

THE PROBLEM OF THE NUMBER OF TARSOMERES IN THE REGENERATED COCKROACH LEG.

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There are five tarsomeres in the normal cockroach leg, but this number is often reduced in regenerated legs. In order to examine this complicated situation, fore-, mid-, and hindlegs of German cockroaches were amputated at 11 different tarsal levels and at 18 different times during the last instar. When tarsi were amputated at or proximal to the third tarsomere, four-segmented tarsi regenerated. When legs were amputated distal to the third tarsomere, the regenerated tarsi had five segments. The lengths of all tarsomeres of regenerated tarsi were measured together with those of unoperated contralateral tarsomeres, and the ratios of the former to the latter were calculated. From a comparison of the ratios and morphological observations, it was suggested that the third tarsomere of the normal five-segmented tarsus has disappeared in the regenerated four-segmented tarsus. Pads and disto-lateral spines of tarsomeres were observed on unoperated and regenerated tarsi. Double spines were often found on the four-segmented tarsi, mostly on the second tarsomere, just proximal to the position of the missing third tarsomere. This observation supported an idea that the third tarsomere has not simply disappeared, but has probably fused to the second tarsomere.

CTENII FORMATION OF REGENERATING SCALES IN THE FLOUNDER, *PARALICHTHYS OLIVACEUS*.

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In the flounder (*hirame*), two different type of scales are present on each side body side: i.e. the ctenoid scales on the melanized ocular side and the cycloid scales on the blind side. On the posterior part of the ctenoid scale, there are many small spines, "ctenii", and each ctenium is made of piled thin cone-like shaped tips. If the scales are plucked, after 1-2 weeks scale plate regenerate and grow to the same size as the initial scales. In this study, we histologically observed ctenii formation in the regenerating ctenoid scales of the ocular side compared to the cycloid scales of the blind side. Young adult flounder were used as samples. Scales were plucked from the skin of both sides, and fish were cultured at 24-26°C. On the ocular side, ctenii began to form on the regenerating scales on day 20 of regeneration. The caudal edge of the scale pocket swelled up, in which a hook shaped process was calcified. Such hooks formed successively at the caudal edge, so the completed ctenii was observed to be a piled cone shaped caps. On the other part of the surface of the regenerated scale plate, small calcification of the circulus was found, while on the blind side, only the scale plate in the circulus parts made small calcified ridges.

NUPTIAL PAD DEVELOPED IN ANURAN

HETEROMORPHIC LIMB REGENERATION.

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The nuptial pad is the male secondary sexual character which is composed of numerous epithelial projections and dermal glands, and its distribution is limited in the first finger of *Rana brevipoda porosa*, and in the ventral aspect of arm (from shoulder joint to fingers) of *Xenopus laevis*. The development of the nuptial pad was examined in the regenerative outgrowths of the above two species by amputating forelimbs midway through the zeugopodium.

In adult *Rana brevipoda porosa*, the amputating limbs were non-regenerative. Therefore, the nerve supply to the distal forelimb was augmented by diverting ipsilateral sciatic nerve and then, regeneration was occurred. The nuptial pad developed in limb regenerative outgrowths even without any digit-like projections.

In adult *Xenopus laevis*, the spike-shaped regenerative outgrowth was normally formed, in which the nuptial pad developed. When the skin at the amputation level was rotated 180 degrees on its stump, the nuptial pad showed overabundant development. Furthermore, when the skin at the amputation level was replaced with the pad-less skin of the back or abdomen, the nuptial pad developed in the regenerative outgrowth even though there was no nuptial pad at the skin of the amputation stump.

THE EFFECTS OF RETINOIDS ON CARTILAGE PATTERN AND THE EXPRESSION OF ANTIGEN DURING LIMB REGENERATION OF AXOLOTL

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Axolotl larvae treated with retinoid during limb regeneration form proximo-distal duplication. We prepared a monoclonal antibody (55C12) against a molecule, which was rich in the blastema and seemed to be axolotl tenascin. In this study, we investigated the distribution of this molecule in the retinoid-treated limbs. The 55C12 antigen disappeared in retinoid-treated and growth-arrested blastema, but when the blastema began to develop locally to form secondary blastema, which later regenerated a new limb from humerus level, the antigen reappeared in the secondary blastema. The local outgrowth of the retinoid-treated limb seems to be caused by the difference in responsiveness to retinoid between the anterior and posterior region. Thus, we examined the regional difference in DNA synthesis. After the retinoid treatment, DNA synthesis in the posterior region was inhibited more markedly than in the anterior region. Therefore, the secondary blastema seems to be derived only from the anterior region of the blastema.