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PRESENCE OF ELASTIN AND COLLAGEN IN THE INNER LINING OF THE FOREGUT IN THE ISOPOD *LIGIA EXOTICA* ROUX

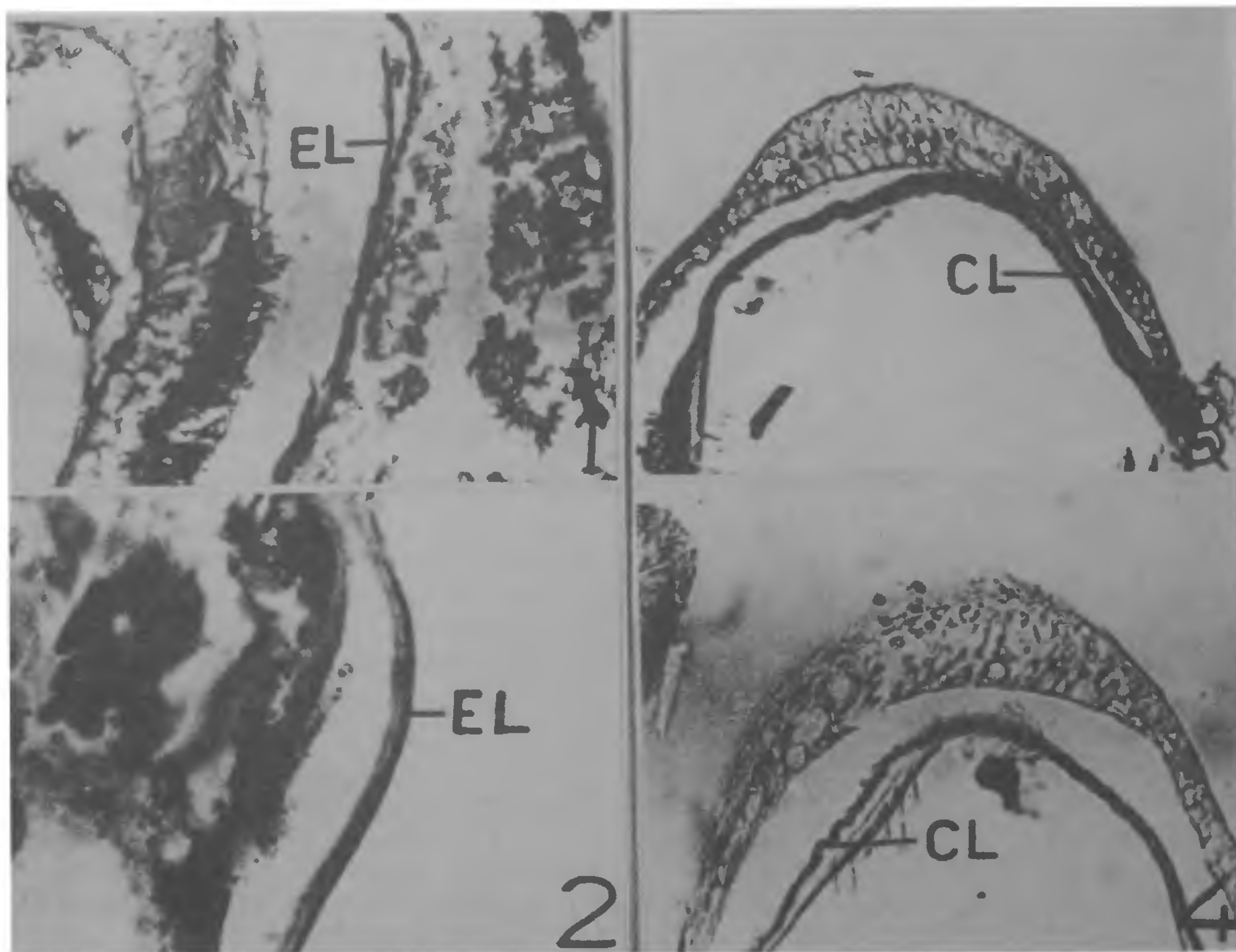
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In many animals the presence of a layer in the foregut helps to withstand against pressure and abrasion caused by the intake of food material.

Generally the internal epithelial lining of the foregut and hindgut in Crustacea has been reported as chitin layer¹⁻³. However, in some isopods the presence of chitinous intima has been demonstrated in the foregut and hindgut^{4,5}. In the herbivorous isopod *Dynamene bidentata*, the intima enveloping over the surface of the hindgut epithelium appears to be composed of a thin acid fuchsin positive layer overlying a thicker aniline blue positive layer⁶. In the present study, on the foregut of the isopod *Ligia exotica*, the foregut wall consists of a thin inner elastin layer and a thick outer collagen layer.

In the foregut the inner layer appears to be composed of two distinct layers, an inner thin layer and an outer thick layer. These layers envelop the foregut epithelium which rests on basement membrane. The inner layer is found to be strongly positive to aldehyde fuchsin (figure 1). This layer is also positive to periodic acid/Schiff (PAS) reaction,



Figures 1-4. Transverse section of foregut showing 1, 2 inner elastin layer and 3, 4 outer collagen layer. 1. Aldehyde fuchsin. 2. Verhoeff's stain. 3. Azan technique. 4. Aniline blue. EL., elastin; CL, collagen.

Table 1 Histochemical tests for elastin and collagen

Histochemical tests applied	Inner layer (elastin)	Outer layer (collagen)
Heidenhain's Azan	-	++
Periodic acid/Schiff (PAS)	++	-
PAS/saliva	++	-
Aldehyde fuchsin	+++	-
Verhoeff's reaction	++	-
Verhoeff's/Van Gieson	B++	R+
Orcein/Van Gieson	+	+
Aniline blue	-	+++
Luxol fast blue G in methanol	+	+

+++ = intensely positive; ++ = strongly positive; + = moderately positive; - = negative; B = black; R = red.

which is resistant to saliva digestion. But the outer layer exhibited a negative response to this stain, indicating its varying chemical composition. The inner layer showed positive response to Verhoeff's (figure 2) and Unna's orcein stains.

The outer layer is stained dark blue with Heidenhain's Azan (figure 3). When aniline blue stain is applied, the outer layer responded very strongly (figure 4). In addition, positivity is also observed with Verhoeff's/Van Gieson and Orcein/Van Gieson techniques. Both the layers showed a positive response to Luxol fast blue G in methanol.

Table 1 shows the histochemical techniques conducted and their reactions.

Therefore it could be concluded that the inner lining of the foregut consists of an inner elastin and an outer collagen layer. There are several reports on histological and histochemical studies on crustaceans^{1,7,8} but until now there are no reports showing the presence of elastin and collagen layers of foregut in isopods. The elastic nature of the stomodaeum and proctodaeum in amphipods have been elucidated⁹.

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INDUCTION OF OVARIAN DYSFUNCTION IN *DYSDERCUS SIMILIS* BY 25-AZACHOLESTEROL

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EARLIER studies have demonstrated that insects require dietary source of sterol for growth, development and reproduction¹. It is also shown that Azasteroids inhibit the biosynthesis of cholesterol from dietary phytosterol². Sterol concentration in larval diets can also affect ovarian development and viable egg production³. Our results presented below show that ingestion of 25-azacholesterol disturbs the normal ovarian development in *Dysdercus similis*.

The bug *D. similis* was reared at $27 \pm 1^\circ\text{C}$ and RH of $65 \pm 5\%$ and fed on soaked cotton seeds. The freshly ecdysed fifth instar nymphs (20) were fed on cotton seeds coated with varying concentrations (500–2000 ppm) of 25-azacholesterol (3β -hydroxchol-5-en-24-dimethylamine) dissolved in methanol; 500 ppm was the concentration at which the activity was maximum. Controls were fed on cotton seeds coated with methanol. The experiments were repeated thrice. The abnormalities after ecdysis were observed in the treated insects and their gonads.

The freshly ecdysed fifth instar nymphs after feeding on the seeds coated with 25-azacholesterol (500 ppm) showed drastic abnormalities. The final instar life span was increased significantly from 7 to 15 days. These nymphs moulted into adults with malformed wings (figures 1 and 2). Most of them