

the tumour cell surface) and (3) new surface antigens resulting from intervention of abnormal DNA. This last group, but also some of group (2) are attractive targets for immunological attack, but it is not yet decided if all neoplastic cell surfaces have such new antigens. Authors adhering to one school of thought freely refer to 'non-antigenic' tumours; the other school attribute these to instances where the test methods were of inadequate sensitivity. There are certainly stronger and weaker tumour antigens as there are strong and weak histocompatibility (H) antigens. Tumours obey the transplantation rules (except under bizarre experimental conditions) implying that their H antigens are not grossly changed. From the practical point of view the allogenic situation is most revealing when enhancing alloantiserum blocks the recognition event, abrogating the prompt rejection of a histoincompatible tumour and allowing free growth.

Much early literature bears on H antigen changes on tumour cells (especially in mice) but these studies have not led to any clear guidelines. On page 713 of this issue of *Nature*, Invernizzi and Parmiani compare a non-antigenic spontaneous mouse tumour and an immunogenic carcinogen-induced tumour of the same ($H-2^d$) genotype to show that the latter expresses an H antigen belonging to other ($H-2^b$ and $H-2^k$) mouse strains, and they believe this to be the true nature of the tumour-specific antigen. The suggestion is made that the tumour antigen possibly resulted from "random mutations at the level of histocompatibility genes". It is especially important to know if such a relationship exists between H and tumour antigens because there is something special about H antigens as targets for immune attack. Not only are they of prime importance in allogeneic situations, they are also the principal target for cellular immune attack even between different species. This surprising information is provided by Lindahl and Bach (*Nature*, 254, 607; 1975). The two contributions make good reading for those working on immunotherapeutic approaches, especially as there is a resurgence of interest in tumour-directed antibodies as carriers of drugs (Davies and O'Neill, Eleventh International Cancer Congress, 1974). This is on the basis that the cellular response of the host has failed, that it cannot be replenished from an allogeneic (histoincompatible) source and antibody is not powerful enough, alone, to wreak sufficient damage on the target.

We should beware of generalising to simple rules such as that tumour antigens are derepressed or mutated H anti-

gens. Such a suggestion was made, for example by Martin, Esber, Cotton and Rice (*Br. J. Cancer*, 28, Suppl. 1, 48-61; 1973), but for at least one particular tumour, tumour-specific and H antigens are physically separable molecules (Davies, Baugh, Buckham and Manstone, *Eur. J. Cancer*, 10, 781-786; 1974) and Yeferof and Klein (*Expl Cell. Res.*, 88, 217-244; 1974) show that H antigens and tumour-specific antigens do not co-cap. Aberrant H antigens derived by mutation or derepression should co-cap using suitable H-directed antibody. On the other hand there are cases where, as tumour antigen increases, H antigen decreases (Haywood and McKhann, *J. exp. Med.*, 133, 1171-1187; 1971); and there are other variations on this general theme.

It is a sobering thought that whereas it would be convenient, and even promising from a practical point of view, if H antigens and tumour antigens had the relationships claimed, we do not actually know the natural physiological role of H antigens and their polymorphism. Among about ten possibilities listed at a recent meeting the favoured role was part of a cell surface recognition structure. One might conclude that a career in cancer research is still a safe one, not likely to be interrupted by an actual cure for the disease.

Hedges as relics of ancient woodland

from Peter D. Moore

MANY conservationists, particularly those with a botanical bent, are agreed that hedgerows in Britain act as an important reservoir for wildlife, though some feel that their importance may have been overrated especially as far as birds are concerned (see *Nature*, 249, 514; 1974). Hooper, a leading botanical champion of the hedges, has stated that as many as 50 species of plant could be threatened with local extinction as a consequence of the current agricultural practice of hedgerow removal (in *Flora of a Changing Britain*, edit. by F. Perring, 58; Clarsey, 1970).

Hooper has also pioneered research into the relationship between plant species richness and the age of hedges, finding that the two are generally positively correlated. This fact can, however, be interpreted in two ways; long-established hedges may have had time for invasion by more species, or, alternatively, old hedges may often be relic strips of rich, ancient woodlands. If the former explanation is correct then it would imply that hedges could act as chan-

nels along which plants migrate, and, if this is so, hedges can be regarded as doubly important, since they provide the means by which reinvasion of isolated fragments of woodland can occur.

Pollard (*J. Ecol.*, 61, 343; 1973) coupled a study of hedge floristics in Huntingdonshire and the Soke of Peterborough with an historical analysis of their origins. His results agreed with the findings of Hooper as far as age and richness were concerned, but he also showed that the richest hedges were those which could be traced back through documentary evidence to old woodland edges, often associated with parish boundaries. Some shrubs were entirely confined to woodland relic hedges, such as field maple, *Acer campestre*, dogwood, *Thelycrania sanguinea* and hazel, *Corylus avellana*. This latter finding is rather surprising when one considers the rapidity with which hazel colonised the early post-glacial land surface of north-west Europe (see Deacon, *New Phytol.*, 73, 1055; 1974). The concept of hedgerows as corridors for plant colonisation began to look unlikely.

Helliwell (*Biol. Cons.*, 7, 61; 1975) has dealt this theory a further blow in his work on hedgerows in Shropshire. Association analysis of his site data split first into base-rich and acidic subsets, and subsequently separated off hedges rich in woodland plant species. These are considered to be relic woodland fragments. Of course the use of a classificatory system of analysis renders it inevitable that a strict division of sites should result. But it is surprising that some invasion of modern hedges has not occurred if they do provide migration routes for woodland plants. This would have produced a continuum of richness.

These conclusions in no way deny the value of hedgerows as objects for conservation; it is the emphasis in determining site priority which should be modified in their light. Hedges of considerable antiquity, due to their richness, remain worthy of conservation effort. The case for maintaining recently planted hedges as aids to botanical recolonisation, however, becomes rather tenuous.

The longest-necked lizard?

from Barry Cox

THE Middle Triassic reptile *Tanystropheus* is one of the most peculiar fossils ever found. The adults are up to 6 metres long but with the head and the enormously elongated neck together contributing nearly one half of the