ethylated, accepting activity was virtually unchanged. Cyanoethylation of the Ψ residue, however, decreased accepting activity considerably. Regrettably, the elusive conclusion slips from their grasp at this point. It cannot definitely be said that Ψ is specifically involved in forming a complex with the activating enzyme and that this complex cannot form when the Ψ is modified, for the effect of the cyanoethyl group can be to distort the tertiary structure of the tRNA molecule. This might be the true reason for the lack of activity. The second reason is likely to be correct because others have shown that the excision of the TΨCG or the replacement of Ψ by 5-fluorouridine does not lead to loss of acceptor activity.

Bernardi and Leder (*J. Biol. Chem.*, **245**, 4263; 1970) describe the purification and characterization of a mutant G (elongation) factor from *E. coli*. This protein is involved in the translocation of the peptidyl-tRNA from the recognition site to the holding site on the ribosome, and surprisingly comprises more than 2 per cent of the soluble protein of the cell. A steroid antibiotic, fusidic acid, inhibits the activity of G factor, as well as the equivalent factor in mammalian cells.

Bernardi and Leder examined five strains of *E. coli* which were resistant to fusidic acid, but found that the G factor of only one of them resisted the effect of the acid on *in vitro* protein synthesis. They purified the mutant factor and also the sensitive factor from the parent strain to apparent homogeneity by chromatography on DEAE-'Sephadex' and DEAE-cellulose. The factors could not be distinguished by chromatography or electrophoresis on polyacrylamide gel or even by immunological reaction. There must be a definite difference between them, however, presumably as a result of a single mutational event, for their properties are indubitably distinct. The specific activity of the G factor from the sensitive strain was roughly twice that of the resistant factor throughout purification. Furthermore, the Michaelis constant for the hydrolysis of GTP by the resistant factor together with ribosomes was twice that of the sensitive factor. Normally GTP hydrolysis is concomitant with peptide chain elongation and is also inhibited by fusidic acid.

These findings could be explained in two ways, and it is not possible to distinguish between them. On the one hand, the mutation causing fusidic acid resistance might directly alter the binding site or catalytic site of the G factor for GTP, if the G factor contains such a site. On the other hand, the GTP might be hydrolysed in a site on the ribosome with the required presence of the factor, and the mutation would alter the interaction of the factor with the ribosome, and indirectly the ribosomal GTPase site. A long term aim of these studies will be to exploit this mutation in an important component of the protein-synthesizing system in genetic studies, now that a firm biochemical basis has been established. In a note added in proof, the authors claim that the fusidic acid resistance mutation lies close to the streptomycin resistance marker.

FISH

Exclusive Diet of Mullet

from our Marine Vertebrate Correspondent

THREE species of grey mullet are found in English waters but none are so abundant as to be of great importance to the fishing industry. There is, however, a small fishery for them chiefly in the south-west, which has recently produced about twenty tons of fish per year. Probably because they have only a marginal economic value the biology of grey mullet has never been investigated by fisheries workers in Britain, and knowledge of these fish is sketchy. They do have some value to anglers and, largely because of this, such recent work as has been undertaken has been in the capable hands of the Irish Inland Fishery Trust's staff (see for example, M. Kennedy and P. Fitzmaurice, *J. Mar. Biol. Assoc. UK*, **49**, 683; 1969).

A recent study of the natural history of the English grey mullets by C. F. Hickling (*J. Mar. Biol. Assoc. UK*, **50**, 609; 1970) goes a long way towards redressing the past neglect of these fish. Hickling has paid particular attention to the food and feeding of the mullets, especially the thick-lipped mullet (*Crenimugil labrosus*), although also dealing with aspects of the growth rate, maturity, spawning and fecundity in this and the other species.

The mullet has three ways of obtaining its food. In the first, and probably the least important, large edible items are ingested by a sudden extension of the protrusible mouth into a circular sucker, and simultaneously a powerful pumping of water through the gills creates a suction current whisking food with a cloud of mud into the mouth. Another feeding process involves scraping, with the hard-edged lower lip used as a scoop to skim off fine algal growth or bottom living diatoms. Grey mullet can often be seen browsing in this way up and down vertical surfaces or over rocks. Finally, they can stir up a cloud of mud and swim into it filtering the mud vigorously through the gill complex.

Mullet have long been notable among fishes for their gizzard-like pyloric stomach and for the extreme length of their gut, which has usually been attributed to their presumed herbivorous diet. Hickling confirms that in large *Crenimugil labrosus* the gut may be five times the length of the body, but he suggests that the long gut is not a result of herbivorous diet but is correlated with the large quantities of indigestible inorganic matter in their diet. Combustion of the cardiac stomach contents of fifty-four fish revealed that only two had more than 30 per cent organic matter, and prior examination showed that much of this was woody matter and chitin. It seems, however, that grey mullet are selective feeders and do not simply suck in mud and food fortuitously, because the stomach contents contain a notably higher percentage of organic matter than the sediment in which they are feeding.

Evidently these fish use their gill rakers to strain off the minute animals such as harpacticoid copepods and free-living nematodes which form their principal animal diet. Mullet fed in an aquarium on cod roe (which contained only 8 per cent inorganic matter) were later found to have 82 per cent of inorganic matter in their stomachs, and this tends to confirm earlier suggestions that the mineral matter in the muscular pyloric stomach is an essential grinding paste, and that this organ is in effect a gizzard.

Grey mullet are thus of singular interest, both for their adaptation to this diet and because few other fish can live on such poor food material. They seem to have evolved a feeding regimen in which they suffer no competition from other fishes.

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