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POSSIBLE BASIC MECHANISMS OF CARCINOGENESIS
 IN SCHISTOSOMIASIS AND OTHER TREMATODE INFECTIONS^a

by

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Scale to ...
bladder ...
liver ...
Trematodes ...

BACKGROUND

In addition to the list of well-documented chemical carcinogens, a number of other factors are associated with increased cancer risk. These carcinogenic risk factors include increased dietary fat, absence of dietary fibre and such cultural or behavioural patterns as age at first marriage or at first pregnancy.⁷⁸ Although our understanding of the mechanisms involved is far from complete, it is likely that these additional risk factors can be accounted for in terms of current cancer theories since increasing evidence exists that multiple mechanisms interrelate in the promotion, enhancement and inhibition of human cancers.^{4,72,97}

BIOLOGICAL FACTORS - TREMATODES

A large number of biological factors have been implicated in predisposing individuals to later development of cancer. These include viral and bacterial infections as well as plasmodial and parasitic infections.^{5,9,32,86,89,98,119} Trematodes, however, are the organisms most often associated with neoplastic risk.

The association of liver flukes and cholangiocarcinoma has been documented by laboratory studies as well as by increased incidence of such cancer in endemic areas.^{28,59-61,83-85,122,127-129} Opisthorchis viverrini and Clonorchis sinensis are the flukes most often involved. These parasites are confined to the lumina of larger intra-hepatic ducts and in the presence of flukes two bile duct changes are observed: hyperplasia and adenomatous proliferation of the epithelial lining. Various enzymes have been identified in the metabolic products of flukes but no carcinogenic effect has yet been demonstrated for these materials.^{25,26} Thamavit et al.¹²⁰ and Flavell & Lucas⁴⁷ have reported, however, that otherwise noncarcinogenic doses of dimethylnitrosamine (DMN) induced cholangiocarcinoma in Syrian golden hamsters previously infected with O. viverrini. Likewise, beef cattle infected with the liver fluke Fasciola hepatica are more sensitive to aflatoxicosis than are uninfected animals.¹⁰⁷ Additionally, F. hepatica infected mice metabolize AFB₁ into its carcinogenic metabolite more efficiently than do uninfected mice.⁵⁸ These experiments with O. viverrini and F. hepatica interrelate environmental carcinogens and neoplastic transformation of parasite-infested biliary epithelial cells.

^a This document was derived from a presentation to the twenty-fifth session of the WHO Global Advisory Committee on Medical Research which met in Geneva on 10-13 October 1983.

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