**Proposal for a UNC Epigenetics Center of Excellence**

A rapidly expanding area with great promise for the treatment of cancer, cardiovascular disease, neurodegenerative diseases, AIDS and autoimmunity disorders is the field of **epigenetics** – a term that describes how our genetic information (DNA) is accessed and then interpreted to control the normal functions within a cell. Significantly, epigenetics plays a fundamental role in the development of single fertilized egg to an adult human being. Recent landmark studies have found that the epigenetic “machinery” that both accesses and interprets our genetic information is commonly mutated in a vast number of human diseases. For these reasons, the study of epigenetics and the development of therapeutic interventions aimed at the mutated epigenetic machinery has become of paramount importance. We propose to create a world-renowned Center of Excellence on the focus of Epigenetics. Our goal is to increase the pace of basic and translational research in this area, and to leverage our strength in epigenetics and drug discovery to develop new therapeutic treatments for a vast number of diseases.

UNC currently has over 35 faculty actively involved in Epigenetics research, and have recently formed a coalition termed The Carolina Chromatin Consortium (C3) and a new program of Chromatin and Epigenetics. This group and program are working together to address the urgent need to advance our understanding of epigenetics – with a specific goal of identifying new therapeutic targets, developing new drugs against the epigenetic machinery, and using these new drugs to advance human health. UNC is uniquely positioned to be the leading institution on epigenetics, as we offer a unique and unparalleled group of epigenetic investigators – with expertise spanning a remarkable range of techniques and areas: from basic to translational research, to a drug discovery center who’s focus is on finding novel drugs against the epigenetic machinery. With further organization, infrastructure and support, along with the recruitment of key researchers, UNC stands to create a world-class **Epigenetics Center of Excellence/Institute** that can lead in the discovery of new therapeutic treatments to cure human disease.

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**Resources Needed**: We need investment in several key areas to achieve our goal. Several endowed professorships and faculty hires are required. These faculty hires would be focused on areas that would fill specific gaps, thereby accelerating basic science and its movement to the bedside. For example, we need basic researchers in the genomics segment that are working on the organization of our DNA in cells, along with medicinal chemists to develop greater libraries of small chemical compounds for drug screening and more faculty dedicated to drug discovery. In addition, structural biologist and bioinformatic faculties who can partner with other UNC researcher to understand large genomic data sets and the chemical structure of proteins that can reveal new targets for therapeutic intervention are needed. Finally, we need more translational researchers that can take new knowledge and our drug discoveries into the clinic. The collective group will be organized and integrated with other centers at UNC where epigenetics can propel basic and translational research (e.g., the division of Infectious Diseases focused on HIV research and the Carolina Center for Genome Sciences focused on the understanding of genetic mutations in human disease). Funding to bridge new collaborations and team science endeavors within this group will generate key findings that will be used to compete for further funding from the NIH to increase the range that the newly developed UNC Epigenetics Center of Excellence can improve human health.