Medio-Lateral Distribution of Inductive Capacity in the Organizer of the Frog, *Rana cyanophlyctis*

It was realized quite early that the segregation of the neuroderm of the amphibian egg into the different parts of the central nervous system was ascribable to differential influences impinging on it from the organizer, which must, therefore, be considered regionally. A large number of investigations concerned with the cranio-caudal distribution of the determining stimuli have been carried out (WADDINGTON[1], and SAXEN and TOIVONEN[2]). Surprisingly enough, there is a contrasting paucity of detailed information regarding the distribution of the inductive capacity in the 'transverse' plane of the organizer. Medio-lateral distribution was indicated by the work of a few investigators[2], including HOLTFRETER[3]. RAVEN and KLOOS[4] investigated this by implanting separately 4 'longitudinally' cut strips of the anterior notochordal area of the archenteric roof. They showed that both the median and lateral strips induced neural crest-derived structures, but a proper central nervous system was induced only by the median strips.

We have carried out experiments to determine the distribution of the inductive potency in both the cranio-caudal and medio-lateral planes of the organizer of *Rana cyanophlyctis*. The present communication reports the results of implantation of medio-lateral strips of the entire zone of the organizer. The dorsal lip of the early blastopore was divided into 4 (in a small series only into 3) equal, 'longitudinal' strips and these were implanted separately into the blastocoel of young gastrulae. A lateral, $^1/_4$ strip of the organizer induced, in 15 cases out of the 16 examined so far, a compact mass of neural cells, which did sometimes have a very small cavity but which totally lacked the distinctive features of any part of the brain or the spinal cord (Figure 1). A well-developed eye, nose and auditory vesicle were often found induced by this part of the organizer. A median, $^1/_4$ 'longitudinal' part of the organizer induced a distinctive brain, and also eye, nose and auditory vesicle. It may be mentioned here that the median, $^1/_3$ transverse strip of the organizer induced a much better formed brain, indistinguishable from the host brain, with which it became fused sometimes (Figure 2). The Table shows that the frequency of induction of nose and eye was practically the same for the median and lateral $^1/_4$ of the organizer. This could be ascertained by external inspection of the larvae. But for the observation of the auditory vesicle and neural canal sectioning is necessary and this has been carried out only in about 3 dozen specimens.

An interesting feature of induction by lateral, $^1/_4$ organizer was that the auditory vesicle so induced was often considerably larger than the one that arises in

[1] C. H. WADDINGTON, *Principles of Embryology* (George Allen and Unwin Ltd., London 1956).
[2] L. SAXÉN and S. TOIVONEN, *Primary Embryonic Induction* (Logos Press, London 1962).
[3] J. HOLTFRETER, Arch. EntwMech. Org. *138*, 522 (1938).
[4] C. P. RAVEN and J. KLOOS, Acta neerl. Morph. *4*, 346 (1945).

Kind of graft	No. of larvae without external indication of induction	No. of larvae with induced head but without induced eye or nose	No. of larvae with induced head and nose	No. of larvae with induced head and induced eye and nose	Total
Lateral $^1/_4$ organizer	106	108	34	19	267
Median $^1/_4$ organizer	137	98	12	18	265

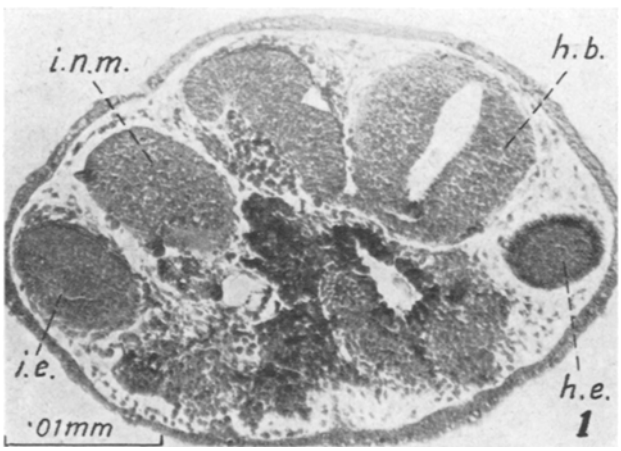

Fig. 1. Transverse section of *Rana cyanophlyctis* larva of 24 h implanted with $^1/_4$ lateral 'longitudinal' strip of uninvaginated organizer from young gastrula of the same species, showing, in addition to the host forebrain (h.b.) and host eye (h.e.), an induced mass of neural cells (i.n.m.) and an induced eye (i.e.).

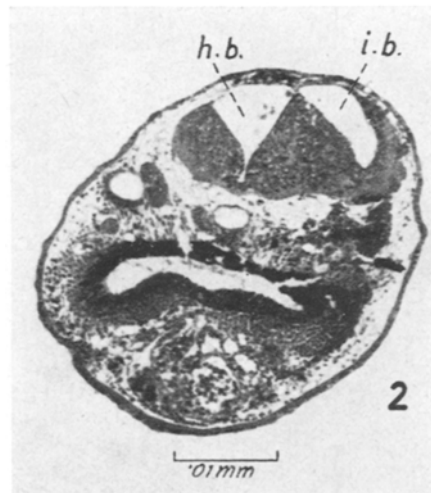

Fig. 2. Same as Figure 1, implanted with $^1/_3$ median 'transverse' part of uninvaginated organizer, showing, in addition to the host structures, an induced brain (i.b.) fused with the host brain (h.b.).

normal morphogenesis (we observed instances of the same for the nose but not for the eye). This would seem to indicate that its formation is subject to regulation by some antagonistic principle proceeding from the central part of the organizer. In fact one might consider the 'transforming' (NIEUWKOOP), or 'mesodermalizing' (TOIVONEN) principle (SAXÉN and TOIVONEN[2]) to be essentially antagonistic to the 'activating' or 'neuralizing' one, which limits the span of induction of the neural tissue, i.e. produces spinal cord in place of the brain.

Our results mentioned above cannot be fully explained on the assumption of the presence of a transverse gradient of a single inducing substance with the peak at the centre, for it is not a decrease in the quantity of the neural cells that are induced, but the failure of their individuation.

OKADA, HAMA and TAKAYA[5–13] reported that by implantation of the entire organizer before invagination only trunk and tail structures were induced and never the fore-brain and its derivatives. As indicated above, our experiments generally yielded induction of fore-brain formations by longitudinal strips of uninvaginated organizer. GALLERA[14,15] also reported some instances of fore-brain structures induced by parts of the uninvaginated organizer.

Zusammenfassung. Nachweis grösserer medio-lateraler Regionalunterschiede im Organisator des Frosches *Rana cyanophlyctis.*

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Intracellular Location of Hyphae in Experimental Dermatomycosis

The precise location of the infective agents in cutaneous infections with bacteria, yeasts and fungi is of paramount importance in terms of basic scientific knowledge, pathogenesis and the development of more specific therapeutic measures. SARKANY et al.[1] and MONTES[2] demonstrated the intracellular epidermal location of the bacterium *Corynebacterium minutissimum*, the etiologic agent for erythrasma. MONTES has found that *Malassezia furfur*[3] and *Candida albicans*[4] also occupy an intracellular position in the horny layer. To date there has been little study of routine dermatophyte (ringworm) infections although the organisms in culture have been examined[3,5–7].

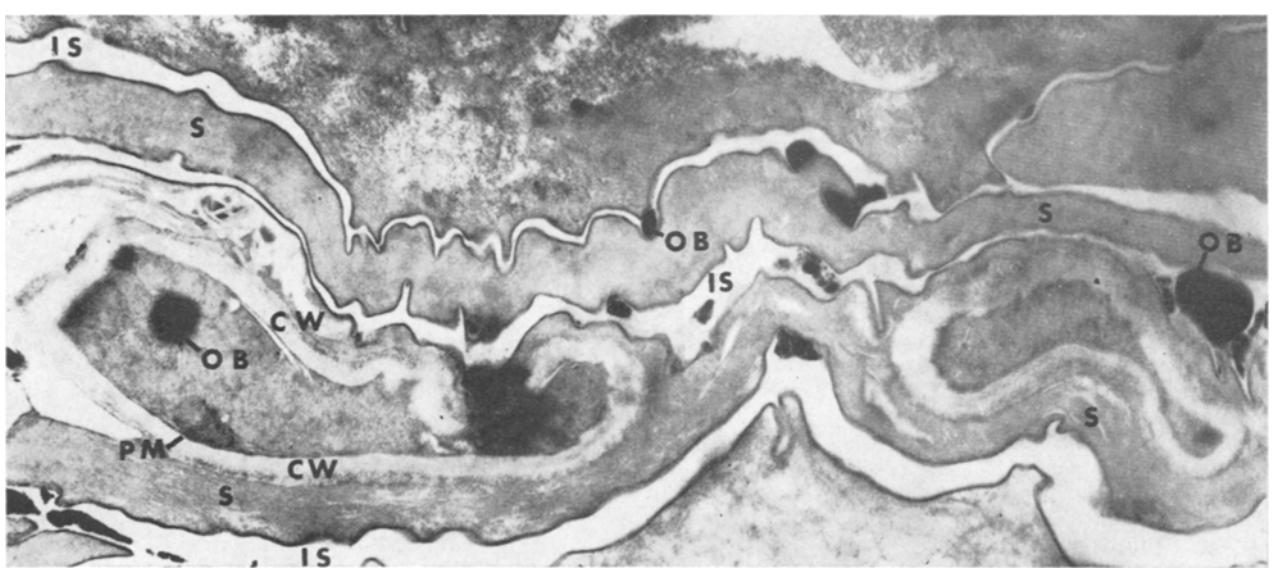

Fig. 1. Cross section of hypha located within squame (S). CW, cell wall; PM, plasma membrane; IS, intercellular space; OB, osmophilic body. × 16,000.