specific differences in the synthesis of the A(M) and B(H) subunits[1] or rates of catabolism of the various isozymes[6–8].

Regional differences in epidermal morphology have been shown to be regulated in adult guinea-pigs and hamsters by the local dermis[9,10]. Overall, it would appear that the varying patterns of LDH epidermal isozymes derive mainly from the activity of local populations of keratinocytes with possibly some contributions by other cell types such as Langerhans cells. It remains to be shown whether the relative amounts of LDH isozymes synthesized depend on information intrinsic to the epidermis or are programmed by the underlying dermis throughout life. In hairless (C57HR) mice, the altered dermal-epidermal interactions culminating in hair loss[10] produce at most a small departure from the LDH isozyme patterns found in the haired mice.

The significance of a multiplicity of forms of LDH in skin is uncertain, for the precise roles played by the various isozymes have not been established[11–17]. PAPACONSTANTINOU[2] has proposed that the passage of mitotically-active cells into the stationary (postmitotic) phase is characterized by a change from an isozyme pattern where LDH-5 predominates to one where LDH-1 predominates. The high level of LDH-5 in mitotically-active normal mouse epidermis and the apparent loss of LDH-1 in epidermis treated with a hyperplasia-producing chemical agent are consistent with PAPACONSTANTINOU's hypothesis. Nonetheless, neither the available data on the LDH isozymes nor on regional mitotic activities in the epidermis of the mouse[18] permit any final conclusions regarding their possible relationship. This study does suggest that in whatever capacity LDH isozymes function, all areas of the epidermis do not have precisely the same requirements.

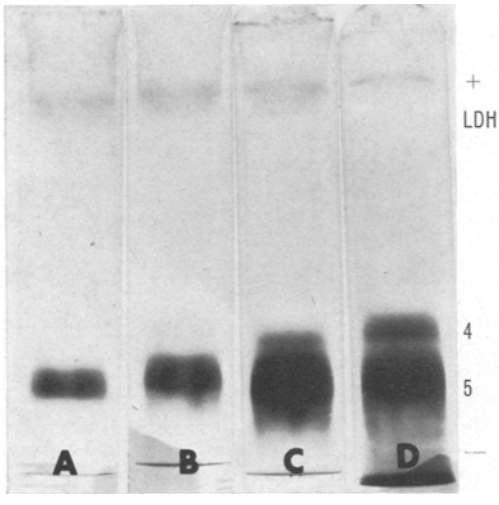

Fig. 3. Electropherograms of LDH isozymes in epidermis of C57BL/6J mice treated repeatedly with a mixture of turpentine and acetone: A) hind foot (treated); B) tail (treated); C) hind foot (nontreated); D) tail (nontreated). LDH-5 predominates in treated and nontreated mice. Although LDH-5, LDH-4 and traces of LDH-3, LDH-2 and LDH-1 are detectable in skin of nontreated mice, only LDH-5 and LDH-4 are demonstrable in treated skin.

Summary. Five isozymes of LDH are demonstrable in the epidermis of the ear pinnae, hind feet, trunk dorsa, and tails of adult C57BL, C57HR, and C3HB mice by polyacrylamide gel electrophoresis. LDH-5 activity predominates in electropherograms. The ratio of LDH-1 to LDH-5 is greater in the epidermis of ear pinna and trunk dorsum than in that of tail and hind foot. The region-specific patterns of epidermal LDH isozymes are not correlated with melanin pigmentation or 'hairiness' of the skin.

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Peroxidase Uptake Through the Tegument of the Cestode *Taenia hydatigena*

One of the important attributes of the cestode tegument is the absorption of food materials from the host intestine, as they lack a mouth and digestive tract. By applying autoradiographic techniques KING and LUMSDEN[1] observed the passage of labelled linolic acid through the tegument of *Hymenolepis diminuta*, suggesting that the tegument is capable of transporting macromolecular substances from the host intestine. Similarly, in the same cestode species, ROTHMAN[2], employing different colloidal substances, reported the absorption of those colloidal substances through the tegument by electron microscope. However, hitherto no experimental evidence has been provided to substantiate the entry of protein molecules through the tegument of cestodes. Hence an attempt has been made in the present investigation to study the nature of the permeability of the tegument of the cestode *Taenia hydatigena* to protein molecules by using plant peroxidase, which has been extensively used recently as a

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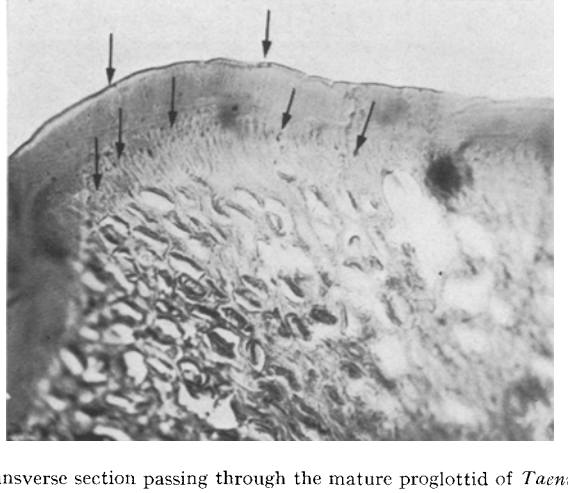
tracer molecule in the study of protein transport across cellular membranes[3–5].

Adult *Taenia hydatigena* were obtained from naturally infected dogs by removal from the small intestine, and were washed in phosphate buffer at pH 6.5. The tracer protein employed was horseradish peroxidase and the procedure follwed was that of OSBORNE and MILLER[6] with appropriate modifications. After washing, the live specimens were placed in concentrations of 0.1, 0.5 and 1.0% horseradish peroxidase in phosphate buffer at pH 6.5 for periods of 30 min to 48 h. All the experiments were performed at 24 °C. For visualizing the sites of peroxidase uptake, the animals were removed from the incubation medium at different time intervals and rinsed in phosphate buffer. Different regions of the worm were sliced in ice-cold 4% buffered neutral formaldehyde and kept in the same solution for 4 h fixation. The different regions of the worm were washed thrice with ice-cold 10% sucrose solution at 30 min intervals. Subsequently the material was embedded in gelatin and frozen sectioned. The sections were washed repeatedly in phosphate buffer (pH 7) and 9 ml of benzidine reagent (0.3% benzidine in phosphate buffer at pH 7) was added with gentle shaking. After 2 min, 2 ml of 0.3% hydrogen peroxide was added and the sections shaken vigorously at room temperature for 10–30 min. The sections were dehydrated, cleared in xylene and mounted in Canada balsam. Regions taking up peroxidase turned dark brown on treatment with benzidine reagent[7]. Control animals were incubated in a similar manner with the omission of peroxidase from the medium and fixed in the same manner as the experimental animals.



Transverse section passing through the mature proglottid of *Taenia hydatigena*. Arrows indicate the location of the peroxidase granules in the tegument and sub-tegumental regions.

In the experimental animals, the tegument of the neck region and gravid proglottides did not show any evidence of peroxidase uptake even after incubation for 48 h using different concentrations of the incubation medium. In the region of the mature proglottides, the tegument showed a positive reaction at 0.1% peroxidase concentration after 24 h of incubation. In 0.5% concentration, granules were observed in the tegument even at 12 h. In a 1.0% concentration, the uptake of peroxidase was faster, the tegument showed a positive reaction after 6 h of incubation (Figure). Control animals did not show any positive benzidine reaction in any region of the body.

It may be seen from the foregoing account that the peroxidase uptake occurs only in the mature proglottides region, suggesting that this region alone is involved in the protein sequestration from the host intestine. Although the absence of peroxidase uptake in the region of gravid proglottides may be correlated with the stabilized nature of its protein component of the tegument[8], the factors which restrain the entry of peroxidase through the tegument of the neck region, the protein component of which is unstabilized and similar to that of mature proglottides[9], are not clear at present.

Zusammenfassung. Die Durchlässigkeit der Kutikula verschiedener Körperabschnitte von *Taenia hydatigena* für Eiweissmoleküle wurde mittels Meerrettich-Peroxidase untersucht. Dabei wurde nachgewiesen, dass die Kutikula von *T. hydatigena* nur im Bereich der reifen Proglottiden für Peroxidase durchlässig ist. Dies lässt die Annahme zu, dass einzig in diesem Körperabschnitt von *T. hydatigena* die Resorption von Eiweiss aus dem Darm des Wirtes erfolgt.

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Penicillium lilacinum: Its Tolerance to Cadmium

A number of metal-resistant fungi were isolated from farm land polluted by mine drainage[1,2]. This experiment was carried out to find the distribution of the fungi in the land polluted by cadmium and the tolerance of the fungi to cadmium.

Materials and methods. Soil and water were collected from Sasagadani mine field[3] and its neighborhood as shown in the Table. Cadmium contents in the collected samples were measured using atomic absorption spectrophotometer, and fungi were isolated from the samples using potato sucrose agar (PSA)-rosebengal-streptomycin medium or the medium containing 1,000 ppm of cadmium[4]. Tolerance of the fungi to cadmium were found by the mycelial growth on PSA medium containing cadmium at a concentration of 10,000 ppm as a maximum and 1,000

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