

Melanophore-Stimulating Substances in Amphibia

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An attempt has been made to determine whether the pars distalis of the pituitary of the tiger salamander, Ambystoma tigrinum melanostictum, is the source of a chromatophorotropin, possibly ACTH, as has been demonstrated in mammals.

Pituitaries of 16 normal adults collected from ponds near Colter Bay and Togwotee Pass were carefully separated into pars distalis, pars intermedia, and pars nervosa and homoplastically transplanted to subcutaneous tissue of 18-22 mm albino tadpoles previously hypophysectomized at the tailbud stage. All 48 grafts of pars distalis evoked melanin dispersion in the host melanophores. Several grafts were observed to evoke strong localized responses for 48 days and all grafts for at least 16 days before fixing in preparation for histological examination.

In addition, 14 grafts of approximately equal size from the pars distalis of 4 adults previously pars intermedia-nervosa hypophysectomized for one month evoked sustained positive responses in the albino larvae.

The 15 control grafts of pars intermedia evoked sustained maximum dispersion of melanin in all melanophores of the hosts up to 48 days at which time they were preserved.

All 19 control grafts of pars nervosa evoked initial positive responses but within 3-4 days 12 became negative. The seven which remained positive may have contained cells from the pars intermedia inadvertently included at the time of the operation. Histological examination of these grafts will be necessary, of course, to confirm this statement.

Additional control experiments were performed to determine the time for residual intermedin and infundibular chromatophorotropin to dissipate from glandular tissue which is saturated with these substances. Thyroids were autoplastically transplanted to the sella tursica of 4 adults completely hypophysectomized and 4 adults previously pars distalis hypophysectomized. One week later the thyroid was excised, subdivided into 4 parts and re-transplanted to albino tadpoles. The 19 thyroid grafts which had been adjacent the pars intermedia one week evoked strong initial responses which disappeared within 24 to 36 hours. The 30 grafts previously associated with the infundibulum evoked weak positive responses for 2 to 3 hours. In all 35 instances where the thyroid was transplanted directly to albino larvae there was no pigment response.

If histological examination confirms the purity of the pars distalis grafts it would appear that the pars distalis of the tiger salamander possesses a melanophore-stimulating substance distinct from intermedin.

Summary of Results

Pigment Responses to Grafts of Adult Salamander Pituitary and Thyroid Homoplastically Transplanted to Young Albino Larvae

Type of Graft	Sustained Melanin Dispersion	
	Positive	Negative
Experimental		
Pars distalis (normal adults)	48	0
Pars distalis (adult previously pars intermedia-nervosa hypophysectomized)	14	0
Controls		
Pars intermedia (normal)	15	0
Pars nervosa (normal)	7	12
Thyroid (normal)	0	35
Thyroid (adjacent pars intermedia one week)	0	19*
Thyroid (adjacent infundibulum one week)	0	30**

*Strong initial response for 24 to 36 hours only

**Very weak initial responses which disappeared in most instances within 2-3 hours.