

induced co-capping of other molecules, such as the H-2 and Θ antigens in splenic lymphocytes, without recourse to use of the specific antibodies. In the light of these results it was vital to show that the Con A-induced inhibition of Ig motility was not an uninteresting artefact due to crosslinking at the cell surface but that microtubular structures were involved.

To do this Yahara and Edelman took advantage of the relative difference in size between the B lymphocyte and blood platelets (*Proc. natn. Acad. Sci. U.S.A.*, **72**, 1579; 1975). They conjugated the small platelets with Con A and studied their interaction with splenic lymphocytes. The much larger lymphocytes could bind several of the platelets through the conjugated Con A, and the platelet distribution was random over the lymphocyte surface. The idea was to complex only a small proportion of the total Con A receptors of the lymphocytes and to see if Ig movement was still restricted. Staining the platelet-treated lymphocytes with fluorescent Con A revealed that only a fraction of the lymphocyte Con A receptors were bound to the platelets; furthermore the Con A receptors not bound by the platelets were distributed diffusely over the lymphocyte surface. The binding of more than ten platelets per cell was sufficient to prevent anti-Ig-induced capping of Ig molecules, showing that Ig redistribution was blocked by the occupation of only a fraction of the Con A receptors. When the lymphocytes with their bound platelets were treated with colchicine they showed polar or cap-like distribution of the platelets on their surfaces. But when these colchicine-treated cells were examined with fluorescent anti-Ig for the distribution of Ig molecules, no co-capping of Ig molecules with the Con A platelets was seen: the motion of bound Con A receptors and Ig molecules was now independent. This provides the strongest evidence that Con A receptor modulation of Ig on the surface of B lymphocytes involves microtubular structures and is not an artefact generated by crosslinking of Ig molecules to Con A receptors on the cell surface.

The evidence for the involvement of microfilaments in the movement of molecules in the cell membrane is even more indirect and depends on the use of the drug cytochalasin B. This agent has had a rather poor press recently and it is not clear how it interferes with microfilament function. A further complication is that different preparations of this drug have different activities. What is fairly clear however is that cytochalasin B will interfere with cap formation and in the right condi-

tions will lead to an 80% inhibition of cap formation induced by anti-Ig. When used in conjunction with colchicine, cap formation is almost completely blocked. The addition of cytochalasin B to cells that have already capped leads to a dissolution of the capped molecules (de Petris, *Nature*, **250**, 54; 1974).

These findings suggest that microfilaments as well as microtubules have a role in the movement of molecules on the cell surface. What is required now is some more direct evidence of the linkage of molecules on the cell surface to microtubules and microfilaments in the cytoplasm.

Another overexploited fishery

from our

Marine Vertebrate Correspondent

OVEREXPLOITATION of fishery resources is no new phenomenon. Examples range in emotive potency from the state of whale stocks, through the decline in numbers of the Atlantic salmon, to the humble North Sea herring and the Californian sardine. Developments in fishery technology, aimed at improving the catch-effort ratio, have generally produced increasingly efficient means of exhausting the stock.

There is no worse offender in this respect than the Japanese high-seas fishery for tuna which during the last two decades exhausted the stocks in the southern Indian Ocean and the western Pacific, before transferring its operations to the Atlantic and the eastern Pacific Oceans. The consequences of this fishery on the billfishes (sailfish and marlins) of the eastern Pacific are discussed in a recent paper by Talbot and Wares (*Trans. Am. Fisheries Soc.*, **104** (1), 1-12; 1975).

By 1963 the Japanese fishery had expanded to 10° north latitude, offshore of Central America, and heavy catches of yellow-fin tuna (*Thunnus albacares*) and striped marlin (*Tetrapturus audax*) were made. In time it spread further north and the marlin became the major exploited species. The success of this fishery resulted in increased fishing effort and in 1964 the catch of this one species approached 300,000 fish. Thereafter the catch declined until 1967, reached a high point in 1968 of around 320,000 fish, but dropped dramatically the next year to just over 200,000. A comparable change has been observed in the catches of blue marlin (*Makaira nigricans*) which attained a maximum (nearly 80,000) in 1963 and thereafter declined severely, only increasing slightly (to 30,000) in 1969. The sailfish (*Istiophorus platypterus*) similarly shows an overall decline

from a peak of nearly 400,000 fish in 1965 to 100,000 in 1969.

Talbot and Wares examine the possibility that these changes in catch may reflect abundance variations caused by differing sea temperatures but, except for one area, they find little evidence to support this. They do, however, find clear evidence of overfishing. The first peaks of abundance for each of the billfish species can be related to increased fishing effort, and the decline in catch has persisted in some cases even though the number of hooks fished has increased. Expressed in terms of hook rate (the catch per hundred hooks), it seems that the striped marlin declined marginally from 0.7 to 0.3 between 1968 and 1969, the blue marlin catch fell from 0.35 to 0.05 between 1959 and 1969, while the sailfish catch fell from nearly 3 to 1.2 between 1965 and 1969. Clearly, in the cases of both the blue marlin and the sailfish the decline has been severe and indicates overfishing and depletion of the stocks. And the average weight of these fish has declined, which is also evidence of overfishing.

The reduction in numbers and weight of these billfishes may have considerable consequences for the sport fishery of the western Mexican and Californian coasts. This sport fishery has provided an important contribution to the income of Pacific Mexico since the second world war. Talbot and Wares point out that the reduction in average size of the fish caught has already made it a less spectacular sport. But they suggest that with the declining returns per unit effort the Japanese fishery may well decrease, leaving enough of the smaller billfishes to maintain the sport fishery.

Exciting days over for reverse transcriptase?

from Karin Moelling

It is five years now since Temin and Baltimore reported the existence in RNA tumour viruses of a reverse transcriptase which can make a DNA copy from the RNA genome. For some time progress on the characterisation of this new type of enzyme filled the front pages of the journals. But results on the characterisation of the enzyme are no longer so spectacular, and have become matters for hard working biochemists.

What do we know about the viral reverse transcriptase? Research was concentrated on the avian viral reverse transcriptase as large amounts of avian viruses can be isolated — and were generously supplied by J. Beard.