XXIX. SALIVARY SECRETION IN INFANTS.

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THERE seems to be great difference of opinion as to the age of onset of the secretion of ptyalin in the saliva and its relation to the food of the child.

Schiffer [1891] says that the ptyalogenous function is present in the new-born child in the submaxillary gland, but is not established in the parotid under the age of two months.

Moll [1905] obtained saliva containing ptyalin from a parotid fistula in a seven months foetus.

Ibrahim [1908] confirmed the work of Moll, and found that ptyalin appeared earlier in the parotid than in the submaxillary gland. This seems natural when one remembers that the parotid is a purely serous gland, and most of the ptyalin in the mixed saliva of the adult comes from it as shown by Pavlov.

Berger [1899] examined the dry residue of the saliva in new born babies, and found that the foetal and adult salivary secretions do not differ very considerably in their consistency. The dry residue in new-born babies being 0.82 % and in adults about 0.79 %.

According to most investigators the secretion of saliva is very slight until after the sixth week of life when the amount increases considerably. Korowin succeeded in collecting as much as $1\frac{1}{4}$ cc. in five minutes in a child of four months.

Finzi [*Rev. Hyg.*] found that up to the age of six months the amylolytic power of the saliva was the same, whether the food contained starch or not, but after that age the power increased if the food contained starch.

Histologically the infant's salivary glands are relatively rich in connective tissue and in blood vessels, and the mucous cells are few in number. At two years of age however it is impossible to distinguish microscopically an infant's salivary gland from that of an adult.

In an extensive investigation of the subject I have recently obtained the following results at St Thomas's Hospital and the Evelina Hospital for Children, London.

The saliva was collected by giving infants plugs of gauze weighing 500 mg. to suck, the amount of saliva being estimated by the increase in weight of the plugs. The latter were extracted with 5 cc. of distilled water for one hour and then two series of tests were done.

(a). Equal parts of salivary extract and 1 % starch solution were mixed.

(b) To 1 cc. of the salivary extract 2 cc. of 1 % starch solution were added.

The test tubes were kept at a temperature of 40° C.

The following table shows some of the results obtained:

Age	Condition of infant	Nature of diet	Equal parts of starch solution and salivary extract	Two parts starch solution to one part salivary extract
34 weeks (premature)	—	Whey	98 minutes	130 minutes
36 " "	—	"	30 "	104 "
36 " "	Not as good as others	"	No change after two hours	
5 hours (after birth)	Fair	Breast	23 minutes	30 minutes
24 " "	Good	"	16 "	30 "
24 " "	Poor	"	29 "	41 "
48 " "	Good	"	17 "	29 "
48 " "	Very poor	"	No change after two hours	
12 days	Poor	Cows' milk and water	17 minutes	65 minutes
	(one of twins)			
9 weeks	Fair	Breast	8 "	11 "
10 " "	Good	"	4 "	5 "
11 " "	Fair	"	7 "	8 "
3 months	Poor	Cows' milk	6 "	8 "
5 " "	Very poor	Breast and bread	9 "	13 "
8 " "	Fair	Breast	1 minute	3½ "
1 year	Good	—	42 seconds	1 minute

The time indicated in the table was taken at the moment when the mixture of enzyme and starch solution had reached the achromic point as indicated by the iodine test. At this point the starch has reached the stage of conversion into achroodextrin and some maltose. The presence of reducing sugar was demonstrated with Fehling's solution.

An analysis of the results obtained from the saliva of 80 different infants supported the following conclusions:

(1) Ptyalin is present in the saliva of infants at least 1½ months before term although only in small quantities.

(2) The amount of enzyme increases gradually to the age of one year, when the composition of the child's saliva becomes identical with that of the adult.

(3) At all ages the quantity of ptyalin present varies with the general condition of the child, being larger in strong than in weak infants.

Inquiries were made among the mothers attending the out-patient departments as to the nature of the diet administered to their infants, and one was surprised to find that a large number of them fed their babies on bread soaked in milk and ground rice at the early age of 11 weeks and even younger, and barley water was a diluent used by most of them. Quite a number of these children were in fair condition and suffering from no digestive trouble.

According to Halliburton [1913] and others no diastatic enzyme is present in the pancreatic juice of infants.

In view of the fact that an amylolytic enzyme is present in the saliva of babies in quite appreciable quantities, and that a number of infants fed on milk plus starchy foods manage to utilise a large quantity of the starch,

there seems every reason for assuming that diastase is present in the pancreatic secretion of infants.

At the commencement of my investigations it appeared as if children who had taken starch in their diet secreted more ptyalin than those who had had none, indicating a capacity of adaptation as postulated by Pavlov, but after examining a larger number it seemed that the presence of starch in the diet makes no appreciable difference in the quantity of ptyalin present in the saliva.

REFERENCES.

- Berger (1899). *Inaug. Dissert.* St Petersburg.
Finzi. *Rev. Hyg. et Méd. Inf.* 8, No. 3, 224.
Halliburton (1913). *Handbook of Physiology*, p. 520.
Ibrahim (1908). *Naturforsch. Vers. Köln.*
Moll (1905). *Monatschr. f. Kinderheilk.*
Schiffer, Korowin and Sweifel (1891). Cited in Halliburton's *Chemical Physiology*.