INTRODUCTION

Arthur Kornberg is one of the great scientists of our generation. A trail of research that he began in the 1940's with the investigation of coenzyme biosynthesis culminated recently in a detailed description of the mechanism by which the E. coli chromosome is replicated. He and his students have reconstituted this extraordinarily complex process with pure enzymes, proteins and cofactors, a monumental achievement that will take its place with the great scientific syntheses in the history of experimental science. There is little doubt that the ability to clone genes and the tremendous scientific revolution that this new technology has spawned owes a great deal to the availability of the polymerases, ligases, nucleases and other enzymes that emerged from these studies.

How did all of this begin? Arthur has described his serendipitous entry into science and his evolution from clinician, to nutritionist, to biochemist. In reading these accounts, it is obvious that he was enormously influenced first by the great biochemists of the 1930's and 40's, F.G. Hopkins, Otto Warburg, Otto Meyerhof and then by Carol Cori and Severo Ochoa in whose laboratories he worked after leaving nutrition research. The power of enzyme purification in revealing and ultimately reconstituting a pathway of metabolism typified by glycolysis quickly became apparent to him. It was Arthur's vision and courage that led him to successfully apply this approach to a problem as difficult and complex as the replication of a chromosome. Arthur's Nobel lecture in which he described the discovery of DNA polymerase is particularly revealing.

"We used a ^{14}C -labeled substrate of high specific radioactivity and incubated it with adenosine triphosphate and extracts of Escherichia coli, an organism which reproduces itself every 20 minutes. The first positive results represented the conversion of only a very small fraction of the acid-soluble substrate into an acid-insoluble fraction (50 or so counts out of a million added). While this represented only a few micromicromoles of reaction, it was something. Through this tiny crack we tried to drive a wedge and the *hammer was enzyme purification*" (italics our own).

Arthur Kornberg's scientific philosophy, that every biologic process no matter how complex must ultimately yield to the hammer of enzyme purification, has influenced the investigation of phenomena as seemingly unapproachable as gene expression, signal transduction, intracellular protein transport and many others.

What has been the source of Arthur's great influence? Of obvious importance has been the example he has set; his extraordinary success in unraveling the complexities of DNA replication. Of no less importance has been the force of his personality and his great expository gifts; his ability to project his ideas, perhaps best exemplified by his wonderful book "DNA Replication." To cite only one example, Fred Sanger has pointed out that the idea for the dideoxy DNA sequencing method came to him while reading the chapter on DNA polymerase I in "DNA Replication."

Beyond this, Arthur's style of doing science, his demand for excellence, his intolerance of mediocrity, his perseverance have inspired all of us who worked with him; he is an absolutely superb teacher. But more than that, Arthur is generous and compassionate, devoted to his students and fiercely loyal to his family and friends. As one measure of the esteem in which he is held, of some 144 present and former colleagues invited to attend a recent symposium in honor of his 70th birthday, 140 agreed to participate.

At age 70, the pace of Arthur's research shows no signs of slackening. In fact, it appears to be accelerating. At latest count he has some 9 papers in press describing various aspects of oriC replication and the DNA polymerase III holoenzyme. A long sought after goal, an understanding of cell membrane involvement in the initiation of DNA replication, may be within reach. He is currently planning a third edition of "DNA Synthesis." We wish him many more years of fruitful, exciting research and scholarship.

Finally, we wish to recall the memory of Sylvie Kornberg, a devoted wife and mother, a gentle and gracious woman, and a fine biochemist. Those of us who were privileged to know her will forever be enriched by the memory of her friendship, her kindness, and her unfailing good humor.

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