SL806 Analysis of *Drosophila* Brain Degeneration Mutant, drop-dead

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The drop-dead(drd)mutation in *Drosophila melanogaster* causes the degeneration of the brain and early death (Bucchanan and Benzer (1993)). To understand the molecular basis of the brain degeneration, we cloned the drd gene and determined its sequence. Conceptual translation predicts a novel protein with multiple membrane spanning regions. A monoclonal antibody was generated and detected a ~95 kDa molecule exclusively in the membrane fractions of fly head homogenates by Western blot analysis. Immunohistochemistry showed expression in a variety of cell types, including tracheal, hypodermal, hindgut, crop, cone, and follicle cells. The common characteristic of these cells is that they secrete a blue fluorescent protein, resilin (Andersen and Weis-Fogh (1964)), in the extracellular cuticular layer. In drd mutant flies, although the cuticular layer is present, the blue fluorescence is absent. Immunoelectron microscopy shows that DRD protein is found in intracellular secretory organelle, tubulo-vesicular membrane structures. We propose that DRD protein is involved in vesicle secretion from ER to Golgi. In drd mutants, the tracheae are fragile due to the lack of the flexible component, resilin, suggesting that hypoxia (lack of oxygen) may underlie the brain degeneration of the drd flies.

Buchanan, R.L. and Benzer, S. (1993). "Defective glia in the *Drosophila* brain degeneration mutant drop-dead." Neuron 10, 839-850.

Andersen and Weis-Fogh (1964) "Resilin, a rubber-like protein in arthropod cuticle." Adv. Insect Physiol. 2: 1-65.