II. BIOTECHNOLOGY OVERVIEW

INTRODUCTION

The term, biotechnology, was coined in 1917 by a Hungarian engineer, Karl Ercky, to describe the large-scale production of pigs using sugar beets as the pig's food source. According to this engineer, biotechnology was " all lines of work by which products are produced from raw materials with the aid of living things." Under this definition, biotechnology has existed since mankind began domesticating microorganisms, plants and animals.

Microorganisms. As far back as eight thousand years ago, our ancestors knew that certain foods and drinks changed during storage, sometimes in tasty ways. Fruit juice would become alcoholic to produce wine; dough would rise and produce pleasing aromas and tasty bread when baked; and milk would sour and curdle to produce cheese. Long before this fermentation process had a name, ancient people learned to control the process by controlling ingredients, temperature and time.

Plants. Stone age farmers began by planting seeds of wild plants. Later they selected the most productive of their domesticated plants to provide the next year's seed stock. Over thousands of years, this process gave rise to most of today's crops.

Animals. Man's symbiotic relationships with animals date to the beginning of recorded history as well. Virtually every society depended to some degree on food-producing animals, beasts of burden and pets. Today, we still rely on animals for much of our food, fiber and companionship.

In the early 1960's, biotechnology was defined as the study of the industrial production of goods and services by processes using microorganisms. Throughout the 1960's and early 1970's, biotechnologists were primarily concern with maximizing the production of industrial quantities of chemicals from microorganisms. Biotechnology research at this time depended on expertise in microbiology, biochemistry, and chemical engineering.

However, this all changed with the development of recombinant DNA technology and monoclonal antibody technology in the early 1970's. Now, biotechnology was no longer limited to microorganisms. With recombinant DNA techniques, any living organism could be directly altered to produce valuable chemicals. This technology provided the means of identifying genes which produce highly valuable proteins and enzymes, and of transferring these genes to any organism. Now, plants and animals, in addition to microorganisms, could be the bioreactors producing valuable gene products.

Today, biotechnology encompasses a diversity of companies, technologies and markets. Karl Ercky's definition of biotechnology, " all lines of work by which products are produced from raw materials with the aid of living thing"' has never been more appropriate. Biotechnology is is no longer the sole activity of entrepreneurial start-up companies; it can be found in the vast majority of the bioscience-based industries from pharmaceutical to food processing companies The following section gives a brief overview of modern biotechnology and the industries which are using this technology. For printed resources with detailed discussions on the science and business of biotechnology, refer to Appendix H.