from lysosomes by density-gradient centrifuging of liver particles obtained from mice and rats injected with Triton WR-1339 (Wattiaux, Wibo & Baudhuin, 1963). They showed a sharp decrease in proteolytic activity at pH 3.6 compared with unseparated particles; the activity at pH 7.0 was also diminished but never to the same extent. Treatment of the mitochondria with Triton X-100 removed most of the remaining acid proteinase activity; the activity at pH 7.0 was less affected by such treatment and was then of the same order as that at pH 3.6. These results appear to provide evidence for a proteinase in mitochondria, active at neutral pH. They accord with evidence of a different kind obtained by Alberti & Bartley (1969).

The reports of Penn (1960, 1961) that protein breakdown by liver particles is markedly stimulated by CoA could not be confirmed.

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Substrate Specificity of Mammalian Intestinal Dipeptidases and Tripeptidases

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Although several mammalian intestinal dipeptidases have been studied in recent years, relatively few have been purified, so that information is lacking about their substrate specificity and their relationship with dipeptidases in other tissues (see Lindberg, 1966). We decided to use starch-gel electrophoresis (Smithies, 1959) and to render the peptidases visible *in situ* on the gel, to obtain preliminary information about substrate specificity and tissue distribution of dipeptidases and tripeptidases.

Dipeptidases and tripeptidases from several tissues including intestine were compared in seven different mammalian species. After electrophoresis of the tissue extracts, three procedures were used to locate the peptidases *in situ* on the gels. The starch gel was covered with an agar gel containing a peptide substrate and one of the following mixtures: (a) L-amino acid oxidase, peroxidase and 3-amino-9-ethylcarbazole (Lewis & Harris, 1967);

(b) glutamate dehydrogenase, NAD, phenazine methosulphate and nitro blue tetrazolium; (c) aspartate aminotransferase, 2-oxoglutarate, glutamate dehydrogenase, NAD, phenazine methosulphate and nitro blue tetrazolium. Procedures (b) and (c) were used with some peptides containing glutamic acid and aspartic acid because the L-amino acid oxidase (from *Crotalus adamanteus*) was inactive with these amino acids.

Many of the dipeptides and some of the tripeptides were hydrolysed by more than one electrophoretically distinct protein in most of the tissues examined. For example, in human small intestinal mucosa, at least three dipeptidases were detected that hydrolysed glycyl-leucine, glycyl-valine, glycyl-phenylalanine, glycyl-tryptophan, phenylalanyl-leucine, leucyl-leucine, leucyl-alanine, leucyl-tyrosine and leucyl-glycine. In contrast, leucine amide and leucyl- β -naphthylamide were both hydrolysed by two other distinct proteins, a slowly migrating band that was more active with leucine amide, and a more rapidly migrating band that was more active with leucyl- β -naphthylamide.

Although the same tissues from different mammalian species had characteristic peptidase patterns, there was a striking similarity in the peptidase patterns of different tissues within a given species.

Some tripeptides were hydrolysed by one or more of the dipeptidase bands, e.g. two of the tripeptidases splitting tyrosyl-tyrosyl-tyrosine had similar electrophoretic mobilities to two of the four dipeptidases splitting glycyl-tyrosine.

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Lysosomes of the Locust Digestive Caeca

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The electron-cytochemical localization of acid phosphatase by lead-salt and azo-dye methods, with tissue cubes from the anterior digestive caeca of the desert locust, has already been investigated (Bowen, 1968). In the present study the localization produced by using these techniques is compared with that obtained by using frozen sections as recommended by Holt & Hicks (1961). The Gomori-type lead-salt method with tissue cubes exhibits a varying degree of non-lysosomal staining,