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Research Development Fund – FALL 2020

Proposal Title: Drug Discovery and Synthesis Core (DDSC)

Lead contact:

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Key Participating units:

At the department level: BioBio, BioE, Chem, ChemE, ECE, MCM, MPI, NExT, NFS, PharmS, VTPB, TMS

At the institute level: Institute of Biosciences & Technology, Institute for Plant Genomics and Biotechnology, Office of the Texas State Chemist

At the college level: COALS, COE, COM, COS, COP, and CVM

At the agency level: TAMHSC, Texas A&M AgriLife Research, TEES, TAMU

Anticipated Request Amount ($): 1,315,000

Executive summary:

The Drug Discovery and Synthesis Core (DDSC) will provide an essential and centralized resource for researchers in TAMU and the Brazos Valley whose research is in the disparate fields of biology, chemistry, biochemistry, medicine, engineering, and life sciences to implement synthetic/medicinal chemistry for the preparation of active compounds in order to accelerate the translation of basic research results from bench to clinic. TAMU is highly reputable in the areas of biomedical and life sciences research, more than 50 PIs have interests in the development of novel therapeutics for a broad range of diseases such as TB, cancer and COVID-19. However, their labs do not have direct access to a chemistry platform at TAMU that provides adequate synthetic compounds for the interrogation of biology and aids the medicinal chemistry to implement the translation from potential drug targets into therapeutics. *The DDSC, along with an active coordination with core facilities on the campus and beyond, will fill this significant gap at TAMU by providing expertise and specialized drug discovery and synthesis resources for assay development, hit generation, most imperatively hit-to-lead/lead optimization, and pre-clinical evaluation. DDSC will also provide novel small molecule and uniquely formulated, phage-displayed peptide libraries for high-throughput screening and selection of lead drugs and an artificial intelligence (AI)-based drug screening platform*.

The mission of DDSC is to establish a truly comprehensive early stage drug discovery platform to serve researchers across multiple colleges with the goal of accelerating the translation of basic research results from the laboratory into the clinic. With an RDF support, DDSC will significantly extend and enhance the capabilities of providing supports and services for multi-disciplinary drug discovery projects that originate from TAMU faculty research across a wide range of human diseases by acquiring the equipment and expertise. With the increasing emphasis from NIH and CPRIT on the impact of healthcare research, the presence of DDSC will increase our success in acquiring various federal, state and private foundation grants by launching numerous collaborative, cutting-edge, and multi-investigator projects, as well as in acquiring major grants to support core facilities. **Our recent CPRIT Core Facility Award application ($4 million) was reviewed favorably (panel summary is attached). An RDF support will strengthen our chance to secure this fund.** The presence of DDSC will also increase the ability to recruit and retain talented faculty members by providing the resource to translate their basic discoveries into clinical applications, as well as benefit the education of undergraduate and graduate students.

DDSC will have short, medium and long-term goals in order to act as a state-of-art collaborative platform to support early-stage drug discovery projects, and to secure various sources of funding to support its activities beyond the initial start-up support. A three-year goal of DDSC is to finalize one novel therapeutic and maintain two others in the development pipeline; a six-year goal is to finalize the second novel therapeutic and maintain three others in the development pipeline. In the long term, DDSC will become self-sustainable through the collection of service fees, federal, state and private foundation grants and awards, and royalty returns from the commercialization of technologies and therapeutics developed in DDSC. DDSC will attract a significant amount of extramural funds to College Station and boost the reputation of TAMU in the translational research field. Commercialization of technologies and therapeutics developed in DDSC will potentially turn into spin-off companies, contribute to economic growth in the Brazos Valley, and turn TAMU as a translational research hub in Texas. In conclusion, the overall success of DDSC will foster innovation, enhance the economic development of the county, and further expand capabilities of our university in educating and training next-generation scientists and leaders. An RDF fund is essential for DDSC to serve as a university-wide drug discovery platform by adding state-of-art instruments and expertise.