawarski, Zellf., 19119.

Kawarski, Zelle, 19119.

Kawarski, Zelle, 19119.
Blepharoplasts can act as division centers.

Hennequin and Kolars claim many vertebrate processes arise from centrioles, thus basal bodies of cilia are homologous with centrioles. Can a centriole multiply?

Conrad: can a divided cell divide?

Jordan claims divided cells divide amitotically. Presumed that before ciliogenesis, basal granules can be found.

But Bowd, Wodkof, Böhm: immediately showed mitosis in divided cells.

V. Schaller, 1934, mitosis epithelium. Appearance of flagellum in "subepithelial" cells, still attached to granules. These may be leukocytes and degenerate epithelial cells, instead of a regenerative process.

Pollister doubts that basal granules are products of ciliogenesis differentiation, because centrioles multiply, just as products of the cilia, which is not necessarily homologous with a flagellum.

Can centrioles multiply autonomously?

Boveri denied de novo formation.

Huxley has traced them through mitosis in Drosophila eggs. Böhm: in leukocyte, Voldeney in salve, Pollister. The case for genetic continuity is clear. But occasionally de novo formation does occur: as in the spermiogenic divisions of barnyard and pteridophyte. In II, this centriole acts as a blepharoplast and multiflagellated sperm is formed. Thence the centriole is not a self-perpetuating body, but the...
product of something darker, i.e., like themselves.

In Acacia spermogenesis, the centriole is intracellular.

In many protostyla, an aster is organized within the nucleus.

10/16/42 -- Atypical spermogenesis and meiosis. Hypopus spermatogenesis displays subcarniate, thin polar apparatus.

Perhaps because of physiological maturity or pre-spermogenesis, some cells appear normal.

Only 2 chromosomes separate normally, 4, 6, etc., in binary; acrosome degenerates through peculiar,ucleoids.

Small nuclei have 2 chromosomes at Anaphase I.

1 chromosome to each pole. Therefore there are only 4 centrioles per quartet. A small nucleus is formed and spermogenesis follows.

In atypical biology, there is one centriole, twin.

Reason: As they break up, they can be counted. They should in number at Anaphase I. They can be not inside opposite to the spermatid. Correto at Telophase II or early spermatid are certain.

The extra centriole comparable to the acrosome chlamydothil. Therefore, the spermogenesis centriole are the accumulated centrioles.

This emphasizes the centriole - centriole division. All good cases of centriole division is somatic cell, occurring metaphase or later -- after it has been in relation to the chromosomes, through the spindle.

In comparison, the centriole is Feulgen-negative.

"Centriole is a material formed by the chromosomes."

Other cases give strong evidence for nuclear origin; i.e., in Nucella, the actin and centriole appear as motile.
Anaphoric pronouns (which may be difficult to
positively identify) preceding a definite
noun phrase, such as a proper name or
adjective, may be parsed into
shallow-structure grammatical
units.

Unfortunately, the grammatical
structure of these units is
insufficient to determine the
nature of the modified.

For instance, in the
sentence "The
classical Greek school
was founded by Socrates,"
the noun phrase "The
classical Greek school"

apparently modifies
"was founded,"
but it is unclear whether this

modification is superficial or
depth-related.

Similarly, in the
sentence "Socrates was a
philosopher,"
the noun phrase "Socrates"

apparently modifies
"was a philosopher,"
but again, it is unclear whether

this modification is superficial or
depth-related.

In both cases, the
grammatical structure

suggests that the

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Chondriosomes

Schultze (1861) recognized granulation in protoplasm.

Altman, bioelectic theory, now known as mitochondria.

Chondriosomes are always vestigial shapes, spheroids. Amorphous granules included. Not all self-duplicating; many secretory structures.

The development of techniques stimulated research. Mitochondria have survived from the bioelectic theory. Benda developed specific methods and differentiated mitochondria from other granules. Now an enormous literature.

Unimproved occurrence probable.

Drew, Arch. Zellf. 6 (1910)

1918

Pores of uniform diameter, rounded ends. All similar. Any one type of cell. Might not be really granular; may be misinterpreted as such. Very easily dehydrated by a poor fixator. Specific artifact studies.

Lewis and Lewis, Arch. Zellf. 14K

Renerjungi Arch. Zellf. 46 (1921)

Shape of mitochondria is severely affected by mitochodinum. Theorized environment. Their orientation indicates a molecular layer and reaction. Arch. Zellf. 54 (1932) structure of cytoplasm.

Michaelis Arch. Zellf. 55, 532

Specific stains: Prussian Blue.

Courey Arch. Zellf. 19: 423 (1916)

Cells were rapidly washed:

\[
\begin{align*}
N = N (N) & \quad \text{Prussian Blue into the cyto-plasm/mito-chondria. They must absorb very highly since Fe can only be Fe in chromatin. Easily reduce the dye, uncountably, through a rhodo and dye form.}
\end{align*}
\]

The rhodo is diethyl starchine! diffusion split molecule. The process is reversible!!! Two rhodos are specifically required, and the pheno-dihydro.
Considerable organisation in some acroploric spermatids. Genomic predilection some function?

Functional aspects:

Symbiotic organisms: algae. More recently by Wallis, Pirtius. Many genomic and/or biological reseemblence to bacteria. Some instances of unique bacterial symbioses now known. Alterations over geological time have led to present forms. They have now had any demonstrated significance.

Cleek L. Symbiotic 1918
Wallis, Symbiotic nouns, 1927
Cleek E.S.H., B.S., Jlm., 9 (1941)

Pollister et al., ultra violet studies indicate predifferentiated absorption at 2600A. Considerable refraction.

Interference may not be chemically identical with Cleek's, nitrogenous precursors.

Legend: Red = tissue. Red = C, O, N, present.
Post-chromatin nucleic acids of fat solubility.

Faust: Faunica: similar results. Fat reaction in mitochondria found on esterolysis. Fats derived from protein.

Analogy with fats: only unsaturated lipids absorbed.

Rondeau, P.H., J., 79 (1929)
Rondeau, J., 79 (1929)
Rondeau, P.J., 105 (1937)

Russo: See other injections. Increase oxygen in mitochondria. Tissue: Analogous with myelin structures in albumin, due to surface action. "phospholipid."

The melting point, density, or higher than saturated fats in "UC" material. But protein condensation would accord.
<table>
<thead>
<tr>
<th>Specificity?</th>
<th>Heilbr's test is positive.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spermatogonia are rich in phosphatide - pullysin sperm tail</td>
<td></td>
</tr>
</tbody>
</table>

Beadly isolated "mitochondria" from divisible, by slow centrifugation. Proximate analysis of mass:

- 40% fat
- 60% protein

Dried fat analysis:

- Protein (and unknowns) 64.67
- Lipid 35.33
- Glucosides 28.88%
- Ash 4.2%
- Starch 2.25%

Some X-ray studies indicate special pattern in the mitochondrion.

Claude - analysis of granules:

- 60% protein
- 40% lipid, largely phospholipids

Brady: Science Oct 1942

Most recent: Beadly -

Leitch's 45-58% of the lipid content of liver mitochondria. Therefore, there is appreciable phospholipids.
Mitochondrial Function:

1. Enzymatic: A variety of proteolytic enzymes. (See page 17.)

Hennig, Herd 17851 '23
Waddington, Morph

Hackett, Proc Biol 3:233 '26
Roberts, Proc Roy Soc 1926

Crowley, Amer Nat 60:157 '26
The Nucleus has a lipid-mediated function; the
нucleus increases the surface (see Crow, de Nuyy).

The lipid acts as a semi-membrane and acts as
an active surface for protoplasmic and replica synthesis.

(after Sengst) Roberts has shown an increase in the
protoplasmic area of the granules, which lipid
mediated as mentioned.

Heilch, Geoph 13:37 (1926)

Dithie, Proc Roy Soc 114:20
De Nuyy & Crow: measured increase surface of formal
Bowen 2, Proc Roy Soc 14:88 '79
Components of eumelanin cells. Assuming hypothesis with
Bowen 2, J. Zool. 9 1979
These compounds on a granular adaptation

See paper.

Heredity factors?

Guillen: Animal mitochondria homologous with
plant plastids. Concerning factors in cytoplasmic inheri-
tance, function of self propagation.

Hence, Band... concerning a morphogenetic function, but
this was carried too far: the pre-morphological basis
of all thinking. Now abandoned.
Harisch-Duttie: vital observation in pancreas cells. The earliest glycogen granules appear basally in the pancreas cell, mitochondria surfaces.

Hayman has some function in myogenesis.

1930. Homologues in plants:

By the meristematic cells, thread-like bodies appear which may be proplastids. Staining with ferriun B.

There are also mitochondria which do not become plastids.

Guillermont: Guillermond distinguishes between active mitochondria, the cytoplasms of the plant, and plastids. Plastids are homologous.

Bowen, 1939, thought they could distinguish them with starch reactions. Plastids contain ribonucleoprotein.
SPERMATOGENESIS

There is very great variation in spermatogenesis. They
are more species characteristic than any other cell, and
perhaps most readily analyzable.
There are 4 constant morphological components, de-

nucleus → head...
Acrone (20%) → acrosome, "perforatorium,"

refractile granules.
Centriole = centriolar apparatus (flagellum).
Mitochondrial Apparatus...

Primarily, flagellated, with head anteri;
Acrosome may be anterior, sometimes lateral (Tropicus).
Significance of the 5th
layer (mitochondrial)
activation; 1
nucleus: 200 µ
acrosome: 650 µ

Wilson

Overall length = 1500 µ

The acrosome is not a perforatorium in function!!

Some mitochondria are always present, always posterior
to the nucleus. May grow down before a middle piece
or spiral arm. May contribute to released core is head.7

Significance is not clear. The symbiostics would
claim that the perinuclear force may be a synangium, a
loss of identity. 2 characteristics: outer structure
and innerker... These mitochondria probably do not
participate in organism development of the egg.
Non-flagellate sperm (see Bowen's review)

Mitochondria in plant.

Homologues are difficult to detect here. The topography is changed; they must bear a morphogenetic basis. While there is a tremendous modification, the morphological features still are recognizable.

Amoeboid and non-flagellate, atypical sperm are secondarily derived from the primitive flagellate sperm, best represented in mammals or lacrimates.

Fate of nucleus in sperm.

Genitalia.

Mitochondria found in sperm.

General features:

Are some from Golgi secretory; Golgi itself lack with nucleoprotein?!!

By to plaques. Formation variable in time and place.

Extra-cytoplasm.

Mitochondria free in sperm.

11/1/42

Wolley, J. Cellule 48 '39

Vaccinia Sections: only part of the capsule is

Stainable. J. Morph. '32


In Araneae, non motile, the "nucleus" ingent body is the Golgi derivative.
Further notes on sperma, eneasio