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## Studies on Glycogen-formation in the Mucous membrane of Alimentary-canal.

(Report No. III.)

The Glycogen-formation in the Mucous membrane  
of Alimentary-canal due to Diuretin injection,  
Diabetic puncture and Phloridzin injection.

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### I. Introduction.

As to the glycogen-formation in the mucous membrane of the gastro-intestinal tracts, I have already dealt with in the preceding paper that I have evidently proved that in hyperglycemia, the mucous membrane of the gastro-intestinal tract, particularly, that of the cecum of healthy adult-rabbit which normally has but a trace, if any, of glycogen, shows the appearance of glycogen and that the said glycogen is formed from blood-sugar in the epithelial cells of the mucous membrane and that in hyperglycemia, therefore, the mucous membrane of the cecum has, by the process of forming glycogen, a certain regulative function for the distribution of the blood-sugar.

Under above consideration, I examined the relation between glycosuria, hyperglycemia and the glycogen-formation in gastro-intestinal mucous membrane in various cases of experimental glycosuria. In the report no. I,<sup>18)</sup> I investigated systematically the relation between the glycogen-formation in case of peripheral glycosuria caused by adrenalin injection and glycosuria and hyperglycemia. In the report no. II,<sup>18)</sup> I also examined the relation between the glycogen-formation by sugar administration in various ways and glycosuria and hyperglycemia. In the present paper, I am going to observe the relation between the glycogen-formation in the central glycosuria caused by diuretin injection and diabetic puncture and in the renal glycosuria due to phloridzin injection and glycosuria and hyperglycemia.

## II. Material and Methods.

It was already described in the preceding paper and so will not be detailed here.

## III. Matured rabbit.

The relation between the appearance of glycogen in the gastro-intestinal mucous membrane in matured rabbit and glycosuria and hyperglycemia is very important as compared with this investigation. However it was already detailed in the report no. I.

## IV. Diuretin injection.

### Experiment No. I.

In 1895, Jacoby<sup>1)</sup> observed that an injection of coffeein and theobromin on rabbit previously fed with nutrient rich in carbo-hydrate caused glycosuria and named it "renal glycosuria." Later, Richter<sup>2)</sup> noticed the occurrence of hyperglycemia and diminution of glycogen in the liver in case of diuretin glycosuria and opposed to Jacoby's view. He presumed that it is so-called liver glycosuria due to the increasing of liver-glycogen-resolvent. Still later, Rose<sup>3)</sup> experienced that the appearance of hyperglycemia is resulted prior to glycosuria and assumed hyperglycemia to be primary and glycosuria, secondary. Considering the fact that glycosuria is not caused by diuretin injection on rabbit of bilaterally splanchnectomized and that Ecghard's experiment on diabetic puncture is quite agreed with his, Pollak<sup>4)</sup> concluded that in diuretin glycosu-

ria, the sugar-centre in the medulla oblongata is stimulated by diuretin and this stimulant coming through the way of the splanchnic nerve, finally causes the increasing of liver-glycogen-resolvent. Nishi<sup>5)</sup> experienced that either the section of left splanchnic nerve alone or removal of both of supra-renal glands does not cause diuretin hyperglycemia nor glycosuria and he pointed out that the stimulant originated in the sugar-centre reaches to the both sides of supra-renal glands via left splanchnic nerve and by this process the liver-glycogen-resolvent is finally increased. On the function of supra-renal glands on this occasion, Bang<sup>6)</sup> claimed that the increasing of adrenalin secretion is concerned in the liver in diuretin hyperglycemia. Against Bang's theory, however, Nishi could not observe any substance in the blood which dilates the pupils and Trendenburg<sup>7)</sup> observed that the hyperglycemia due to adrenalin injection is always accompanied by marked high blood-pressure but diuretin hyperglycemia vice versa. On the contrary, Fujii<sup>8)</sup> noticed that in diuretin hyperglycemia, chromaffin-substance of suprarenal glands is decreased and that after splanchnics denervation, there is no appearance of diuretin glycosuria nor alteration of chrom-affin substance. Still, Miculicich<sup>9)</sup> remarked that hirdin which keeps adrenalin hyperglycemia and glycosuria under control does not act on diuretin glycosuria but ergotoxin acts on both adrenalin glycosuria and diuretin glycosuria. Having observed the animal in experiment becomes remarkably restless, Bang<sup>10)</sup> assumed that diuretin hyperglycemia is not due to the direct stimulation on the sugar-centre by diuretin but it may presumably corresponds with the so-called psychical hyperglycemia. Morita,<sup>11)</sup> however, opposed from the view point of his experiment that diuretin hyperglycemia is demonstrated on rabbit previously removed of its brain. Summarriging above views, the following theory is to be generally acknowledged that in diuretin hyperglycemia and glycosuria, the sugar-centre is stimulated by diuretin injection and its stimulant reaches to the liver through splanchnic nerve.

6% Diuretin was subcutaneously injected in the abdomen with a dose of 10 c.cm per kilo-grams of body weight and the examination was made in the lapse of one, two, three, four, five, seven, twelve and 24 hours. The glycosuria and hyperglycemia were examined twice just before injection and at the time of sacrificing animals. It is shown in the table 1.

#### Experiment No. II.

The similar experiment was repeated here and its result is as table 2.

#### Experiment No. III.

The similar experiment was repeated here and its result as table 3.

Table 1. Experiment I (Diuretin Injection)

Number of rabbit	1	2	3	4	5	6	7	8
Weight of body	1420	1390	1510	1820	1700	1560	1470	1670
Sacrifice time	after 1 hour	after 2 hours	after 3 hours	after 4 hours	after 5 hours	after 7 hours	after 12 hours	after 24 hours
Glycosuria	{ before injection	—	—	—	—	—	—	—
	{ before sacrifice	+	+	+	+	+	—	—
Sugar content in Blood	{ before injection	0.095	0.101	0.087	0.098	0.093	0.096	0.098
	{ before sacrifice	0.119	0.139	0.185	0.156	0.179	0.156	0.090
Stomach	B ##	B ##	B ##	B ##	B ##	B ##	B ##	B ##
Pylorus	B ##	B ##	B ##	B ##	B ##	B ##	B ##	B ##
Duodenum	—	±	—	+	—	—	—	—
Jejunum	—	—	—	—	—	—	—	—
Ileum	—	—	—	—	—	—	—	—
Lymph apparatus in ileo-cecum	+	##	##	##	##	##	##	—
Cecum	+	##	##	##	##	##	##	—
Appendix vermiformis	—	+	—	—	—	+	—	—
Colon	—	—	—	—	—	—	—	—

Glycosuria; From one to seven hours after injection, positive; and after 12 hours, negative.

Blood-sugar; It is already increased an hour after injection and it reaches to the maximum after 3—4 hours and gradually comes down until it reaches to normal after 12 hours.

Glycogen; The Best's positive result is obtained in the mucous membrane of the stomach and of the pylorus in all cases and it entirely agrees with that of the report no. I or no. II. In hyperglycemia, from one to seven hours after injection, there shows a remarkable glycogen-formation in the epithelial cells of the cecum mucous membrane and on this occasion, glycogen was also somewhat markedly demonstrated after 12 hours. There are generally seen the fine granules accumulated in the free ends of the epithelial cells and rather coarse granules coalesced in the basal ends of the same cells. The glycogen is slightly found in the duodenum and appendix vermiformis. The epithelial cover-cells of the ileo-cecal lymph apparatus always presents glycogen but the jejunum, ileum and colon do not present any glycogen.

Table 2. Experiment II (Diuretin Injection)

Number of rabbit	1	2	3	4	5	6	7	8
Weight of body	1350	1280	1450	1720	1650	1530	1730	1450
Sacrifice time	after 1 hour	after 2 hours	after 3 hours	after 4 hours	after 5 hours	after 7 hours	after 12 hours	after 24 hours
Glycosuria	{ before injection	—	—	—	—	—	—	—
	{ before sacrifice	—	+	+	+	+	±	+
Sugar content in Blood	{ before injection	0.097	0.106	0.103	0.091	0.093	0.086	0.090
	{ before sacrifice	0.108	0.176	0.201	0.156	0.133	0.121	0.114
Stomach	B ##	B ##	B ##	B ##	B ##	B ##	B ##	B ##
Pylorus	B ##	B ##	B ##	B ##	B ##	B ##	B ##	B ##
Duodenum	—	—	—	—	—	—	—	—
Jejunum	—	—	—	—	—	—	—	—

Number of rabbit	1	2	3	4	5	6	7	8
Ileum	—	—	—	—	—	—	—	—
Lymph apparatus in ileo-cecum	—	##	##	##	##	+	±	##
Cecum	+	##	++	##	++	++	—	++
Appendix vermiformis	—	+	+	+	—	±	±	—
Colon	—	—	—	—	—	—	—	—

Glycosuria; After one hour it is negative, but from 2 to 12 hours, it is positive.

Blood-sugar; It is already increased an hour after injection and it reaches to the maximum after 3 hours and gradually lowered until it nearly returns to normal after 12 hours and reaches to normal after 24 hours.

Glycogen; In hyperglycemia, from one to 7 hours after injection, there displays a remarkable glycogen-formation in the epithelial cells of the cecum mucous membrane and this quite agrees with the result of the previous experiment. On this occasion, the glycogen is somewhat markedly observed in the cecum after 24 hours and slightly in the epithelial cover-cells of the ileum lymph apparatus after 3 hours.

Table 3. Experiment III (Diuretin Injection)

Number of rabbit	1	2	3	4	5	6	7	8		
Weight of body	1340	1520	1380	1460	1570	1390	1480	1570		
Sacrifice time	after 1 hour	after 2 hours	after 3 hours	after 4 hours	after 5 hours	after 7 hours	after 12 hours	after 24 hours		
Glycosuria	before injection		—	—	—	—	—	—		
	before sacrifice		±	+	+	+	—	—		
Sugar content in Blood	before injection		0.091	0.095	0.104	0.091	0.097	0.087	0.101	0.093
	before sacrifice		0.111	0.157	0.178	0.191	0.121	0.115	0.095	0.098
Stomach	B ##	B ##	B ##	B ##	B ##	B ##	B ##	B ##	B ##	
Pylorus	B ##	B ##	B ##	B ##	B ##	B ##	B ##	B ##	B ##	
Duodenum	—	—	—	—	—	—	—	—		
Jejunum	—	—	—	—	—	—	—	—		
Ileum	—	—	—	—	—	—	—	—		
Lymph apparatus in ileo-cecum	+	##	##	+	##	##	++	+		
Cecum	±	##	##	++	—	±	++	—		
Appendix vermiformis	—	++	+	—	—	—	—	—		
Colon	—	—	—	—	—	—	—	—		

Summarizing the above experiment, the result is agreed with the previous two experiments. On this occasion, however, the glycogen in the cecum was in the negative only after five hours.

## V. Diabetic puncture.

### Experiment No. I.

In 1854 and 1855, Cl. Bernard<sup>12)</sup> observed hyperglycemia by means of puncture

at the middle point of the line between the origins of the auditory nerve and the vagus in the fourth ventricle of medulla oblongata and designated it "sugar-centre." According to his view, the puncture at the point on the median line just near the starting point of the auditory nerve causes diuresis but not hyperglycemia. On the contrary, the puncture at the point on the median line quite near the starting point of the vagus causes the result vice versa. Eckhard<sup>13)</sup> ascertained that the denervation of both splanchnic nerves causes no hyperglycemia, even followed by the puncture of sugar-centre. Cl. Bernard experienced that after the sugar-centre was punctured, liver-glycogen is disappeared and yet the sugar content in the blood is increased. Furthermore, he observed that glycosuria does not appear even the sugar-centre was punctured after keeping the animal in starvation for a long time. After four or five days starvation on rabbit, F. W. Dock<sup>14)</sup> punctured the sugar-centre and found no glycosuria but observed the liver-glycogen disappeared on the control animal. By these experiments, the glycosuria caused by the puncture of the sugar-centre can be explained as follows; 1. the stimulation of the sugar-centre transmits through the splanchnic nerve, 2. the origin of the sugar in urin comes from liver-glycogen. As to the process of the stimulation, it is not, however, determined whether it reaches secondarily to the supra-renal glands or directly to the liver.

The method of puncture of the sugar-centre was followed to Eckhard's and examination was made after two, four, six, eight, twelve and 24 hours.

The glycosuria and hyperglycemia were observed twice just before puncture and at the sacrifice time. The following table shows it.

Table 4. Experiment I (Diabetic Puncture)

Number of rabbit	1	2	3	4	5	6
Weight of body	1620	1820	1460	1780	1790	2140
Sacrifice time	after 2 hours	after 4 hours	after 6 hours	after 8 hours	after 12 hours	after 24 hours
Glycosuria						
{ before Puncture	—	—	—	—	—	—
{ before Sacrifice	+	+	+	+	—	—
Sugar content						
{ in Blood before Puncture	0.098	0.103	0.091	0.095	0.101	0.097
{ before Sacrifice	0.186	0.139	0.161	0.159	0.094	0.089
Stomach	B ##	B ##	B ##	B ##	B ##	B ##
Pylorus	B ##	B ##	B ##	B ##	B ##	B ##
Duodenum	—	—	—	—	—	—
Jejunum	—	—	—	—	—	—
Ileum	—	—	—	—	—	—
Lymph apparatus in ileo-cecum	##	##	+	++	##	##
Cecum	##	##	##	##	—	—
Appendix vermiformis	++	++	—	—	±	—
Colon	—	—	—	—	—	—

Glycogen; From 2 to 8 hours after puncture, positive; and after 12 hours, negative.

Blood-sugar; It is increased from 2 to 8 hours after puncture and it returns to normal after 12 hours.

Glycogen; The Best's positive result is obtained in the mucous membrane of the stomach and of the pylorus in all cases and it entirely agrees with that of the previous experiment due to the diuretin injection. In hyperglycemia, from two to eight hours after puncture, there shows a remarkable glycogen-formation in the epithelial cells of the cecum mucous membrane. There are generally seen the fine granules accumulated in the free ends of the epithelial cells and somewhat coarse granules coalesced in the basal-ends of the same cells. In the appendix vermiformis, the glycogen is somewhat remarkably found after 2 to 4 hours and slightly after 12 hours. The epithelial cover-cells of the ileo-cecal lymph apparatus always present glycogen but the duodenum, jejunum, ileum and colon do not present any glycogen.

### Experiment No. II.

The similar experiment was repeated here and its result is as follows.

Table 5. Experiment II (Diabetic Puncture)

Number of rabbit	1	2	3	4	5	6
Weight of body	1580	1640	1760	1820	1630	1590
Sacrifice time	after 2 hours	after 4 hours	after 6 hours	after 8 hours	after 12 hours	after 24 hours
Glycosuria						
{ before puncture	—	—	—	—	—	—
{ before sacrifice	+	+	+	+	±	—
Sugar content						
in Blood						
{ before puncture	0.103	0.089	0.095	0.091	0.099	0.093
{ before sacrifice	0.147	0.160	0.185	0.200	0.105	0.108
Stomach	B ‡	B ‡	B ‡	B ‡	B ‡	B ‡
Pylorus	B ‡	B ‡	B ‡	B ‡	B ‡	B ‡
Duodenum	—	—	—	—	—	—
Jejunum	—	—	—	—	—	—
Ileum	—	—	—	—	—	—
Lymph apparatus in ileo-cecum	+	‡	++	‡	—	‡
Cecum	‡	++	‡	‡	++	+
Appendix vermiformis	—	—	+	+	+	+
Colon	—	—	—	—	—	—

Glycosuria; From 2 to 8 hours after puncture, positive; and in addition, it is a trace after 12 hours.

Blood-sugar; It is increased from 2 to 8 hours after puncture and it returns to normal after 12 hours and this agrees with that of the previous experiment.

Glycogen; In hyperglycemia from 2 to 8 hours after puncture, there displays a remarkable glycogen-formation in the epithelial cells of the cecum mucous membrane and this is quite agreed with that of the previous experiment. On this occasion, the glycogen is also slightly observed in the cecum after 12 hours and 24 hours. In the epithelial cover-cells of ileo-lymph apparatus, the glycogen is relatively remarkable after 24 hours.

### Experiment No. III.

The similar experiment was repeated here and its result is as follows.

Table 6. Experiment III (Diabetic Puncture)

Number of rabbit	1	2	3	4	5	6
Weight of body	1750	1790	1680	1670	1810	1560
Sacrifice time	after 2 hours	after 4 hours	after 6 hours	after 8 hours	after 12 hours	after 24 hours
Glycosuria						
{ before puncture	—	—	—	—	—	—
{ before sacrifice	+	+	+	+	+	+
Sugar content						
{ before puncture	0.089	0.095	0.104	0.096	0.101	0.087
{ before sacrifice	0.158	0.165	0.191	0.135	0.142	0.115
Stomach	B ††	B ††	B ††	B ††	B ††	B ††
Pylorus	B ††	B ††	B ††	B ††	B ††	B ††
Duodenum	—	—	—	—	—	—
Jejunum	—	—	—	—	—	—
Ileum	—	—	—	—	—	—
Lymph apparatus in ileo-cecum	††	††	††	††	††	††
Cecum	††	††	††	+	††	+
Appendix vermiformis	—	—	—	+	—	—
Colon	—	—	—	—	—	—

Summarizing the above experiments, it is almost agreed with the previous two experiments.

## VI. Phloridzin injection.

### Experiment No. I.

v. Mehring<sup>15)</sup> found that on the occasion of phloridzin administration on human being or on animal, the glycosuria appears remarkably. In the phloridzin glycosuria, Mikonski<sup>16)</sup> observed that the sugar content in blood is not increased, but contrarily, it is frequently diminished. Zuntz<sup>17)</sup> experienced that by injection of phloridzin into the renal-artery, the urin comes from the kidney of the same side, displays glycosuria more marked and quicker than that comes from the untouched kidney and therefore, he concluded that the phloridzin acts directly upon the kidney. This fact is acknowledged by many authorities.

Phloridzin was subcutaneously injected in the dorsal region with the dose of 0.2 g. per kilo-grams of body-weight and examined after one, two, three, four, five, seven, twelve and 24 hours. The glycosuria and hyperglycemia were observed twice just before injection and at the sacrifice time.

The table 7 shows it.

Summarizing the above experiments, it almost agrees with that of the previous experiments on normal rabbits.



Table 7. Experiment I (Phloridzin Injection)

Number of rabbit	1	2	3	4	5	6	7	8
Weight of body	1420	1180	1260	1530	1320	1650	1320	1450
Sacrifice time	after 1 hour	after 2 hours	after 3 hours	after 4 hours	after 5 hours	after 7 hours	after 12 hours	after 24 hours
Glycosuria	{ before injection	—	—	—	—	—	—	—
	{ before sacrifice	+	+	+	+	+	+	—
Sugar content in Blood	{ before injection	0.091	0.105	0.089	0.096	0.099	0.101	0.085
	{ before sacrifice	0.089	0.092	0.101	0.093	0.095	0.085	0.093
Stomach	B ††	B ††	B ††	B ††	B ††	B ††	B ††	B ††
Pylorus	B ††	B ††	B ††	B ††	B ††	B ††	B ††	B ††
Duodenum	—	—	—	—	—	—	—	—
Jejunum	—	—	—	—	—	—	—	—
Ileum	—	—	—	—	—	—	—	—
Lymph apparatus in ileo-cecum	+	††	††	+	††	††	††	††
Cecum	—	—	—	+	—	—	—	—
Appendix vermiformis	+	—	—	±	—	+	—	—
Colon	—	—	—	—	—	—	—	—

Glycosuria; From one to 12 hours after injection, positive; and after 24 hours, negative.

Blood-sugar; It is not increased in all cases.

Glycogen; The Best's result is obtained in the mucous membrane of the stomach and of the pylorus in all cases and it entirely agrees with that of the diuretin injection and diabetic puncture. The glycogen is slightly observed in the cecum after 4 hours and in the appendix vermiformis after one, four and seven hours. In the epithelial cover-cells of the ileo-cecal lymph apparatus, the glycogen always presents, however, in the duodenum, jejunum, ileum and colon, it is in the negative.

### Experiment No. II.

The similar experiment was repeated here and its result is as follows.

Table 8. Experiment II (Phloridzin Injection)

Number of rabbit	1	2	3	4	5	6	7	8
Weight of body	1350	1260	1410	1290	1320	1320	1150	1340
Sacrifice time	after 1 hour	after 2 hours	after 3 hours	after 4 hours	after 5 hours	after 7 hours	after 12 hours	after 24 hours
Glycosuria	{ before injection	—	—	—	—	—	—	—
	{ before sacrifice	+	+	+	+	+	+	—
Sugar content in Blood	{ before injection	0.101	0.089	0.096	0.092	0.098	0.091	0.104
	{ before sacrifice	0.095	0.095	0.102	0.093	0.094	0.095	0.090
Stomach	B ††	B ††	B ††	B ††	B ††	B ††	B ††	B ††
Pylorus	B ††	B ††	B ††	B ††	B ††	B ††	B ††	B ††
Duodenum	—	—	—	—	—	—	—	—

Number of rabbit	1	2	3	4	5	6	7	8
Jejunum	—	—	—	—	—	—	—	—
Ileum	—	—	—	—	—	—	—	—
Lymph apparatus in ileo-cecum	+	‡	‡	‡	‡	‡	‡	‡
Cecum	—	—	—	—	—	—	±	—
Appendix vermiformis	—	—	—	—	±	+	—	—
Colon	—	—	—	—	—	—	—	—

Glycosuria; From one to 12 hours, positive and this agrees with that of the previous experiment.  
 Blood-sugar; It is not increased in all cases and this agrees with that of the previous experiment.  
 Glycogen; It is almost agreed with that of the previous experiment.

### Experiment No. III.

The similar experiment was repeated here and its result is as follows.

Table 9. Experiment III (Phloridzin Injection)

Number of rabbit	1	2	3	4	5	6	7	8
Weight of body	1190	1090	1050	1320	1180	1150	1230	1320
Sacrifice time	after 1 hour	after 2 hours	after 3 hours	after 4 hours	after 5 hours	after 7 hours	after 12 hours	after 24 hours
Glycosuria	before injection	—	—	—	—	—	—	—
	before sacrifice	+	+	+	+	+	+	—
Sugar content in Blood	before injection	0.090	0.096	0.101	0.086	0.086	0.096	0.093
	before sacrifice	0.096	0.105	0.091	0.096	0.093	0.089	0.096
Stomach	B ‡	B ‡	B ‡	B ‡	B ‡	B ‡	B ‡	B ‡
Pylorus	B ‡	B ‡	B ‡	B ‡	B ‡	B ‡	B ‡	B ‡
Duodenum	—	—	—	—	—	—	—	—
Jejunum	—	—	—	—	—	—	—	—
Ileum	—	—	—	—	—	—	—	—
Lymph apparatus in ileo-cecum	+	‡	‡	‡	+	‡	+	‡
cecum	—	—	—	+	—	—	±	—
Appendix vermiformis	±	—	—	—	—	—	—	—
Colon	—	—	—	—	—	—	—	—

Summarizing the above experiment, the result almost agrees with that of the previous two experiments.

### VII. Summary.

Summarizing the above various experimental results, in hyperglycemia, glycogen

appears evidently in the mucous membrane of the alimental-canal, particularly of the cecum as it is similarly seen on the occasion of report no. I and no. II. In renal glycosuria due to phloridzin injection, there occurs no hyperglycemia and the amount of glycogen is almost same as that of the normal rabbit. The size, location and arrangement of the glycogen-granules are also practically similar in all cases and the fine granules are accumulated in the free ends of the epithelial cells and somewhat coarse granules coalesced in the basal ends of the same cells. This may presumably be a special phenomenon of glycogen granules accumulating on one side of the cells by alcohol-fixation. In hyperglycemia, besides the cecum, the glycogen is observed remarkably in the epithelial cover cells of the ileo-cecal lymph apparatus and some in the mucous membrane of the appendix vermiformis and in addition, it is infrequently proved in the mucous membrane of the duodenum and in the epithelial cover cells of the ileo lymph apparatus.

### VIII. Conclusions.

1. In central-glycosuria, there is seen the glycogen-formation marked in the mucous membrane of the alimental-canal, particularly in the cecum, but in renal-glycosuria, there is shown no definite alteration as compared with that of the normal adult-rabbit.
2. The glycogen-formation in the cecum mucous membrane has an intimate connection with hyperglycemia. On the occasion of hyperglycemia, it is obvious that some of the blood-sugar are transformed into the glycogen in the epithelial cells of the cecum mucous membrane. Considering this point of view, it may be concluded that in hyperglycemia, the epithelial cells of the cecum mucous membrane play a certain role as a regulator of the excessive sugar content in the blood.

In ending, I wish to acknowledge my indebtedness to Profs. O. Tamura and H. Tanabe. (*Received on 6th Feb. 1925*)

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## Description of plates.

Figure No. I. Cecum mucous membrane 3 hours after Diuretin-injection.

Figure No. II. Cecum mucous membrane 2 hours after Phloridgin-injection.

Figure No. III. Cecum mucous membrane 4 hours after Diabetic-puncture.

○蒼鉛口内炎ノ組織的竝ニ實驗的研究. Stempel u. Armuzzi, Zur Histopathologie der Wismut-stomatitis mit experimentellen Beiträgen. (Dermat. Zeitschr. Bd. 42 H. 1, 1924.)

蒼鉛ハ化學的ニ純粹ナル次硝酸蒼鉛ナル形ニ於テハ之ヲ大量内服スルモ殆ンド危險ナル中毒症狀ヲ現ハサズ大部分硫化水素ト結合シ硫化蒼鉛トナリテ腸管ヨリ排泄セララル事ハ已ニ明カナリ。Meyer, Steinfeld 兩氏ハ溶解性蒼鉛ノ複鹽ヲ動物ノ皮下ニ用ヒテ全身竝ニ局部ノ重篤ナル中毒症狀ヲ惹起セシメタリ。致死量ヲ與フレバ中樞神経系ノ障碍ヲ來シ少量ナラバ主トシテ腸、腎臟及ピ口腔ノ變化ヲ起ス。蒼鉛ノ驅敵療法中ニ屢々遭遇スルハ口内炎ナリ。該口内炎ニハ單純ナル蒼鉛齒齦沈着ヨリ潰瘍性炎症ニ至ル迄種々ノ階梯アルモ廣汎性ノ變化ハ唯動物實驗ニ際シテノミ見ラル。

「サルフルサン」及ピ蒼鉛ノ併用療法ヲ施セル二人ノ患者ニ於テ一ハ齒齦ノ蒼鉛沈着部ヲ他ハ左頰粘膜炎ヨリ蒼鉛斑ヲ切除檢索セルニ上皮ニハ強度ノ浮腫アリテ其ノ細胞ハ退化現象ヲ呈シ、蒼鉛ハ主トシテ乳頭體ノ尖端ニ沈着セリ。毛細管ノ内皮細胞モ亦一部分暗色ノ顆粒ヲ含有セシモ上皮ニハ之ヲ認メズ。

次ニ頰粘膜炎ニ限局性潰瘍性ノ口内炎ヲ呈セル者ニ就キ切除研索セルニ潰瘍周圍ノ上皮ハ上述ノ所見ニ類似シ潰瘍ノ領域ニハ上皮缺損シ潰瘍底面ニハ組織頹敗物、白血球、竝ニ多數ノ細菌ガ充滿セリ。乳頭ノ尙ホ存在スル部ニ於テハ蒼鉛沈着シ、或ハ毛細管壁ニ或ハ其内皮細胞中ニ在リ。然レドモ上皮ニハ其痕跡ヲモ見ズ。壞疽部ニ於テハ蒼鉛ノ沈着著明ナリ。

廣汎性壞疽性口内炎ハ上述ノ如ク犬ニ於テ見ラレ比較ノ少量ノ蒼鉛ヲ與ヘタル後突如トシテ現ハル。

諸家ノ實驗ニ依レバ赤毒性口内炎ノ發生ニ對シテハ口腔内ノ腐敗現象ニ依テ硫化水素ガ發生シ糜爛セル或ハ弛緩セル粘膜炎ヲ通シテ瓦斯ガ吸收セラレ毛細管内ニ硫化水銀ガ沈着スルモノニシテ之レガ爲ニ組織ノ循環及ピ營養ノ障碍等ヲ來スモノナリ。蒼鉛性口内炎モ同様ノ條件ノ下ニ起ル。血管内ニ沈着セル硫化蒼鉛ハ毛細管ニ限局性ノ機械的及ピ化學的中毒作用ヲ及ボス。然レドモ蒼鉛性口内炎ハ是レノミニヨリテ起ルニアラズ。即チ蒼鉛ガ中樞神経系ヲ侵シ血管運動神経ヲ介シテ血管ヲ麻痺セシムル事モ關係シ、尙ホ個人ノ體質竝ニ蒼鉛ニ對スル感受性ヲモ顧ミルベキナリ。必ズシモ蒼鉛ノ絶對量ニハ依ラズ。

Almkvist 氏ガ水銀ニ實驗セルト同様ニ著者ハ蒼鉛ヲ注射セル家兎ニ口粘膜炎ヲ亂切シテ硫化水素ヲ通シ口内炎ガ發生スルト否ヲ檢シタルモ不成功ニ終レリ。(皮、内田抄)

**Fig.1.**



**Fig.2.**



**Fig.3.**

