Preface

Molecular Genetic Engineering and its Relationship with Biotechnology

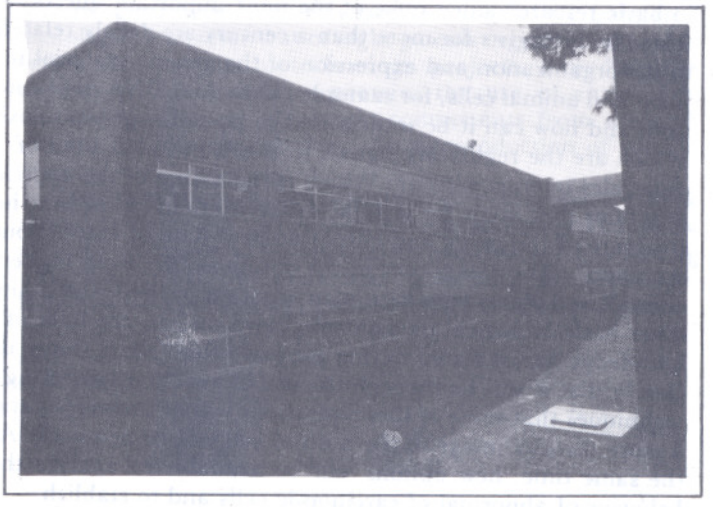
A turning point in the history of Biology was marked by the discovery of the structure of the genetic material in 1953, bringing to life a new field, Molecular Biology. Thereafter, a clearer and molecular image of the functioning of a living cell and specially of the structure of its genetic material, has emerged. The year 1970 marks an important period: the beginning of the enzymatic manipulation of the genetic material from living organisms and consequently the birth of Molecular Genetic Engineering. Today, with the use of recombinant DNA techniques, it is possible to isolate fragments of genetic material that carry specific genes. The possibility of studing these genes has permitted, among other things, a detailed biochemical and molecular analysis of the chromosomes that constitute the genetic material of living organisms.

The feasibility of this analysis is of fundamental importance in basic research since some of the most important questions raised by biologists for more than a century are deeply related to the organization and expression of the genetic material in plant and animal cells, for example : How does DNA duplicate itself and how can it be transmitted to posterior generations? Which are the regulatory signals in DNA and what kind of molecules interact with it? ; Which is the nature of the genetic programs that allow for cellular differentation? ; How has the structure of the genes and chromosomes changed throughout evolution? . The complexity of the chromosomes from higher animals and plants have kept man ignorant in these and many other basic biological phenomena. Nevertheless, the bulk of knowledge accumulated during the last fifteen years shows us clearly that it will be through the use of genetic engineering techniques that some of these questions will be answered, and a more distinct image of the normal cell will be acquired. At the same time, new options will be available to analyze the behavior of abnormal of carcinomic cells and to stablish

rational strategies for treatment of diseases with molecular basis.

The potential of genetic engineering is quite broad, and, together with the manipulation of the genetic material from living organisms emerges a new tecnology; new because it brings a different perpective to the empirical work of existing biological systems of wich very little is known and which implies the handling of many variables. Soon, a single microorganism or an existing biological system will not be sufficient to accomplish a process. Many of the present and future processes will be designed genetically, by exploiting the feasibility of manipulating genetic information from one organism and introducing it into another.

Cells specialized in the building of unimagined products have been made available by the manipulation of the genetic material. Until recently it was difficult to imagine that a microbe cell could build human proteins such as insulin or interferon. Today, there are not many products in nature that cannot be obtained thanks to the *in vitro* recombination of the genetic material from different microorganisms. Possibilities are such that the horizon is nounded only by man's imagination.



Man is living a new step in history. It is clear that great part of the future technology will be one that uses living systems, their products, or theirs parts. In other words, it will need to be biological technology or biotechnology. The reason is simple: an important part of man's problems are susceptible to treatment or manipulation with biological technologies: hunger, disease and at least part of the ecosystem's pollution and energy production. Important efforts have been made by the government and private sector from several countries channeling economic and human resources for the structuring and implementation of biotechnological development schemes.