The transport of P from interstitial water to the hypolimnion (*b* in Fig. 1) seems to be a physical process (diffusion or turbulence from gas bubbles) unaffected by poisoning. This process, however, is largely controlled by an earlier biological process (*a* in Fig. 1), and this new finding will alter both the theory of P dynamics and methods for control of eutrophication.

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Chemical Stimuli for Penetration of *Schistosoma mansoni* Cercariae

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The pathogen of human intestinal bilharziosis, *Schistosoma mansoni*, infects its host with cercariae that actively penetrate the human skin. The invasion of these larvae consists of at least three steps that require different stimulating factors [1]: (1) attachment, (2) creeping on the substrate, and (3) penetration. This study deals with the penetration, which itself is composed of several single processes [2]. It was found that while thermal stimuli in fact could actuate attachment as well as creeping on agar, they could not trigger penetration. However, agar was penetrated when it contained defined fractions of human- or rat-skin lipids [3, 4]. The specificity of this reaction was studied by offering more than 160 skin-lipid components and related substances, emulsified in agar. Aliphatic hydrocarbons proved to be the most effective. Saturated hydrocarbons are only effective when they contain both a lipophilic and a hydrophilic end group. For instance, 0.1 m*M* decanoic acid results in a penetration rate of 13.3%, whereas decanedioic acid does not stimulate penetrations (0.0%). At pH 7.0, effectiveness of saturated (but not of unsaturated) hydrocarbons is limited to chain lengths between C_{10} and C_{15} (Fig. 1). The structure of the hydrophilic end group is an important determining factor. The effectiveness of the polar end group of, e.g., 0.1 m*M* C_{14} hydrocarbons at pH 7.0 increases as follows: $=CH_2 < -CH_2SH < -CH_2NH_2 < -COOCH_3 < -COOH < -COCl < -CH_2OH < -CN < -CHO$. Double bonds are very important. In C_{18} carboxylic acids they are far more effective in cis position than in trans position, e.g., 0.01 m*M* cis-$C_{18:\Delta 9,12}$ stimulates 27% penetration, the transisomer only 5%. The effectiveness of double bonds increases, the greater their number and the shorter their distance from the hydrophilic end group.

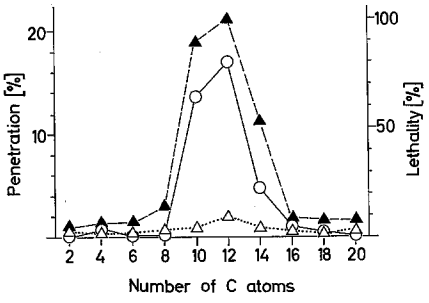

Fig. 1. Influence of chain length of saturated fatty acids on penetration into agar and on lethality of *Schistosoma mansoni* cercariae. Lethality refers to the number of cercariae that had not penetrated the agar substrate. Incubation 1 h at 35°C. Emulsion of 0.5 m*M* test substance with 5 m*M* phosphate buffer in agar together with or without 0.9% NaCl (pH 7.0). —○— Penetration, --▲-- lethality in water, ···△··· lethality in 0.9% NaCl

Lowering the pH also intensifies the response, but only in the presence of stimulating substances. The pH seems to act via the dissociation rate of the substances, i.e., increasing effectiveness may be produced by the rising amount of nonpolar substance.

At first it was surprising to find that all penetration-stimulating substances, including human-skin lipids, quickly killed cercariae. The intensity of the penetration stimulus in these cases closely correlated to the degree of damage (Fig. 1). However, this lethality can be reduced by adding mammal isotonic electrolyte (Fig. 1) or sugar solutions and may therefore be attributed to osmotic damage. It is known that *Schistosoma* cercariae lose their osmotic protection during transformation to schistosomula while penetrating the skin of the host [5]. Thus, the transformation of the tegument is actuated by chemical penetration stimuli, even when the cercariae are still in free water. It may be possible to use this mechanism in schistosomiasis control by adding penetration-stimulating substances to infected waters. When we know the exact specificity of the receptors, only small amounts of such substances may be needed.

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Response of European Populations of *Scolytus multistriatus* to Isomers of Multistriatin

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Populations of the smaller European elm bark beetle *Scolytus multistriatus* Marsh. endemic to forests in the Upper Rhine Valley did not aggregate in response to the tripartite attractant described for North American populations [1], containing (−)-α-multistriatin [2]. Instead, (−)-δ-multistriatin proved attractive when combined with 4-methyl-3-heptanol and cubeb oil. Addition of (−)-α-multistriatin strongly reduced response of the beetles to the field olfactometers baited with the attractant mixture (Table 1).

The field tests have been repeated in two subsequent years and in two different locations, with similar results. Also, the stereoisomeric identity of the synthetics used has been thoroughly rechecked. Such

