

into two periods: (1) The high resistance period of the newborn animals to low body temperatures (the lethal limit being about 0°C) (between ages of 0 and 7 days). (2) The period of decrease in cold resistance (between ages of 7 and 18 days).

After the latter period, cold resistance of the mice is on a rather steady level for at least ten days. At the end of this period, the lethal body temperature is about 9°C, thus being approximately at the adult level.

The present results have been descriptive in character. The correlations found earlier in other animals between the level of thermoregulatory ability and the appearance of muscle shiver in cold, the myelination of hypothalamus, and general metabolic changes have to be subjected to day-to-day studies during the development. The decrease in cold resistance may reflect an increase in vulnerability of the central nervous system through cold or anoxia or the occurrence of general nutritional and metabolic changes in the tissues, as well as the activation of endocrines. These studies may also throw some light on the mechanism of the cold death⁴.

Résumé. Par la mesure des températures dermales stabilisées des souris jeunes exposées aux températures extérieures variées, il a été possible de séparer quatre périodes dans le développement d'homéothermie entre les âges de 0 à 19 jours. La résistance au froid chez les souris jeunes s'amoindrit notamment entre les âges de 7 à 18 jours.

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Visceral and Vascular Transposition in the Viviparous Toothcarp *Xiphophorus maculatus* (Wagtail Strain)

In some strains of viviparous Toothcarps *situs inversus viscerum*, an anomaly, which is known to occur in about one out of ten thousand human beings, is not uncommon. Recently BAKER-COHEN¹ described this anomaly in 37% of specimens of an inbred line of the domesticated *Fury* strain of the platyfish *Xiphophorus maculatus*. Personally, we have observed visceral and vascular transposition in the same species, namely an inbred line of the Wagtail strain. 45% of the specimens showed *situs inversus viscerum*, whereas in three other strains of the platyfish, and in the related swordtail species *Xiphophorus helleri* and *Xiphophorus pygmaeus*, the anomaly was not observed or proved to be infrequent. Unborn Wagtail embryos revealed no evidence of a positive correlation between the visceral situs of the mother and the offspring or for twinning in association with visceral and vascular transposition. The asymmetry of the unpaired vena jugularis inferior, occurring in the genus *Xiphophorus*, appeared to be inverted in 10 to 25% of fishes of nearly all strains of *Xiphophorus helleri*, *Xiphophorus pygmaeus*, and *Xiphophorus maculatus*. In animals with *situs inversus viscerum*, an associated inversion of the venous asymmetry was present in most specimens, being consequently mirror images of their normal fellows in both respects. As in

animals with a normal visceral transposition, in about 10 to 25% a relative inversion was observed. In some cases, a double inversion occurred, in this way producing a normal venous asymmetry.

As in the *Fury* strain¹, so also in the Wagtail strain, both types of inversion were independently genetically determined. However, in neither instance could a simple hypothesis for the mechanism of inheritance be fitted to the available data. The visceral and vascular transposition in the *Fury*¹ and Wagtail strain of *Xiphophorus maculatus* appeared to be not sex-linked, nor was it maternally influenced. The indications were that it was due to autosomal genes which lacked full expression. As these results correspond very well with those obtained by BAKER-COHEN¹, a more general significance should indubitably be attached to them.

Zusammenfassung. Beschreibung des relativ häufigen *Situs inversus viscerum* beim lebendgebärenden Zahnkarpfen *Xiphophorus maculatus*.

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¹ K. F. BAKER-COHEN, *Amer. J. Anat.* 109, 37 (1961).

Die Mitschattierung

Jedes Objekt fällt in seiner Umgebung mehr oder weniger auf. Für Tiere kann beides je nach den Umständen vorteilhaft sein: Kontrastfärbungen dienen allgemein zum Signalisieren und speziell zum Warnen, Tarnfärbungen verbergen das Tier vor seinen Feinden und den Räuber vor seiner Beute.

Von der Umgebung hängt es ab, was (1) möglichst wenig oder (2) möglichst stark auffällt. Wenn man nur zwei Typen unterscheidet, benutzen Tiere (a) in optisch reich gegliederter Umgebung mannigfache Fleckungen, (b) in

optisch eintöniger Umgebung Hell-Dunkel-Schattierung. Entscheidend ist die Grösse des Tieres verglichen mit dem Umgebungsmuster.

(1a) *Tarnen durch Fleckung*: Ein bekanntes Beispiel sind die Plattfische, die ihre Farbe dem Umgebungsmuster sehr weit anpassen können.

(1b) *«Gegenschattierung»*¹: Der dem Licht zugekehrte, das heisst gewöhnlich hell beleuchtete Teil des Tierkörpers ist dunkel, der dem Licht abgewandte, normalerweise im

¹ F. SÜFFERT, *Z. Morph. Ökol. Tiere* 26, H. 1/2 (1938).