Nicotinic Acid in Human Blood Cells at Birth

THE nicotinic acid was determined in blood from the umbilical cord, and in blood taken from the mother at the time of birth. The cord blood was obtained by allowing the placental end of the cord to drain into a centrifuge tube containing a mixture of ammonium and potassium oxalates, and the blood was mixed with the oxalates as gently as possible to prevent hæmolysis. The maternal blood was taken from the antecubital vein a few minutes later and mixed with the oxalates in a similar way. The cells were separated by centrifuging the blood for 45 min. at 3,000 r.p.m. and the nicotinic acid was determined in the cell mass by the method of Klein, Perlzweig and Handler¹.

The following results were obtained :

Subject	Nicotinic acid ($\mu\text{gm.}/\text{c.c.}$ of cells)	
	Maternal blood	Cord blood
A	13.5	12.0
B	12.8	13.4
C	16.2	15.1
D	12.2	12.6
E	12.8	13.0
F	13.0	13.3
G	10.6	12.3
Average	13.0	13.1

No consistent difference was found in the concentration of nicotinic acid in the two kinds of cells. The average concentrations were in the range usually accepted as normal for the blood cells of adults.

The work of Lwoff, Morel and Dignonnet², who used the *Proteus* technique for their estimations, suggested that the newborn child did not possess any large store of nicotinic acid. These investigators even went so far as to say that the tissues of the infant probably contained smaller concentrations than the same tissues of the mother; but the evidence for this statement was not conclusive. Blood was not investigated, and the present work perhaps throws some doubt on the accuracy of the previous observations, which, as Clements³ has pointed out, certainly need confirmation.

Human breast milk is a comparatively poor source of nicotinic acid, and the newborn child may need more than it can obtain from this source. If so, it may be able to synthesize the vitamin from tryptophane (Sarett and Goldsmith⁴), or it may have to rely on bacterial synthesis in the gut. An attempt is being made to find out whether such synthesis occurs, and if so, how soon it begins.

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¹ Klein, T. R., Perlzweig, W. A., and Handler, P., *J. Biol. Chem.*, **145**, 27 (1942).

² Lwoff, A., Morel, M., and Dignonnet, L., *C.R. Acad. Sci., Paris*, **213**, 1030 (1941).

³ Clements, F. W., in "Vitamins and Hormones", **4**, 96 (Academic Press, Inc., New York, 1946).

⁴ Sarett, H. P., and Goldsmith, G. A., *J. Biol. Chem.*, **167**, 293 (1947).

Effect of Removal of Neurosecretory Cells in the Brain of Adult *Calliphora erythrocephala* Meig.

IN a number of insects neurosecretory cells have been found in the brain¹; but very little is known of their function. Wigglesworth² showed that in *Rhodnius* the moulting hormone is produced by the pars intercerebralis of the protocerebrum, in which part of the brain Hanström³ had detected neurosecretory cells. Recently, C. M. Williams⁴ has found that neurosecretory cells in the brain of *Platysamia cecropia* play an important part in the regulation of the pupal diapause. (I am indebted to Prof. Williams for permitting me to quote this result.)

In the adult insect, the corpus cardiacum and probably the corpus allatum are innervated from the pars intercerebralis of the protocerebrum. In *Leucophaea* (*Blattaria*) B. and E. Scharrer¹ found that colloid could be traced from the secreting nerve cells in the pars intercerebralis to the corpora cardiaca all along the nervus corporis cardiaci. This morphological evidence renders it highly probable that the neurosecretory cells of the brain in some way influence the function of the corpus cardiacum and possibly that of the corpus allatum.

In *Calliphora*⁵⁻⁶, as in several other insects, the presence of the corpus allatum was found to be necessary for the production of yolk in the egg. If the neurosecretory cells of the brain influence the function of the corpus allatum, it might be expected that removal of these cells would have an effect similar to that of allatectomy.

Owing to their light-bluish colour, the neurosecretory cells in the pars intercerebralis of the protocerebrum can be distinguished in the living *Calliphora*. The neurosecretory cells were removed from forty-nine *Calliphora* females five to eight hours old (at 25° C.); thirty-nine flies of the same age served as operated controls. The flies were fed on meat, sugar and water for seven days (25° C.) before they were dissected. The length of the biggest egg-chambers was measured. The result was clear: the egg-chambers of the twenty-two surviving females deprived of the neurosecretory cells measured 0.13–0.17 mm., whereas only two of the surviving twenty-eight controls had egg-chambers measuring 0.17 mm. and 0.18 mm., while of the remaining twenty-six controls, two flies oviposited, seventeen contained ripe eggs, and in seven flies the egg-chambers measured from 0.28 mm. to 1.25 mm., all egg-chambers containing normal yolk. No yolk was present in the egg-chambers of the flies lacking the neurosecretory cells (as a rule no yolk is deposited until the egg-chamber reaches a length of 0.25–0.30 mm.).

In twelve females, allatectomized at the same age and kept for seven days (25° C.), the length of the egg-chambers varied from 0.14 mm. to 0.23 mm., and no yolk was present in any of them (ref. 6, p. 357). Thus it is evident that the ovaries of the flies deprived of their neurosecretory cells only develop to the same, or nearly the same, stage as the ovaries of allatectomized flies. This result seems to indicate that the corpus allatum is activated from the neurosecretory cells, possibly through the corpus cardiacum.

As neurosecretory cells have also been found in the brain of dipterous larvæ, one might go a step further and suggest that the larval corpus allatum