

**The Postnatal Growth of the Alimentary Canal  
and the main long Bones of the Free-  
Extremities in the Albino Rat  
(*Mus Norvegicus Albinus*).**

By

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*(Continued from No. 422.)*

As to the growth of the alimentary canal, only the length, as previously mentioned, was measured in four portions: the stomach, cecum (including appendix vermiform) and small and large intestines. The weight was disregarded as it is very indeterminate on account of the content in the canal and moreover, its width is also indefinite. Hatai<sup>3</sup> stated that the weight of the alimentary tract is represented by the following formula in albino rat:

Weight of alimentary tract

$$= 0.0245 \text{ Body-weight} + 4.720 \text{ Log (Body-weight} + 7) - 5.753.$$

The distance between the cardiac and the pylorus was measured for the stomach-length and the content in the stomach was untouched. This measuring may not be proper, but the stomach of such young rat is always filled with some contents nearly to the same extent and so the content will not disturb the measuring. There are several methods of measuring the stomach besides the above one; the length of greater curvature or lesser curvature, or the dimension of stomach etc., are also applied. On the first day after birth, the stomach is already filled with milk and its white color is clearly seen through the wall of the skin as previously described. In the intestine, especially in the large intestine, the dark green substance, the meconium is detected. As a rule, all the portions are developed proportionately and particularly after having opened their eyes on about fifteenth day, they make remarkable progress. On this occasion, the stomach holds some content besides milk and also the intestinal contents

grow in volume and especially the cecum is markedly enlarged, measuring its width nearly three times as large as that of the small intestine though its length is not distinctly extended. The rate of increase between the average length of each portion on the first day after birth and that of the same portion on the thirtieth day is as follows:—

	1st day	30th day		1st day	30th day
Body-length	1	2.1	Cecum (includes appendix)	1	5.8
Stomach-length	1	2.9	Large intestine-length	1	3.2
Small intestine-length	1	2.6			

The following table VIII shows the proportional length of the above four portions compared with the body-length.

Table VIII.

Days after birth	Body length	Stomach length	Small intestine length	Cecum length	Large intestine length
1st	1	0.18	3.96	0.08	0.57
2nd	1	0.18	4.08	0.10	0.55
3rd	1	0.20	4.13	0.09	0.59
4th	1	0.19	4.23	0.11	0.63
5th	1	0.21	4.33	0.12	0.67
6th	1	0.20	4.27	0.12	0.64
7th	1	0.23	4.58	0.10	0.73
8th	1	0.21	4.24	0.11	0.70
9th	1	0.19	4.30	0.10	0.73
10th	1	0.20	4.00	0.10	0.68
11th	1	0.19	4.07	0.12	0.70
12th	1	0.20	4.14	0.12	0.72
13th	1	0.20	4.20	0.13	0.71
14th	1	0.19	4.35	0.13	0.70
15th	1	0.17	4.24	0.13	0.74
20th	1	0.20	4.05	0.14	0.73
25th	1	0.23	4.67	0.15	0.72
30th	1	0.24	4.92	0.21	0.85

Still, the following table shows the average number of the various portions in both sexes.

As above table illustrates, in all the portions, the male is always superior to the female, with an exception that the former's stomach is slightly smaller than that of the latter. Comparing this relation with that of the human beings, it is obvious that the

			Total number	Average
Body-length :	Total males examined	51	372.0	7.3
	Total females examined	57	402.0	7.1
Stomach-length :	ditto		76.1	1.3
	ditto		81.0	1.4
Small intestine-length :	ditto		1650.3	32.4
	ditto		1698.2	29.8
Cecum : (includes appendix vermiform)	ditto		48.0	0.9
	ditto		48.0	0.8
Large intestine-length :	ditto		269.0	5.3
	ditto		273.0	4.8

male is always superior to the female. On this occasion, however, the measuring of the fully matured human-intestines is applied and we failed to find out a literature on the same subject which was investigated systematically in young and accordingly, the comparison of the intestines between the young albino rat and the fully matured human beings may not be proper.

For comparison, the following table in human beings is shown:—

The length of the small intestine.

Investigators' name		Total number examined	Longest length	Shortest length	Average
Kubo <sup>19</sup>	man	40	888.30	394.80	645.02
	woman	11	924.49	394.80	612.91
Sato <sup>21</sup>	man	5	—	—	641.00
	woman	5	—	—	629.60
Sugita <sup>21</sup>	man	82	1100.00	354.00	678.86
	woman	38	898.00	164.00	607.44

The length of the large intestine.

Kubo <sup>19</sup>	man	38	204.63	98.70	144.26
	woman	11	200.69	90.74	137.60
Sugita <sup>21</sup>	man	82	222.00	116.00	173.21
	woman	38	216.00	98.00	166.96

The ratio between the small and large intestines is as follows:—

Male :	Large intestine : Small intestine	= 1 : 6.1
Female :	ditto	= 1 : 6.2
Average :	ditto	= 1 : 6.15

In human beings, Suzuki<sup>18</sup> compared the large intestine with the small intestine as

follows:—

Man:	Large intestine : Small intestine	= 1 : 4.0
Woman:	ditto	= 1 : 3.7
Average:	ditto	= 1 : 3.9

It is seen that the deviation between the large and the small intestines in human beings is smaller than that of the rat.

The ratio between the body-length and the small intestine is as follows:—

Male:	Body-length : Small intestine	= 1 : 4.4
Female:	ditto	= 1 : 4.2
Average:	ditto	= 1 : 4.3

Miyake and Soeshima<sup>20</sup> compared the above ratio in human beings as follows:—

Miyake:	Body-length : Small intestine	= 1 : 4.2
Soeshima:	ditto	= 1 : 4.1

Lastly, the ratio between the total lengths of small and large intestines and the body-length is as follows:—

Male:	Body-length : Total length of intestines	= 1 : 5.2
Female:	ditto	= 1 : 4.9
Average:	ditto	= 1 : 5.0

Kubo's<sup>19</sup> comparison in human beings is as follows:—

Man:	Body-length : Total length of intestines	= 1 : 5.0
Woman:	ditto	= 1 : 4.9
Average:	ditto	= 1 : 5.0

It is enthusiastically hoped that these records may serve as a standard in investigating this line of study on the albino rat.

In ending, we beg to record our thanks to Professors Tamura and Tanabe who were kind enough to look over this manuscript. (*Completed on December 25, 1924.*)

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C 褐色色汗症ノ一例ニツキテ. Schoch, Über einen Fall von branner Chromidrose.  
(Dermat. Wochenschr. Bd. 80 Nr. I, 1925.)

患者 48 歳ノ商人, 幼時ヨリ壯健善患ヲ知ラズ. 本疾患ハ八日前過度ノ散歩ノ後ニ發汗, 倦怠, 眩暈感, 視障害起レリ. 患者ハ之ヲ當日食セシ腸詰ニ歸シタルモ, 胃腸障害ナシ. 此等ノ發作的不快感ノ臥休安靜ニ依リ約一時間後消失セリ. 然ルニ患者ハ手掌, 指, 爪ニ暗褐色, 肩, 胸, 背部ニ黄色乃至褐色ノ斑ヲ發見, 襯衣モ同様ノ着色ヲ來セリ. 上述ノ外ニハ皮膚及内臓ニハ何等ノ異常ナカリキ. 色汗症ノ原因ハ不明ナルモ細菌, 絲狀菌或ハ食物, 醫藥ト共ニ生体内ニ入り, 又ハ氣道ヨリ入りテ皮膚ニ分泌セラレル物質, 或ハ身體内ニ發生セル物質ノ存在ニ原因セラレルモノアリ. 色素ヲ發生スル微生物トシテハ Leptothrix, Trichomyzearten, Micrococcus chromidrogenes, ruber, citreus, carneus, luteus 等アリ. 著者ノ例ニ於テハ, 培養上無菌ナリキ. 而シテ外部ヨリ身體内ニ入りテ色汗ヲ起ス物質即チ鐵, 銅, 沃剝等ハ此患者ニハ用ヒザリキトイフ. 故ニ本症ハ特發性色汗症ト診斷スベク, 色素或ハ其前物質ガ身體内ニ發生セルモノナラン. 色汗症ニハ黑色, 灰色, 青色等ノモノ多クシテ, 多クノ場合ニハソノ際ニ Indigo ヲ證明セラレ又化學的ニ不明ナル物モアリ. 著者ノ例ニ於テハ其後腸詰ヲ食セズシテ前同様ノ發作性色汗ヲ見タリ. (皮, 大道抄)