STUDIES ON BLOOD SERUM. IV

THE INFLUENCE OF THE PUERPERIUM ON THE PROTEOLYTIC ACTIVITY.

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(Received for publication, September 26, 1917.)

INTRODUCTION.

In the puerperium remarkable physiological changes take place in the breasts and in the uterus. In the former a great increase in the number and activity of the parenchymal cells takes place. These cells are rich in intracellular ferments. The physiological changes going on in the uterus are equally interesting although of entirely different nature. Instead of being proliferatory they are retrogressive. The uterus in woman decreases in size from an organ weighing about 1,000 gm. to one weighing only about 30 gm. This decrease in size is the result of several factors the most important of which is a decrease in the size of the individual fibers due to retrogressive changes in the cytoplasm of the muscle cells. There is in fact an autodigestion of the fibers without destruction of the cells manifested microscopically by the formation of minute fat droplets in the cytoplasm around the nucleus which tend to coalesce and form larger droplets which are in turn extruded into the intercellular spaces and absorbed. This digestion takes place over a period of 6 weeks at the end of which time the uterus is again normal in size. Whether this is a process of increased ferment activity in the cells of the uterus itself or is part of a general ferment increase in the blood, is of considerable theoretical importance.

We have in the puerperium a period in which great cellular activity (development of the breasts and involution of the uterus) is manifested following a period (pregnancy) in which some observers have reported an increased ferment content of the blood serum. The question arises: How is the ferment content of the blood serum affected by the local changes in the breast and uterus and by parturition?
EXPERIMENTAL.

In order to throw some light upon this problem we took a series of dogs post partum and tested the proteolytic activity of the blood serum according to the technique described in previous papers. The time elapsing following the birth of the pups varied from a few hours to several days. The involution period is much shorter in dogs than in the human species but the loss of weight of the uterus per kilo of weight of the dog is equally great, thus making results comparable. An autopsy was done in each case immediately after the blood was obtained, and the degree of involution of the uterus was determined. The dogs were all fasting for at least 12 hours previous to the time the blood was obtained thus assuring that any increase in the proteolytic content of the serum was not occasioned by non-specific digestion ferment. Milk is present in the breasts of dogs at the time of the birth of the pups or appears very shortly afterward. They differ in this respect from women in whom milk does not appear normally till the 3rd day. Therefore any influence that lactation might have on the ferment activity of the blood serum would be manifest under the conditions of the experiment.

The results tabulated are the averages of closely agreeing duplicates.

<table>
<thead>
<tr>
<th>Puerperal Dogs.</th>
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<tr>
<td>Time, post partum</td>
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<tr>
<td>mg.</td>
</tr>
<tr>
<td>Total nitrogen.</td>
</tr>
<tr>
<td>Non-colloidal nitrogen.</td>
</tr>
<tr>
<td>Serum (incubated).</td>
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<tr>
<td>Serum + placenta.</td>
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<tr>
<td>Serum (inactivated) + placenta.</td>
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</tbody>
</table>

These figures were obtained from a volume of 2.5 cc. of serum.

*72 hours' incubation.

CONCLUSION.

The results of these experiments fail to show a constant increase in the proteolytic activity of the blood serum in the puerperium. It would therefore appear that the ferment activity in the uterus and the mammary glands does not affect the ferment activity of the blood serum.

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J. Biol. Chem. 1917, 32:519-520.

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