We have also observed a similar stabilizing effect of manganous ions on ribosomes prepared from pea seeds.

Analysis of wheat germ ribosomes for manganese[6] gave values of 0·12–0·14 μgm. per mgm. ribonucleic acid. The extract from which they were isolated contained approximately ten times as much manganese per mgm. ribonucleic acid.

This dissociation of 70 *S* particles on dialysis in the presence of magnesium is in contrast to the reported behaviour of ribosomes prepared from the sources referred to earlier[2–5]. A further difference exhibited by wheat germ ribosomes is the irreversibility of the dissociation which occurs on dialysis either in the presence or absence of magnesium. Further dialysis of the dissociated particles against the buffer containing magnesium, manganese and calcium, which was effective in repressing dissociation, led to aggregation of the 50 *S* and 30 *S* components, but little if any 70 *S* component was regenerated.

It is possible that the difference in properties of the ribosomes studied here may be due to their having originated from embryonic rather than fully differentiated tissue. Further work will be required to check this.

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The β-D-Fucosidase Activity of Mammalian Tissues and its Relation to other Glycosidases

An earlier communication[1] described the occurrence of the enzyme α-L-fucosidase in mammalian tissues. These tissues have now been surveyed for β-D- and β-L-fucosidase activity, using the appropriate *p*-nitrophenyl fucosides as substrates. The β-D-fucoside was hydrolysed by all the mammalian tissues that were studied, and also by an extract from the limpet, *Patella vulgata*, but no β-L-fucosidase activity was detected anywhere.

Table 1 gives figures for some of the richest sources of β-D-fucosidase, alongside comparable figures for β-D-galactosidase[2]. Since fucose is 6-deoxygalactose, β-D-fucosidase could be identical with β-D-galatosidase, but the parallelism which would then be expected between the two enzyme activities, within at least a single species, was not observed. Inhibition experiments with the appropriate aldonolactones[3] are shown in Table 2. While the results for the preparations from the rat are consistent with the action of a single enzyme, with a higher affinity for the galactose than for the fucose residue, the figures for ox liver suggest the very opposite. In any event, the enzyme or enzymes in the two species are evidently quite different. This is reflected in differences I have observed in the *p*H-activity curves.

Whether or not it is due to β-D-galactosidase, the β-D-fucosidase activity of mammalian tissues is considerable. D-fucose has not been reported in animals, but both D- and L-fucose occur in plants. Although L-fucose has been positively identified in mammalian preparations in at least two instances, in other cases its presence has been inferred from evidence that does not distinguish it from the D-enantiomorph. As with other galactose derivatives, the biological interconversion of D- and L-fucose by an end-to-end oxidation-reduction would appear to be feasible.

Table 1. β-D-Fucosidase and β-D-Galactosidase Activities of Mammalian Tissues

	β-D-Fucosidase			β-D-Galactosidase		
	Pig	Ox	Rat	Pig	Ox	Rat
Liver	22,800	29,700	1,910	14,500	7,260	4,710
Kidney	31,700	1,010	4,050	28,550	1,860	11,400
Epididymis	360	900	3,300	970	1,740	47,300

Results expressed as μgm. *p*-nitrophenol (fucosidase) or *o*-nitrophenol (galactosidase) liberated per gm. moist tissue in 1 hr. at 37°.

Table 2. Inhibition of β-D-Fucosidase and β-D-Galactosidase by D-Aldonolactones

Source of enzyme	β-D-Fucosidase		β-D-Galactosidase	
	Fucono-lactone	Galactono-lactone	Fucono-lactone	Galactono-lactone
Rat epididymis	0	56	0	60
Rat liver	0	64	0	65
Ox liver	0	0	32	0

The experiments were done at *p*H 4 in 0·05 *M* acetate buffer with 1 m*M* substrate and inhibitor. Results are expressed as inhibition per cent.

One interesting observation made in this work was a great variation in the β-D-fucosidase activity of cow ovary, which was found to be related to the amount of luteal tissue present. The corpus luteum had a mean activity of 1,000 units per gm., whereas the remainder of the tissue had only one-tenth of this activity and the enzyme was virtually absent from the follicular fluid. This phenomenon was shown to extend to α-L-fucosidase, β-D-galactosidase, α-D-mannosidase, β-D-glucuronidase and β-*N*-acetyl-D-glucosaminidase in cow ovary. While the physiological significance of these results is obscure, they point to a common function for all six enzymes, and to direct or indirect control of their activity by the anterior pituitary. As already shown for the other four enzymes[4], β-D- and α-L-fucosidase in epididymis and uterus respond to castration by steep falls in activity.

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Biosynthesis of Squalene by the Annelid *Lumbricus terrestris*

Large amounts of sterols have been shown to be present in many of the invertebrates, although cholesterol does not seem to occur predominantly among the more primitive animals. Instead, as Bergmann has pointed out, the lower phyla especially appear to contain a diverse group of sterols with structures which are more similar to those of plants[1]. Moreover, since some Protozoa and insects have been shown to require dietary cholesterol[2], it has been suggested that the invertebrates cannot synthesize their own sterols, but rather modify the steroid nucleus present in their food sources.