Willis, D.E. and C.P. Wright, Western Carolina University, Cullowhee, North Carolina. A histological study of glufultyrless-1, 1(1)EN7, a lethal mutant of Drosophila melanogaster.

Glufultyrless-1, 1(1)EN7, is a sex-linked, lethal mutant of Drosophila melanogaster which was X-ray induced by Novitski (1963). Death in this mutant usually occurs in the pupal stage. A histological study of 1(1)EN7 larvae was made in an attempt to determine the developmental breakdowns which lead to death.

Larvae for the study were fixed in Bouin's fluid and imbedded in paraffin. All larvae were cut into 12μ serial sections. The sections were stained with Harris' Hematoxylin and counterstained with 5% eosin. Both transverse and longitudinal sections were made. Sections of control larvae were made at 48, 72, and 96 hours after oviposition. Sections of 1(1)EN7 larvae were made at 48, 72, 96, 144, 168, and 192 hours after oviposition. The sections of older 1(1)EN7 larvae were made because puparium formation in the mutant occurred much later than in the control. The average age at puparium formation in 1(1)EN7 was 195 hours after oviposition whereas in the control it was 110 hours.

Prior to the time at which puparium formation would normally occur the only observable histological abnormality in 1(1)EN7 larvae related to the structure of the pharyngeal muscles. In the control (Fig. 1) the pharyngeal muscles were oriented more or less longitudinally

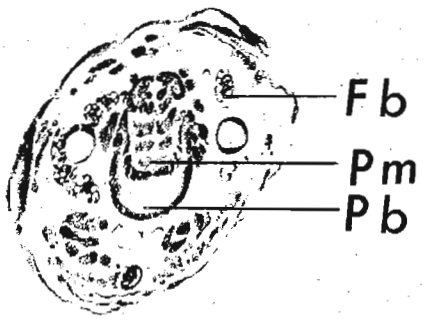

Fig. 1. Cross section through pharyngeal region of a 96 hour control larva. Fb, fat body; Pb, pharyngeal bars; Pm, pharyngeal muscles.

Fig. 2. Cross section through pharyngeal region of a 96 hour 1(1)EN7 larva. Fb, fat body; Pc, pharyngeal cavity; Pm, pharyngeal muscles.

within the larval body. In 1(1)EN7 larvae (Fig. 2) the pharyngeal muscles appeared to be oriented dorso-ventrally. After the age at which puparium formation would normally occur the pharyngeal muscle abnormalities were still evident in the 1(1)EN7 larvae. Other abnormalities also became evident. As the mutant larvae aged, their fat bodies became more and more broken apart and diffuse. These old 1(1)EN7 larvae appeared to be extremely fragile as evidenced by the fact that sections of the larvae tended to break up badly during preparation.

Perhaps the observed histological abnormalities relate to the developmental breakdowns which cause death in this mutant. It is known that in normal larvae the pharyngeal muscles aid in the ingestion of food materials by contracting and exerting a suction force in the pharynx which pulls food into the digestive tract (Snodgrass, 1935). In 1(1)EN7 perhaps the abnormal pharyngeal muscles cause breakdowns in the digestive process. The observed fat body abnormalities might cause changes in the process of metamorphosis which eventually lead to death.

References: Novitski, E. 1963, List of biochemical mutants. DIS 37:51-53. Snodgrass, R.E. 1935, Principles of Insect Morphology. McGraw-Hill, New York.