

Macao Funding Scheme for Key R & D Projects 2022

Application Guideline for Projects of Biomedical Materials

I. Background

Biomedical materials are materials used to diagnose, treat, repair, and replace damaged tissues, organs or enhance their functions in living organisms. With the development of the society and the economy, the improvement of people's living standards, the increasing aging population, the emergence of new technologies, as well as the continuous support on policies and funds from global government institutions, the biomedical materials industry has developed rapidly and has become a representative of emerging industries with low energy consumption and high value addition. The Mainland has issued a number of policies to support the research and development and industrialization of biomedical materials, and relevant deployments have been made in the National Medium-and-long-term Program for Scientific and Technological Development Outline (2021-2035) and the Healthy China 2030 initiative.

The high-tech and the big health industries are the development priorities proposed by the Macao SAR government in the Policy Address for the Fiscal Year 2022. New materials and biomedicine are the key areas of industrial development specified in the Second Five-Year Plan for Economic and Social Development of the Macao Special Administrative Region (2021-2025). After years of development, Macao has accumulated

strong research and development capabilities in the field of biomedical materials, especially for the cross-integration of biomedical materials and modern biotechnology. Major breakthroughs have been made in the research and development of new probes, real-time target analysis and detection, and new technologies for non-invasive treatment, which have become great advantages. Further concentration of resources on the research in this field is of great significance for promoting the development of Macao's biomedical material technology and the big health industry, and enhancing the comprehensive strength of Macao's scientific and technological innovation.

In order to fully leverage Macao's advantages in the field of biomedical materials, further integrate existing advantaged resources, and enhance the R&D capabilities and industrialization levels, the Science and Technology Development Fund (FDCT) of Macao has, upon seeking opinions from researchers of relevant fields in Macao and expertise from experts in the Mainland, proposed a key R & D project of biomedical materials in Macao that aims to: bring Macao's advantages into full play in a planned and step-by-step manner to accommodate the needs of our country; cater to the needs of Macao's social, economic and technological development; promote the moderate diversification of Macao's economy and the development of the Guangdong-Macao In-Depth Cooperation Zone in Hengqin through technological innovations in support of the development of International Innovation and Technology Hub in the Guangdong-Hong Kong-Macao Greater Bay Area, thereby contributing to China's development into an innovative country.

II. Overall Objectives

For the diagnosis and treatment of tumors and fundus neovascularization diseases, the cross-integration of biomedical materials and modern biotechnology will be considered as a breakthrough to develop new probes, real-time target analysis and detection and new technologies of non-invasive treatment, providing new technologies and products for the diagnosis and treatment of tumors and fundus neovascularization diseases, and enabling these topics to enter into clinical research.

III. Research Fields

Field 1: Real-time target analysis and detection and non-invasive treatment of fundus neovascular diseases

To explore and analyze the pathogenesis of fundus neovascular diseases, realize the detection and non-invasive treatment technology of efficient drug delivery, and complete the following research: constructing fluorescent probes with specific biological activities and outstanding optical properties; developing real-time and targeted fluorescence imaging methods for ocular cells/tissues; carrying out the R&D of delivery carriers of drugs with the ability to cross the corneal barrier; as well as developing new, safe, effective and non-invasive ocular drugs.

Performance indicators: Successfully completing the above-mentioned research, creating a research report, and completing the technical examinations organized by the relevant departments; obtaining 4-5 invention patents and entering clinical trials.

Field 2: Research and development of new probes for precision tumor therapy

To research and develop highly sensitive and specific molecular probes (including small molecules, polypeptides or

antibodies) based on nanoscale to explore new technologies for tumor diagnosis and treatment. The following research contents shall be completed: to research and develop molecular probes or nanosensors integrating highly specific diagnosis and treatment; to develop long-duration target imaging methods for tumor cells/tissues; to propose new strategies for combined tumor therapy based on functional biomaterials; and to clarify clinical indications and conduct research on the biosafety and efficacy of related new probes/nanosensors.

Performance Indicators: Successfully completing the above-mentioned research, creating a research report, and passing the technical examinations organized by the relevant departments; obtaining 4-5 invention patents, completing preclinical research and applying for clinical research approval.

IV. Application Requirements

The applying entity shall file the application in the form of a project under the research topics of the fields listed in this Guideline. Each project should be submitted for the application as a whole, with content research and performance indicators fully covered. The leading entity of the project must be a local one but we also encourage cooperation with entities from areas outside Macao. Unless otherwise specified, a project should include no more than 3 topics. Every project leader or topic leader(s) must be qualified to work full-time in Macao. Led by Macao's scientific research units, research in Field 1 should include participation from hospitals, whereas applications in Field 2 shall preferably be submitted with hospital, and a formal cooperation agreement must be provided.

The implementation period of the project is 3 years. The

maximum application amount for each project is MOP 15 million.

V. Experts Involved in the Formulation of the Guideline

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