# Onset of Melanophore-stimulating Substances by the Pars Distalis and Pars Intermedia of the Pituitary Body of *Ambystoma tigrinum melanostictum*

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It has been shown that the hypothalamus, pars distalis and pars intermedia are separate sources of melanophore-stimulating substances in the tiger salamander, *Ambystoma tigrinum melanostictum* (Thurmond, 1967). In light of these findings, previous reports that intermedin could first be detected in extracts of heads of tailbud embryos should be re-examined. In fact, recent studies have shown that it is the hypothalamus of the late tailbud embryo (stages 37-38) that possesses melanophore-stimulating activity and only at young larval stages 39-40 does the adenohypophysis evoke a pigment response (Thurmond, 1967). The present study was undertaken to determine if the initial melanophore-stimulating activity of the adenohypophysis was pars intermedia or pars distalis in origin.

The procedure was to begin with large larvae in which parts of the pituitary are easily separated and progress to younger animals testing each part of the gland for pigment-stimulating activity. Control tissues were taken from the post optic ventral hypothalamus, cerebral hemispheres, olfactory lobes and medulla. All tissues were transplanted to the subcutaneous tissue of "albino" larvae, 18-20 mm in length, previously hypophysectomized at the tailbud stage. The response of the host's pigment cells were recorded on diagramed data sheets using the melanophore index of Hogben and Slome (1931) as well as by photograph.

The results are summarized in Table I. It can be seen that grafts of pars distalis and pars intermedia from large and small larvae to stage 40 all evoked an immediate pigment response. At stage 39, however, only the portion of the pituitary that is beginning to form the intermediate lobe evoked an immediate and sustained response. Pars distalis grafts from stage 39, 38, and 37 embryos did not give an immediate pigment response and only after one to several days did the host show a darkening. Similarly, the grafts of developing pars intermedia from stage 37 and 38 embryos did not evoke a pigment response until a day or so after implantation in the albino host.

Control grafts responded as anticipated from the earlier studies. Grafts of the hypothalamus from donors of all ages studied evoked melanin dispersion in the host's melanophores. Grafts of the pars nervosa and from various regions of the brain did not stimulate a darkening.

These results indicate that the pars distalis and pars intermedia are functioning in the larval stages of development and that both parts of the pituitary begin to function at approximately the time of hatching (stages 39 to 40). The evidence further suggests that the pars intermedia may begin functioning a few days (one stage) before the pars distalis; however, additional experiments are needed at these critical stages to confirm this observation.

Table I. Pigment Response of "Albino" Larvae to Pituitary and Control Grafts from Larvae and Embryos of *Ambystoma tigrinum melanostictum*.

| | DONORS | | | | | |
|---|---|---|---|---|---|---|
| | | | Hatching | | | Late Tail-bud |
| | Larvae | | Stage 40* | Stage 39 | Stage 38 | St.37 |
| Snout-vent length (cm) | (2.0-6.0) | (0.85-1.2) | (0.74-0.80) | (0.69-0.76) | (0.65-0.68) | (0.63) |
| Pars distalis (34)** | 100%(12) | 100%(7) | 100%(5) | 0%(5) | 0%(4) | 0%(1) |
| Pars Intermedia (27) | 100%(6) | 100%(7) | 100%(5) | 100%(5) | 0%(3) | 0%(1) |
| Hypothalamus (28) | 100%(6) | 100%(6) | 100%(5) | 100%(4) | 66%(6) | 100%(1) |
| Pars Nervosa (8) | 0%(8) | | | | | |
| Olfactory lobe, Medulla, Cerebral hemispheres (49) | 0%(10) | 0%(16) | 0%(10) | | 0%(11) | 0%(2) |

* Stages based upon a modification of Harrison's series for *A. maculatum*.
** Number of grafts.

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