8.1: Prelude to Molecular Genetics

Genetics is the study of the inheritance and variation of biological traits. We have previously noted that it is possible to conduct genetic research without directly studying DNA. Indeed some of the greatest geneticists had no special knowledge of DNA at all, but relied instead on analysis of phenotypes, inheritance patterns, and their ratios in carefully designed crosses. Today, **classical genetics** is often complemented by **molecular biology**, to give **molecular genetics**, which involves the study of DNA and other **macromolecules** that have been isolated from an organism. Usually, molecular genetics experiments involve some combination of techniques to isolate and analyze the DNA or RNA transcribed from a particular gene. In some cases, the DNA may be subsequently manipulated by mutation or by recombination with other DNA fragments. Techniques of molecular genetics have wide application in many fields of biology, as well as forensics, biotechnology, and medicine.
Figure 1: Disposable tips for a pipette are used to distribute microliter volumes of liquid in molecular biology. (Flickr-esterase-CC:ANS)