

## AP Biology Lab 7

# GENETICS OF ORGANISMS

### OVERVIEW

In this lab you will use living organisms to do genetic crosses. You will learn how to collect and manipulate the organisms, collect data from  $F_1$  and  $F_2$  generations, and analyze the results from a monohybrid, dihybrid or sex-linked cross. The procedures that follow apply to fruit flies.

### OBJECTIVES

Before doing this lab you should understand:

- Chi-square analysis of data, and
- the life cycle of diploid organisms useful in genetic studies.

After doing this lab you should be able to:

- investigate the independent assortment of two genes and determine whether the two genes are autosomal or sex-linked using a multigenerational experiment, and
- analyze the data from your genetic crosses using chi-square analysis techniques.

### INTRODUCTION

*Drosophila melanogaster*, the fruit fly, is an excellent organism for genetics studies because it has simple food requirements, occupies little space, is handy, completes its life cycle in about 12 days at room temperature, produces large amounts of off spring, can be immobilized readily for examination and sorting, and has many types of hereditary variations that can be observed with low-power magnification. *Drosophila* has a small number of chromosomes (four pairs). These chromosomes are easily located in the salivary gland cells. *Drosophila* exists in stock cultures that can be readily obtained from several sources. Much research about the genetics of *Drosophila* during the last 50 years has resulted in a wealth of reference literature and a knowledge about hundreds of its genes.

#### The Life Cycle of *Drosophila*

**The Eggs.** The eggs are small, oval shaped, and have two filaments at one end. They are usually laid on the surface of the culture medium and, with practice, can be seen with the naked eye. The eggs hatch into larvae after about one day.

**The Larval Stage.** The wormlike larvae eats almost continuously, and its black mouth parts can easily be seen moving back and forth even when the larva itself is less distinct. Larvae tunnel through the culture medium while eating; thus, channels are a good indication of the successful growth of a culture. The larva sheds its skin twice as it increases in size. In the last three larval stages, the cells of the salivary glands contain giant chromosomes, which may be seen readily under low-power magnification after proper staining.

**The Pupal Stage.** When a mature larva in a lab culture is about to become a pupa, it usually climbs up the side of a culture bottle or onto the strip provided in the culture bottle. The last larval covering then becomes harder and darker, forming the pupal case. Through this case the later stages of metamorphosis to an adult fly can be observed. In particular, the eyes, the wings, and the legs become readily visible.

# Laboratory 7 Genetics Of Organisms Teacher Guide

**Joacim Rocklöv**



## Laboratory 7 Genetics Of Organisms Teacher Guide:

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