

DR. ROBIN'S MEMOIR ON THE ANATOMY AND PHYSIOLOGY OF
THE MUCOUS MEMBRANE AND THE EPITHELIUM OF THE
UTERUS DURING PREGNANCY.

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THE epithelium which is found in the regions I have just described, is partly formed of *free nuclei* and partly of *cells*; the latter of which very much exceed the former in quantity. In each preparation of the fresh subject we oftener find them closely associated, under the form of little membranous filaments, than isolated. These epithelial cells are to a certain extent similar to those which I have pointed out in the preceding paragraph, and are sometimes more, and sometimes less granular. Some of them, especially those which are hypertrophied, become larger by the half or double their normal state, preserving, however, to a limited degree, the form of the prismatic epithelium, with extremities adherent, sometimes constricted and sometimes distended and rounded. Others have become distinctly polyhedral. In almost all, the nucleus has increased in volume in the same proportion as the cell, and encloses one or two nucleoli, having a brilliant yellow centre, with a deep blackish outline.

But at the same time, between the preceding cells, or in their vicinity, we find cells, whether isolated or closely associated in bits, or layers of greater or less size, which have undergone very considerable and most singular hypertrophy and morbid alteration.

We find there those which, instead of having two or three hundredths of a millimetre ($\frac{1}{100}$ or $\frac{2}{100}$) in size, or thereabouts, as in the normal state, attain one tenth of a millimetre even, and more in length ($\frac{3}{10}$); and could consequently be perceived by the naked eye, if they had a greater diameter and were less transparent. Between these dimensions and those of the normal state, we find every possible degree of intermediate length. The thickness of these cells rarely exceeds eight or twelve thousandths of a millimetre ($\frac{8}{1000}$ to $\frac{12}{1000}$), but they are dilated and appear to be from one to four hundredths of a millimetre ($\frac{1}{100}$ to $\frac{4}{100}$) across.

The form of the cells naturally varies a good deal, according as the hypertrophy and the increase of the mass has taken place in one or two directions only (which very often occurs, and is the precise cause of the malformation), the other dimensions remaining normal, or in proportion as the hypertrophy goes on in all directions. In this case, the cells become entirely spherical or spheroidal; but we find few cells which show this form, and their diameter does not much exceed two or three hundredths of a millimetre ($\frac{2}{100}$ to $\frac{3}{100}$).

The greater part of the cells thus distorted and hypertrophied, are elongated and terminated at two ends by a point, generally irregularly truncated, and more rarely sharp and regular. This

elongation frequently takes place on one side only, the other remaining polyhedral or rounded, as if it had been truncated.

It is just at the nucleus of each cell that the largest portion of the latter is found. When they are regular, the cells have a general ovoid, elongated, or better, a fusiform shape, very dilated or clubbed, according as the distended portion continues itself from each side to a point or from one side only.

It is common to find one or two extremities of each cell irregularly bifurcated, and their edges, as it were, cut, or, on the other hand, furnished with one or more prolongations more or less narrow. These prolongations are principally to be seen upon the angles of the cells which remain more or less irregularly polyhedral. They there give very queer shapes to the epithelial cells. The nature of the latter would certainly be then misunderstood, if we should pass judgment upon them without having followed their phases of hypertrophy and distortion through the different periods of pregnancy, and if we had not observed their successive conditions; the different degrees which separate the sufficiently regularly shaped, polyhedral cells, already noticed, from these last, are now and then to be noticed also in the envelope of a fœtus at term, and in the same region of the epithelium of the decidua.

Some of these hypertrophied cells contain two or three nuclei, but this circumstance is rare. The majority have only one, but remarkably voluminous, with a clear, brilliant centre, slightly granular, and having a sharp, regular outline. The nucleus is generally ovoid, as in the normal state, but very much hypertrophied. It almost always attains a length of from twelve to eighteen thousandths of a millimetre ($\frac{12}{1000}$ to $\frac{18}{1000}$), with a breadth of from six to ten thousandths of a millimetre ($\frac{6}{1000}$ to $\frac{10}{1000}$). Each nucleus encloses one or two nuclei, of the size of from one to two thousandths of a millimetre ($\frac{1}{1000}$ to $\frac{2}{1000}$), having a brilliant amber-tinted centre, with a sharp, deep, blackish contour.

The free nuclei of the epithelium, whose presence I have pointed out at the commencement of this description, are similar to those which I have just described. They are manifestly similar, or very analogous with those which have been described and figured under the names of *cancerous*, *carcinomatous* nuclei, &c., and have received this name, without doubt, from those who may have seen them without having followed the phases of their modifications, which I have just described. Here, however, they are normal, but their analogues are to be seen in the epitheliums of most other organs under a variety of morbid conditions.

It is from having formed an opinion upon the anatomical arrangements of this class, before having followed the various phases of the normal and pathological evolution of anatomical elements, that the conclusions with regard to so many of the morbid tissues ought to be reviewed.

I will say, in conclusion, that some of the hypertrophied and distorted cells which I have already described, remain finely granulated, almost as much so as in the normal state. At that time they are very pale, and very transparent. But most of the cells are studded or filled with fatty granulations, having a brilliant yellow centre and a deep outline, such as we so often see in tumors, upon the pathologically hypertrophied epithelial cells. These granulations are generally more numerous about the nucleus which they circumscribe, or at its two extremities, than in the other portion of the cell. Everywhere, when they are accumulated, they render the cell opaque, a condition which is in great contrast to the transparency of the rest of the body. There are some cells in which the granulations form masses quite regular, elegant, and more or less distant from the nucleus, or disposed in chains or in the form of a string of beads, which appear in the body of the cell itself, or in the prolongations of the latter when it has them.

§ 3.—*Of the Principal Modifications which the Epithelial Cells of the Uterus, between the Placenta or the Allantois and the Mucous Membrane of the Uterus, exhibit in some of the Domestic Mammalia.*

During pregnancy, the epithelial cells of the uterus, in domestic and wild animals, show gradual changes, analogous to those which I have pointed out in the human female.

In the cornua of the uterus in the sow, the cells differ, during pregnancy, according to their locality. In the spaces between the points occupied by each ovum, the cells maintain their prismatic state and their nucleus more frequently spherical than ovoid, without a nucleolus. Moreover, they do not retain their vibratile cilia, having lost these at this period.

At the regions where the allantois is applied against the mucous membrane, the epithelium of the latter, as well as many of the cells which remain adherent to the allantois, under the form of a soft, viscous, grizzly coat, are hypertrophied and become tessellated. It is peculiarly interesting to follow the phases of the transformation of the prismatic cells into the tessellated form, by taking the epithelium at points more or less near to the portions of the mucous membrane which are applied against the ovum.

The cells, in reality, appear relatively more and more short and thick; they do not become more granulated, but their nucleus gradually changes from the ovoid form, becomes larger, and acquires a nucleolus, generally as much more enlarged as the nucleus itself increases in size.

In the portions of the mucous membrane which are closely applied to the ovum, the cells which have become polyhedral, but often showing blunt angles, with curved sides, usually reach a diameter of from two to three hundredths of a millimetre (from $\frac{1}{10000}$ to $\frac{3}{10000}$ of an inch). Many of the intermediate ones become spherical or ovoid, from which they are isolated each from the other, and freed.

Those which contain two or even three nuclei are furnished with a brilliant yellowish nucleolus. With these cells are found mingled a few free nuclei, similar to those which are found in the cells themselves.

The epithelial cells, which I have just described, whether prismatic or tessellated, form, in the portions which they occupy, a sheath for the vascular papillæ, with which the uterine mucous membrane is furnished in animals. We often find the *debris* of these epithelial sheaths in the uterine mucus or in the grizzly coat interposed between the mucous membrane and the allantois.

These sheaths are easily distinguished from those of the follicles of the mucous membrane of the uterus; for the epithelium of the latter is nucleated, with ovoid nuclei, a little larger than the blood globules in the adult, without nucleoli, and often slightly separated from each other by a minute portion of finely granulated amorphous matter.

In the doe-rabbit or Guinea-pig, or sea-hog, the modifications undergone by the epithelial cells of the uterus during gestation are more interesting than in the sow.

The cells of the mucous membrane which is not in contact with the placenta undergo, in reality, in their own conformation, certain changes, and these differ from that which takes place in the *inter-utero-placental* epithelial cells.

1st. *In the portions of the mucous membrane taken in the intervals between the ova*, the cells usually preserve their prismatic form, except that their thickness may be generally doubled, or even, in some instances, tripled. Their length changes but little. Those of the few whose thickness is quadrupled or quintupled, become cubical or polyhedral, with many faces, and even spheroidal.

From their juxtaposition, they form bits of epithelium of great beauty under the microscope, particularly in the epithelial sheaths of the very vascular villosities of this mucous membrane. These epithelial sheaths, which maintain the form of the villosities, are easy to recognize, and afford an opportunity of observing this epithelium under every point of view.

In each cell, with hardly an exception, hypertrophied or not, are to be seen two, three, four or five nuclei. They are generally contiguous, placed in a series one after the other, in a single row, in the cells little or not at all hypertrophied. Towards the largest part of the cell, there are sometimes two nuclei placed across, below the line formed by the other nuclei. In the cells which are double, triple or quadruple in volume, the number of nuclei may amount to from six to fifteen, or thereabouts. Then they are disposed in two, three or four contiguous ranks, along the length of the cell, or heaped up without order.

In these arrangements, very singular and very different appearances take place in the cells, from what we observed in the unimpregnated state.

These nuclei are always, or almost always, spherical, of from five to seven thousandths of a millimetre ($\frac{1}{100000}$ to $\frac{1}{100000}$ of an inch), finely granulated and without nucleoli. The bodies of the cells remain finely granulated. These facts, with what follows, may be noticed when the gestation has hardly as yet reached the fifteenth day.

2d. *At the placenta, in the inter-utero-placental*, grizzly, friable coat, of which I have already spoken in the second part of this memoir, the cells exhibit changes different from those which I have just described.

They are entirely hypertrophied and deformed, very much as are the cells of the decidua in the human female, described in the preceding paragraph. Their very structure is more modified even than in the human female; moreover, these cells have not the slightest resemblance to the cells of the mucous membrane of the uterus when empty.

All these cells have taken the tessellated form, but are irregular in consequence of the inequality in the length of the angles which limit their faces; their borders also are often slightly dentated. They attain almost to the dimensions of which I have given the figures in the preceding paragraph, in describing the epithelial cells of the inter-utero-placental decidua, in the human female, with this exception, that the incisions or prolongations of the edges of these cells are more rare in the rabbit than in the human female. Moreover, we find cells isolated or joined together, and in contact with the preceding, which are not much more than half as long and thick as in the empty uterus. They resemble, very remarkably, in form and volume, the cells of the impregnated uterus, taken from the intervals between the ova. They, in like manner as the latter, enclose from three to six nuclei or thereabouts, similar in kind. Moreover, besides the spherical nuclei, we almost always find in the same cell one, two or more nuclei of an ovoid shape, and slightly larger than those which are spherical. Above all, it is near the border of the placenta, that the grizzly coat, the *inter-utero-placental*, shows cells analogous even with those from the space between the ova.

From these last, up to the largest cells, which are also the most irregular, we find every intermediate degree of form and volume, in the majority of cases mingled without order through the different layers of the epithelium.

The largest cells, which are flattened, and scarcely regular, enclose (like the largest of the cells which we find in the spaces between the ova) from six to eighteen and even twenty nuclei. They are contiguous or but little separated, according to their distribution in the body of the cell; almost invariably, there are one or two which have a spherical form, and a size of about six thousandths of a millimetre (about $\frac{1}{100000}$ of an inch); but the rest are ovoid, and always of different sizes. It is not rare, actually,

to find in the same cell, nuclei which are from six to eighteen thousandths of a millimetre ($\frac{225}{1000000}$ to $\frac{875}{1000000}$ of an inch) in size; but in the majority of the cells, the length of the largest nuclei does not exceed twelve thousandths of a millimetre ($\frac{450}{1000000}$ of an inch), for the most bulky are ovoid.

There are few nuclei which show a nucleolus. The body of the cells in the spaces between and around the nuclei, is very much granulated. These granulations give to the cells a greyish tint, having but little transparency, when they do not reach a thousandth of a millimetre (about $\frac{37}{1000000}$ of an inch) in size, and are uniformly distributed. The cells are as much more greyish and deep colored as the granulations are larger and nearer together.

And besides, certain cells are rendered nearly opaque by a multitude of fatty granulations, which may have attained a size of two thousandths of a millimetre even ($\frac{75}{1000000}$ of an inch), yellow in the centre, with a deep-colored outline. They are scattered, or accumulated about the nuclei, but generally more abundant than those which we see in the analogous cells of the decidua of the human female.

These cells can be detected, under the microscope, in an isolated condition or associated together in fragments of various sizes, or even juxtaposed in hollow strings, suggesting, moreover, the form of the sheaths which cover the villosities of the mucous membrane of the uterus.

In the Guinea pigs, we observe facts analogous to the preceding; but at the surface of the placenta especially, the viscous greyish coat, which is formed from the epithelium, contains many cells which are regularly spherical or ovoid, in the midst of those which are polyhedral and hardly regular. These are from three to seven hundredths of a millimetre ($\frac{111}{1000000}$ to $\frac{330}{1000000}$ of an inch), or thereabouts. They contain one or more nuclei, which are particularly noticeable for their enormous volume. We find there some, indeed, which reach twenty-five thousandths of a millimetre ($\frac{250}{1000000}$ of an inch), and many have an average of fourteen to eighteen thousandths of a millimetre ($\frac{430}{1000000}$ to $\frac{690}{1000000}$ of an inch). The presence of two nucleoli is common. They are brilliant and yellow in the centre, and from one to four thousandths of a millimetre ($\frac{37}{1000000}$ to $\frac{150}{1000000}$ of an inch) in size.

CASE OF PLACENTA PRÆVIA.

BY EBENEZER STONE, M.D.

[Read before the Norfolk (Mass.) District Medical Society.]

ON the 23d of December, 1858, at 9 o'clock, P.M., I was called to Mrs. H. G., aged 33, in the seventh month of pregnancy, with her fourth child. I was informed that she had had slight hæmorrhage, for two or three days, which had now increased on the occurrence