Of Cells and Mice Then Men

In the 1980's much of the basic science research focused on protein interactions and attempted to define the roles for each protein and how they affected a cell. It was a difficult time for research as complex skills in HPLC, GC, amino acid sequencing and biochemistry were essential in successful competition for research grants or academic positions. It served to help identify how proteins worked in complex patterns to reach a desired effect in a cell with the hopes that understanding the cell would eventually lead to cures for human diseases. It was sometimes successful but quite often too focused on a single pathway or mechanism to be applied in the clinical setting. Often a series of protein interactions were identified and appeared to be fully understood only to find out that the pathway was different in whole organisms or had alternate arms in humans that confounded the results obtained in cells. It did however pave the way for future understanding of how a protein could be activated and be translated into a desired effect. Much was still needed to translate the findings into useful information and cures.

In the 1990's molecular biology took the center stage as our understanding of DNA and the mapping of genes began its' ascent into the basic science laboratory. Molecular tools such as the use of restriction enzymes, Southern blots and DNA sequencing were necessary for success. Our understanding of how the proteins were made in the first place led us into the understanding of alternate pathways and alternative splicing capable of altering the effects a protein had on a cell and thus the whole organism. Transgenic mice were the ultimate goals of many laboratories as they sought to prove the theories of a proteins' effect by knocking out its' production and observing the effect. The mapping of mouse and human DNA helped us to understand the differences between the species and allowed us to begin making the step up the evolutionary scale to understand human diseases. Microarray chips and bioinformatics were used to screen entire pathways and understand the activations that occurred. Genetic manipulation and recombinant protein production provided new tools not available before and while grants and academic positions were awarded based on the word "molecular" in your CV, clinical medicine remained largely unchanged. Our understanding of cellular processes and their relationship to the whole organism however was greatly increased.

In the new millennium, basic science research is being replaced by translational research. Translational research brings the clinic closer to the laboratory as the "bench to bedside" approach is being pushed forward. Our understanding of proteins and the ability to study them on a large scale at the molecular level now provides the tools to allow us to move research forward towards cures. All of the tools appear to be available now to understand a human disease and why it affects the individual in a particular way. It is hoped that this decade will be successful in bridging the basic sciences into the clinical setting and begin to provide alternatives in medicine that will be far reaching in improving health care and the human condition. It is a time when basic scientists and clinical scientists must work together to translate our previous studies and understanding toward this goal.

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