

HEALTHY LONGEVITY GLOBAL COMPETITION

2021 Catalyst Awardees

Sponsor: Chinese Academy of Medical Sciences

A New Strategy for The Treatment of Early Gastric Cancer Based On Endoscopic Inverting Suturing Technique

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PROJECT DESCRIPTION

Gastric cancer, with a high incidence in middle-aged and elderly people, is the fifth most common malignant tumor in the world with the fourth highest mortality rate. In China, its morbidity and mortality are both the second highest among malignant tumors. With the extension and improvement of gastric cancer screening, early gastric cancer (EGC) is gradually increasing. Subtotal gastrectomy used in traditional open or laparoscopic surgery is traumatic to the elderly, which seriously affects their health and longevity. In contrast, endoscopic resection of EGC is less invasive. Recently, endoscopic submucosal dissection (ESD) is most commonly used for endoscopic resection of EGC. However, the application of this technique is very narrow, covering only a portion of intramucosal carcinoma with cT1a stage. This project will explore the use of endoscopic full-thickness gastrectomy combined with the newly developed inverting suture technique of our research group to expand the applications of endoscopic treatment for EGC, especially to include EGC with cT1b into the scope of endoscopic treatment. The main technical scheme includes the use of the seromuscular closure clip invented by our research group to close the defect under the condition of the seromuscular layer turning inward to the gastric cavity, with the aid of a twin grasper after full-thickness gastric wall resection. This new technique will expand the indications for endoscopic resection of EGC without lymphnodes metastases, while also ensure application of Laparoscopic Endoscopic Cooperative Surgery (LECS) for EGC with lymphnodes metastases, maximize the protection of gastric function and reduce patient trauma.

A novel strategy to treat atrial fibrillation with extracorporeal stereotactic radioablation for pulmonary vein isolation

Principal Investigator	Dr. Xingxing Cai, MD, PhD
PI Primary Affiliation	Department of Cardiology, Xinhua Hospital Affiliated to Shanghai Jiaotong University

	School of Medicine
Co-Investigator(s)	Dr. Jian Sun, MD Dr. Yigang Li, MD Dr. Wei Li, MD, PhD Dr. Yudong Fei, MD, PhD Dr. Yuli Yang, MD Dr. Mawei Jiang, MD, PhD Dr. Yichen Shen, MM Dr. Shunxuan Yu, MB Dr. Jing Cai, MB

PROJECT DESCRIPTION

Atrial fibrillation is a common clinical cardiovascular disease. With the aging of society, its incidence is increasing year by year, reaching as high as 7.5% in people over 80 years old. Abnormal electrical activity of the pulmonary veins triggering atrial fibrillation is recognized as an important pathogenesis. Radiofrequency or cryo-balloon based pulmonary vein ablation via catheter is the main invasive treatment for atrial fibrillation. However, complications such as pseudoaneurysm, cardiac perforation, and left atrial esophageal fistula may occur. Stereotactic body radiotherapy (SBRT) is a conventional treatment method for some malignant tumors. At present, we have mastered the key technology of SBRT through preclinical studies. Using its characteristics of non-invasive, precise and stereotactic ablation of lesions, we can explore noninvasive SBRT for pulmonary vein isolation to treat atrial fibrillation. This project intends to enroll 12-18 patients with refractory and symptomatic atrial fibrillation (anti-arrhythmic drugs are ineffective, and there are contraindications to catheter ablation, or previous catheter ablation therapy has failed, or they are unwilling/cannot tolerate catheter ablation), stereotactic radioablation will be performed using a dose-climbing strategy. Patients will be followed for 6 months to observe the efficacy and safety of noninvasive SBRT for pulmonary vein isolation to treat atrial fibrillation. The research results may provide a new strategy for the treatment of atrial fibrillation, and provide evidence for its promotion and application, and finally promote healthy aging.

A prospective cohort study of OLIF/MIS-TLIF-based Mini-invasive treatment modality for Degenerative Lumbar Scoliosis(OTM-DLS)

Principal Investigator	Wu Hao, MD, Department of Neurosurgery, Xuanwu Hospital, Capital Medical University
PI Primary Affiliation	Xuanwu Hospital, Capital Medical University
Co-Investigator(s)	Wang Kai, MD, Department of Neurosurgery, Xuanwu Hospital, Capital Medical University Cheng Lei, MD, MD, Department of Neurosurgery, Xuanwu Hospital, Capital Medical University

PROJECT DESCRIPTION

Reduction of daily life activity is one of the main factors that contribute to short life span in old-aged population. Degenerative lumbar disease, in particular, degenerative scoliosis which mainly occurred in old-aged population with a mean age at presentation of 60 years and an approximate prevalence of 6% in adults older than 50 years old and 15% in older than 60 years old, could cause low back & lower limb pain and reduce physical activity in daily life. Traditional treatment modality for degenerative scoliosis was transforaminal lumbar interbody fusion (TLIF), but this treatment could cause large surgical injury, consequently, traditional TLIF is not optimal treatment strategy for old-aged patients, instead, mini-invasive treatment modality should be pursued for old-aged patients. Both mini-invasive oblique lumbar interbody fusion (OLIF) and mini-invasive surgery TLIF (MIS-TLIF) are mini-invasive surgery for degenerative lumbar disease. However, the role of OLIF and MIS-TLIF in degenerative lumbar scoliosis is underdetermined. In the present study, we aim to investigate the feasibility of OLIF/MIS-TLIF-based treatment modality for degenerative lumbar scoliosis. This is a prospectively designed cohort study whereby a comparison of safety and efficacy between OLIF/MIS-TLIF-based treatment modality and traditional TLIF will be made. The objective of the study is to evaluate the feasibility of OLIF/MIS-TLIF-based treatment

modality for degenerative lumbar scoliosis and establish the technical criteria of OLIF/MIS-TLIF-based treatment modality for degenerative lumbar scoliosis. Prior to initiation of this study, our previous work revealed that patients with degenerative lumbar disease who received OLIF or MIS-TLIF therapy achieved favorable outcome, this encourages us to investigate the role of OLIF/MIS-TLIF-based treatment modality for degenerative lumbar scoliosis; and, our team is the first neurospine team that perform OLIF and MIS-TLIF.

A Spine Healthcare Risk Management Platform based on IoT(Internet of Things) Edge Computing

Principal Investigator	Wanru Duan, MD , Xuanwu Hospital, Capital Medical University (Dr. Wanru Duan)
PI Primary Affiliation	Xuanwu Hospital, Capital Medical University
Co-Investigator(s)	Zan Chen, MD, PhD, Xuanwu Hospital, Capital Medical University; Wentao Tang, MBA , Eniot Co.,Ltd;Luying Zhang, BA, Eniot Co.,Ltd; Chong Fan, Master, Eniot Co.,Ltd; Mingfa Zeng, BA, Kang Co.,Ltd

PROJECT DESCRIPTION

Spine related health problems have a great impact on the quality of life, and increasingly become a major health problem. People concerning about their spine health usually learn various "cervical exercises" from the Internet or TV, or even wear "neck holder" and "waist protection". However, the problem of these methods is that they cannot get professional guidance easily and effectively. How to carry out professional and convenient daily management of spinal health?

In this project, a sensor device with the core of spine health monitoring is designed to monitor the posture of human spine at rest and in motion in real time. Five core planes on the spine were demarcated, and the core plane data were labeled with the spinal health of volunteers. Then the AI algorithm was used to train the model, and the relationship between the core plane data and the spinal health was established. Then, patients only need to wear sensors to obtain their spinal health data through model calculation. Real time monitoring of rehabilitation exercise and warning of overactivity for users.

This project will establish an interactive platform to connect the wearer, data terminal and professional medical team, so that patients can easily get professional health advice and reminders in the process of home health care and rehabilitation. From the business perspective, the goal includes the output of medical and consumer wearable spine health care and monitoring products, and the provision of wearable devices and internet medical resource value-added services.

An economical subunit zoster vaccine without production limit of adjuvants

Principal Investigator	Cunbao Liu, Ph.D., Institute of Medical Biology, Chinese Academy of Medical Sciences.
PI Primary Affiliation	
Co-Investigator(s)	None

PROJECT DESCRIPTION

Morbidity of shingles among people older than 50 is 1-2%, among which 10-18% were associated with postherpetic neuralgia (PHN). 15% of PHN focus at the eye meridian of trigeminal nerve and may result in blindness. Infection of the central nervous system may cause death from encephalitis. The live attenuated vaccine Zostavax based on Oka strain showed limited effect to prevent shingles. The subunit vaccine Shingrix is very expensive (150-200 USD per dose, 2 doses needed) and unavailable because of the short supply of its adjuvant QS21 (10 million doses worldwide annually). Novel affordable and effective shingles vaccine is in high demand. Based on the successful experiences on the development of various subunit vaccines and the frontier

knowledge of immunology, here we propose a subunit vaccine design strategy according to the philosophy of bionics, i.e., to elicit an effective protective immunity targeting at a specific pathogen, a subunit vaccine should imitate the natural characters of the corresponding pathogens as much as possible. These characters including particle size, effective antigens, pathogen-associated molecule patterns (PAMPs), even the infection processes (such as the life process from endosome to cytoplasm). Our previous studies have proved that the efficacy of subunit vaccine depends on both of its physical form and the adjuvant contained. We will further testify our theory with highly biocompatible nanoscale materials and lay the preclinical foundation for the development of affordable and effective shingles vaccine.

Application of image recognition method based on AI composite model in laparoscopic colorectal cancer surgery

Principal Investigator	Bin Wu , MD , PhD, Department of General Surgery, Peking Union Medical College Hospital(Dr Bin Wu,Professor Bin Wu)
PI Primary Affiliation	Chinese Academy of Medical Sciences and Peking Union Medical College
Co-Investigator(s)	None

PROJECT DESCRIPTION

Laparoscopic colorectal surgery has become the standard surgical method for colorectal cancer due to its advantages of minimally invasive, quick recovery and high surgical quality. The protection, separation and disposal of blood vessels, nerves and lymphatics involved in the laparoscopic colorectal surgery require rich clinical experience. It is difficult for junior doctors and to quickly master this surgical skills. An auxiliary system for laparoscopic colorectal surgery which can shorten the learning curve, facilitate the operation and improve the operation quality is urgently needed in clinical practice. The AI algorithm based on image recognition method of artificial intelligence composite model, using convolution neural network for feature extraction. The development of the AI algorithm will be based on the artificial intelligence composite model image recognition method, the use of convolutional neural network for feature extraction, semantic segmentation through optimization combination and deep fusion, to achieve the purpose of fast and accurate recognition and distinction of laparoscopic colorectal surgery area scene. This has not been found in previous papers, patents, monographs and other relevant materials. We plan to develop the system to reduce the risk curve of laparoscopic colorectal surgery and improve the quality of laparoscopic colorectal surgery.

Artificial intelligence aided drug discovery of CDK12 inhibitors-system construction and application

Principal Investigator	Dr Ma Fei, Department of Medical Oncology, National Cancer Center/National Clinical Research Center for Cancer/ Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, 100021, Beijing, China.
PI Primary Affiliation	National Cancer Center/National Clinical Research Center for Cancer/ Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College
Co-Investigator(s)	Dr Wen Tingyu; Dr Wang Jun, Ping An Healthcare Technology; Dr Xie Guotong, Ping An Healthcare Technology; Dr Yi Zongbi

PROJECT DESCRIPTION

Although the successful development of antibody drugs and small-molecule tyrosinase inhibitors (TKI) targeting HER2 has significantly improved the survival time of HER2-positive breast cancer patients, most patients will eventually develop primary or acquired resistance during long-term treatment. Preliminary studies of our group suggested that HER2-positive breast cancer is often accompanied by CDK12 co-amplification, which can promote tumor growth by activating the PI3K/AKT signaling pathway. HER2/CDK12 co-amplified patients are

more resistant to HER2 TKI lapatinib than CDK12 non-amplified patients, and they are associated with poor median progression-free survival. Meanwhile, dual inhibition of HER2/CDK12 will prominently benefit the outcomes of patients with HER2-positive breast cancer by sensitizing or re-sensitizing the tumors to anti-HER2 TKIs treatment. Since there are no approved CDK12 inhibitors, this study intends to construct a graph neural network model for drug molecule representation through the self-supervised pre-training method of graph neural network, assist in the screening of new CDK12 small molecule inhibitors, and test its anti-tumor activity in vivo and in vitro.

Assessment of Fine Motor Skills for Cognitively Impaired Older Adults with Dynamic Motion Capture

Principal Investigator	Dr. Jing Li, MMed, Department of Geriatrics, Beijing Hospital
PI Primary Affiliation	Beijing Hospital
Co-Investigator(s)	Dr. Ji Shen, MD, Department of Geriatrics, Beijing Hospital Ms. Jie Zhang, MS, Department of Geriatrics, Beijing Hospital Dr. Ruolin Liu, MD, Department of Rehabilitation Medicine, Beijing Hospital Mr. Rui Liu, MS, Product and Technology, Beijing Noitom Technology Co., Ltd. Mr. Jieli Yang, Department of Geriatrics, Beijing Hospital

PROJECT DESCRIPTION

In 2017, the World Health Organization proposed that the geriatric model of care should transform from treating diseases to maintaining body functions. These functions are divided into five domains, in which the loss of cognitive and physical function is the most critical issue and requires intensive attention and care. The impairments on these functions have caused a tremendous socioeconomic burden, but specific healthcare resources are scarce. Global consensus on the management of cognitive impairment has been emphasizing the importance of taking proactive measures to delay and even prevent cognitive decline in its early stage. Since the mastery of fine motor skills marks a phase of maturity in child development, it is expected that gradual changes in such a skill, which supports advanced quality of life needs, will have already taken place correspondingly. Previous studies have observed the decline of basic manual dexterity in patients with dementia. Therefore, we aim to further characterize fine motor skills manifested in hand-brain coordination tasks in older adults with different levels of cognitive functions. We will employ the MEMS inertial motion capture technology to execute real-time modeling and analysis of manual performance by formulating a set of digital assessment strategies and designing an interactive system as the testing environment. A cross-sectional study will be conducted, and we will evaluate the effectiveness of our assessment strategy and perform modifications contingent upon study results. Our findings will facilitate implementing an accessible resource to proactively manage older adults' cognitive and physical functions in primary care facilities.

Construction and application of precise diagnosis and treatment system for thoracic-abdominal aortic aneurysm

Principal Investigator	Yuehong Zheng, MD, Department of Vascular Surgery, Peking Union Medical College Hospital
PI Primary Affiliation	Peking Union Medical College Hospital, Chinese Academy of Medical Sciences
Co-Investigator(s)	Rong Zeng, MD, Zhili Liu, MD, Fangda Li, MD, Hui Zhang, MD, Chuxiang Lei, Jinrui Ren, Xiaoning Sun, MD, Guangchao Gu, MD, Haoxuan Kan, Jiawei Zhou, Zijian Wang

PROJECT DESCRIPTION

Thoracic-abdominal aortic aneurysm (TAAA) is an aneurysm involving the aorta, multiple visceral arteries in the thoracic and abdominal segments, and the blood supply arteries of the spinal cord. It is more common in elderly patients, and is characterized by challenging surgical treatment, high incidence of serious complications such as paraplegia, and large individual heterogeneity. In response to this, there is currently a lack of TAAA's precise diagnosis and treatment decision-making system and a mature patient management system. Therefore, there is an urgent need to efficiently integrate clinical case data, diagnosis and treatment experience, and basic research data to develop a TAAA precision diagnosis and treatment system to provide important references for disease supervision, treatment decision-making, and patient management to improve the level of disease diagnosis and treatment.

This project intends to use the database architecture of the panoramic data cloud platform to integrate clinical data, blood flow simulation parameters, omics analysis results, and use intelligent platform machine learning methods to establish a precise diagnosis and treatment system for TAAAs, including disease management systems, clinical decision-making systems, technology optimization systems, and device development systems.

On the basis of this system, optimize the disease diagnosis and treatment process and the patient's in- and out-of-hospital management mode, improve the intracavitary technology, develop new monitors and drug treatment targets. Through the promotion of this system, we can improve the level of diagnosis and treatment of TAAA in China, improve the quality of life of patients, and reduce related medical expenses.

Critical pathways and optimal strategies for healthy ageing and longevity among the Chinese population

Principal Investigator	Xiaoming Shi, PhD, National Institute of Environmental Health, Chinese Center for Disease Control and Prevention
PI Primary Affiliation	National Institute of Environmental Health, Chinese Center for Disease Control and Prevention
Co-Investigator(s)	Chen Mao, PhD, School of Public Health, Southern Medical University
	Juan Zhang, PhD, Peking Union Medical College (PUMC) & China Academy of Medical Science (CAMS)
	Yue Zhang, PhD, School of Life Sciences and Biotechnology, Shanghai Jiao Tong University
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PROJECT DESCRIPTION

Findings from studies in China and other countries have suggested that healthy longevity are closely associated with multiple factors such as genetics, environment, lifestyle, social behavior, and mental health. However, existing evidence is limited to select key factors and comprehensive effects, and draw conclusions about the cause-effect association. This study is to build on existing work led by our team like Chinese Longitudinal Healthy Longevity Survey from 1998 to 2018, and Healthy Ageing and Biomarkers Cohort from 2008 to 2021. Using the obtained data, we will explore the underlying factors, in particular causes of healthy ageing and longevity, conduct Mendelian randomization and difference-in-difference analysis to test causal associations, find the weakest links in the etiological chains, identify the most important and modifiable factors and their interactions in the web of causation, and clarify the critical pathways of healthy ageing and longevity. Evidence-based medical research will be carried out to verify relationships and the magnitudes of effects of multi-dimensional factors of environmental, genetic, biological factors on healthy ageing and longevity, then to look at the optimal strategies; Delphi method will be conducted to reach consensus on critical pathways and optimal strategies. Stakeholder mapping will be conducted to identify key stakeholders, and analyze the contexts to implement the critical pathways and optimal strategies for healthy ageing and longevity among the Chinese population. The findings will provide essential evidences for the government to respond to ageing society and provide support for scientific decision-making on promoting healthy ageing and longevity of Chinese.

Design and manufacture optimization of ostium stent system in treatment of ostial artery stenotic diseases

Principal Investigator	Chaohua Xin , B.D. Senior engineer , Successively hold the post of Co founder , R & D director and general manager in Alain Medical(Beijing)Co. Ltd. Senior designer in the field of intravascular products , have managed and designed the the world's first Maurora Rapamycin drug eluting vertebral artery stent system. Held the post of the item design person incharge and design chief engineer , such as Octoparms Inferior vena cava filter , Pinterventional aortic valve stent system, mitral valve stent system, renal artery sympathetic nerve cryoablation balloon catheter, freezing equipment.
PI Primary Affiliation	Evans technology(Beijing)co.,Ltd.
Co-Investigator(s)	Dr. Lei Li, M.D., graduated form Peking Union Medical College. dedicate in vascular surgery, Professor of medical school of Tsinghua university. interest in vascular surgery device development. Rusong Shi , B.D. Mechanical Engineer. 5 years of experience of research and development in medical devices and participated in 3 cardiovascular implants projects.

PROJECT DESCRIPTION

Atherosclerosis (AS) is the main cause of coronary heart disease, cerebral infarction and peripheral vascular disease. Atherosclerosis has a high incidence in some ostial arteries, such as common carotid artery, subclavian artery. which is related to the formation of blood turbulence, blood flow impact leading to inflammatory lesions and lipid deposition. Endovascular stent implantation is the best treatment for this kind of disease. In addition, in some special parts, such as the lesions at the opening of vertebral artery, the artery may twist with breathing and neck rotation, which may easily lead to stent rupture and affect patency. At present, there are some technologies for accurately positioning the open support, such as Szabo technology, which have high risk of support failure and unloading. Covered stent can effectively cover the atherosclerotic lesions and improve the patency rate, but there is still a rare delivery system for the accurate positioning of covered stent at the opening, and the existing covered stent still has some shortcomings, such as thick coating, poor uniformity, and unsatisfactory flexibility.

Our group has completed the research of self expanding bare stents with precise positioning and complete coverage of the lesions at the opening, and the electrospinning technology of ePTFE and its application in the small covered stent system. Based on this, we plan to improve the design and manufacturing of bare stents and coated stents, further explore the commercial feasibility of the design and manufacturing of coated stents and their precise release systems for open lesions.

Development of a novel PI3K inhibitor XH-30 for the treatment of glioblastoma

Principal Investigator	Dr. ZHANG Kehui
PI Primary Affiliation	Institute of Materia Medica, Chinese Academy of Medical Sciences & Peking Union Medical College
Co-Investigator(s)	Prof. XU Heng, Dr. LIN Songwen Prof. CHEN Xiaoguang, Dr. JI Ming

PROJECT DESCRIPTION

Glioblastoma is the most common primary intracranial tumor caused by the carcinogenesis of glial cells in the brain and spinal cord. It is highly aggressive, recurs easily, and has limited treatment options. Currently, only Temozolomide (TMZ) has been approved by the FDA for clinical use, which, however, shows obvious side effects and severe drug resistance after long-term use. Therefore, the development of new anti-glioma drugs is imminent. PI3K inhibitors not only have superior anti-tumor activity by selectively blocking the signal pathways involved in tumor cell proliferation, but also reduce the incidence of drug resistance. Based on our previous research, in this project, we have developed a new structure of the blood-permeable brain barrier PI3K inhibitor drug candidate XH-30. The candidate drug has good blood-brain barrier permeability, strong target inhibitory activity and high selectivity. It has high antiproliferation activities against a variety of glioma cells, and is used in subcutaneous and in vivo models of glioma, in which XH-30 can both almost completely inhibit the growth of tumors and has good safety profile. In view of the good pharmaceutical properties of the candidate drug, we are planning to carry out systemic preclinical studies of XH-30 in this project, including pharmacology, pharmacokinetics, and toxicology studies. The goal will be to obtain clinical trial permission from the State Food and Drug Administration of China to carry out clinical research of the drug to meet the huge clinical needs.

Effect of Blood Flow Restriction Training on patients with hypertension

Principal Investigator	Fang Wang, M.D. Ph.D. Beijing hospital, Professor Wang/Dr. Wang. Director of cardiology department of Beijing hospital
PI Primary Affiliation	Beijing hospital
Co-Investigator(s)	Zhao Zhi Guang, Bachelor of medicine, master of sports and human science, associate researcher, registered dietitian. Director of Competitive Research Office of Beijing Institute of sports science. Zhang Qian, MD/Phd, Beijing hospital, attending doctor. Dr. Zhang Qian

PROJECT DESCRIPTION

1.Necessity: hypertension is a disease with high incidence rate, high morbidity and mortality, but low control rate. Antihypertensive drugs account for a high proportion of medical insurance expenses in China, with a total amount of about 10 billion yuan. Exercise therapy is an important adjunctive therapy for reducing blood pressure.It can avoid side effects of drugs, have additional benefits besides antihypertensive effect, and can significantly reduce the expenditure of medical insurance. Compared with traditional exercise therapy, Blood Flow Restriction Training(BFRT) has the advantages of low load requirement, short time consuming and high efficiency. Some studies showed that doing BFRT twice a day for 2-3 weeks can achieve the effect of traditional exercise training for 2-3 months.If it can be widely used in clinic, it will significantly increase the effect of exercise therapy.

2.objectives: Improve the method of exercise therapy, improve the control rate of hypertension, reduce the medical insurance expenses and mortality while improve the quality of life of patients with hypertension.

3.Methods: Set the BFRT device with appropriate scheme, and apply it on patients with grade 1 hypertension for 3 months. The efficacy and safety of the treatment group were evaluated compared with the control group.

Related basic conditions: our department has a large number of patients with hypertension, mature experience in treatment of hypertension and clinical trials, and sufficient monitoring conditions. The cooperative group has mature experience, programs and sufficient BFRT experience in competitive sports. 4.Related basic conditions: our department has a large number of patients with hypertension, mature experience in treatment of hypertension and clinical trials, and sufficient monitoring conditions. The cooperative group has mature experience, programs and sufficient BFRT experience in competitive sports.

Establishment and application of 5G mobile stroke prevention and treatment system

Principal Investigator	Professor Xiuhai Guo
PI Primary Affiliation	Xuanwu Hospital, Capital Medical University
Co-Investigator(s)	Dr. Ruxiang Xu Dr. Guowei Shang Mr. Xincheng Zhang Mr. Zhili Li Mr.Qiang Yu

PROJECT DESCRIPTION

Stroke is the first disease of death and disability in China. It is characterized by high incidence of morbidity, high recurrence rate, high mortality rate and high disability rate, and has become a global public health problem. The Mobile Stroke Unit (MSU) mode provides new ideas for stroke prevention and control, it will bring revolutionary changes to the stroke treatment mode in China.

Focusing on the basic medical theory, key common equipment and technology of stroke treatment, so as to improve the supply capacity of key technologies and equipment in the whole industry. Create a new information system platform for precision medical, smart medical, mobile medicine, and telemedicine, improve stroke prevention and control ability.

Relying on the early exploration of mobile stroke treatment mode based on 5G, and the original domestic small 16-row mobile CT technology, the existing hospital-centered acute stroke treatment mode has been innovated and developed into a new mode of double combination of pre-hospital and in-hospital acute stroke diagnosis and treatment. We intend to Rely on 5G mobile stroke unit technology, active screen stroke risks for over 10,000 elderly people, Form a clinical resource database for primary mobile stroke prevention and control, perform two 4 / 5G-based mobile cohort study on ischemic stroke and hemorrhagic stroke Accumulate a high-quality clinical evidence-based bases, strive to write and form our country 4 / 5G mobile stroke prevention and control norms and guidelines, and create a 5G mobile stroke prevention and cure system with Chinese characteristics.

Nanobodies in the Diagnosis and Treatment of Central Degenerative Diseases

Principal Investigator	Fang Zheng, PhD in Bio-science engineering, Department of Biochemistry and Molecular Biology, Health Science Center, Xi'an Jiaotong University, Xi'an, 710061, China, and Dr. Fang Zheng, Professor
PI Primary Affiliation	Xian Jiaotong University
Co-Investigator(s)	Yurong Wen, Ph.D. in Biochemistry and Biotechnology, Talent Highland and Center for Gut Microbiome Research of Med-X Institute, The First Affiliated Hospital, Xi'an

Jiaotong University, Xi'an 710061, China, Dr. Yurong Wen, Professor

PROJECT DESCRIPTION

Degenerative diseases of the central nervous system have been receiving broad attention due to the complex pathogenic mechanism and lack of diagnosis and treatment methods. Studies have shown that Microglia are highly correlated with Alzheimer's disease (AD) and responsible for early immune activation. Targeting Microglia is crucial for systematically understanding and monitoring the early symptoms of AD development. Therefore, we have developed a nanobody named Nb119 as a molecular imaging probe for the noninvasive monitoring of these macrophages. Interestingly, Nb can serve as an ideal molecular imaging probe for the brain because of its unique ability to pass through the blood-brain barrier in pathological conditions. In this study, we have verified the specificity, effectiveness, and safety of Nb119 targeting Microglia in mouse brains in vivo and in vitro. It provides new tools for researching the mechanism, diagnosis, and treatment of central degenerative diseases and lays the foundation for realizing the precise diagnosis and treatment of central degenerative diseases by targeted molecular imaging in vivo. Furthermore, we will research the mechanism and diagnosis, and treatment of AD and try to apply them to the clinic usage, making the Nb119 a reliable tool for the research, diagnosis, and treatment of central degenerative diseases. This will enlighten more molecular imaging probes applied to brain science research and other conduct research on the mechanism of central degenerative diseases and strive to find a diagnosis or treatment method.

Nasal stent - Sleep apnea solution for the elderly

Principal Investigator	Li liang CEO
PI Primary Affiliation	Northay Technology (Beijing) Co., Ltd
Co-Investigator(s)	Professor Liu Junxiu ; Professor Li Yan

PROJECT DESCRIPTION

Sleep apnea syndrome in the elderly is a group of low oxygen, hypercarbonateemia, acidemia, which can cause damage to many organs such as the heart and brain. Sleep apnea syndrome in the elderly is a common disease with certain potential harm to the elderly, the prevalence is high, the combination of many, prone to night-time disease deterioration and death at night. Data indicate that more than half of the population over the age of 65 have sleep disorders, and the incidence of sleep apnea syndrome is as high as 20-40%, and increases with age.

Sleep apnea syndrome The main feature is that during sleep, in addition to snoring, there is repeated apnea. This is also a long-term patient in a shallow sleep state, poor sleep quality of a manifestation. Obstructive sleep caused by structural nasal stenosis such as rhinitis, sinusitis, skewed nasal separation, bubble-like mid-nasal armor, lower nasal armor hypertrophy, etc., is the main problem we have in this product.

Aiming at the clinical needs and disadvantages of sleep apnea syndrome in the elderly found in clinical work, this project, in cooperation with Peking University Third Hospital and Beijing University of Aeronautics and Astronautics, designs a new nasal stent, which can automatically rebound after being compressed into the nasal cavity and firmly attached to the inner wall of the nasal cavity, effectively improving the patient's ventilation function, breathing smoothly and contributing to sleep health. The stent is suitable for the majority of elderly snoring patients, sleep apnea syndrome patients, with broad clinical application prospects and huge market demand potential.

Non Pharmacological— —An Evidence-Based Study of Social Work Multicomponent Intervention Approach on Mild Cognitive Impairment

Principal Investigator	Dr. Chen Honglin, Professor Chen Honglin /Chen Honglin, PhD, Fudan University
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PI Primary Affiliation	Fudan University
Co-Investigator(s)	An Ning, PhD , Chen Yanyan, PhD , Yin You, PhD , Huang Yanyan, MM (Master of Medicine) , Hu Mengmeng, MSW(Master of Social Work) , Liu Wenrui, MSW , Zeng Wanru, MSW , Fudan University , Hefei University of Technology , HuaShan Hospital Affiliated to Fudan University , ShangHai ChangZheng Hospital

PROJECT DESCRIPTION

Mild Cognitive Impairment (MCI) is a pre-symptom of dementia, which has a high prevalence in the population. This project is precisely based on evidence-based practice and aims to explore and implement an integrated non-pharmacological intervention approach for people with MCI in a localized context. Firstly, we will systematically examine the existing literature on non-pharmacological interventions for old adults with MCI and evaluate their implementation effects and staff requirements based on a Logit model. And then, we will cooperate with the well-established tertiary hospitals in Shanghai to select 300 old people diagnosed with MCI and their caregivers. Through a paired design, the research samples are randomly divided into experimental groups and control groups, 150 patients in control groups will receive conventional pharmacological treatment and their caregivers will not be interfered. In addition to pharmacological treatment, 150 patients in the experimental group will also receive an social work non-pharmacological intervention which means “physiological-psychological-social” integrated assessment and intervention. And their caregivers will receive simultaneous intensive contact training for 3 months. The participants will be subjected to baseline measurement before the intervention, and three retests were performed 3, 6, and 12 months after the intervention.

Data will be analyzed using the Time Series-Cross Section method to compare multiple measurements in the experimental and control groups, so as to comprehensively evaluate the results of pharmacological and non-pharmacological combination intervention and pharmacological intervention, and find out the best evidence for the intervention of MCI patients by social work practices in line with the client's value, and establish a “practice-evidence-research-practice” system.

Optimization and promotion of the online adaptive workflow of MR-Linac

Principal Investigator	Ning-Ning Lu, M.D., PhD, National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College
PI Primary Affiliation	National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College
Co-Investigator(s)	Ran Wei, PhD; Yuan Tian, PhD; Shi-Rui Qin, M.S. National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College

PROJECT DESCRIPTION

The online adaptive workflow provided by MR-Linac (MRL) can solve all the problems when treating prostate cancer patients with conventional linacs, including bad soft tissue contrast, invasive procedure due to fiducial markers or electromagnetic transponders insertion, target area and organs motion and deformation, etc.. However, the time-consuming MRL workflow is the main obstacle to widely use this technique. The online adaptive deformable registration aligned on MRL is not good enough for prostate cancer, as the bladder filling changes and adjacent organs motion would affect the radiotherapy target, including prostate and seminal vesicles. Therefore, we collect the MR images at pre-scan and during each fractionation, extract the prostate and adjacent organs motion data, and build the prostate and pelvic organs motion prediction model (PPMPM) by Finite Element Analysis (FEA) and Biomechanical Model Constrains (BMC). The accuracy and performance of this model will be testified by comparison of the similarity to the position verification 3D-MRI(PV-MRI), cine-MRI and post-MRI. Based on the PPMPM, a new set of auto-contouring software will be developed to help the adaptive contouring which is rate-limiting step during the Adapt-To-Shape (commonly used for prostate cancer) workflow of MRL. With expanded enrollment, population-based, convolutional neural network (CNN)-based

algorithm will be used to improve the model accuracy and robustness. Finally, the total on-couch time would be significantly reduced, patients' satisfaction increased and more patients could be treated each day. The optimized workflow will reduce the doctors' workload and promote the clinical use of this high precision technique.

Pharmaceutical preparation research of TDX105 for skin toxicity related to tumor molecular targeted drugs

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Co-Investigator(s)	Dr. Xinrui Hu, Dr. Ning Du, Wei Jin, PhD, Lixing Liu, PhD, Jie Li, PhD, Jiayang Chen, PhD, Jinyuan Chang, PhD, Lianzhen Chen, PhD, Zhongge Wang, PhD, Bin Dong, PhD, Linlin Fan, PhD, Mingming Bo, PhD, National Cancer Center/National Clinical Research Center for Cancer/Cancer Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College.

PROJECT DESCRIPTION

Skin toxicity is the most common side effect of anti-tumor targeted drugs, which affects the quality of life of patients and the implementation of the best dose of drugs. There is no specific drug for this kind of skin injury, and the conventional treatment based on hormone has little effect. TDX105, a traditional Chinese medicine developed by our team in the early stage, has obvious curative effect advantages and good development prospects compared with the current conventional treatment. The patent of the compound has been authorized and the technology transformation has been completed, and we plan to further research and develop new drugs. In this project, the ultimate goal is to develop new drugs. Based on the relevant laws and regulations of domestic and international new drug development and registration, combined with the actual industry, we carried out a comprehensive CMC (chemical manufacturing and control) research on TDX105, providing a modern preparation with controllable quality, stable uniformity and large-scale production for the evaluation of product effectiveness and safety. The research contents include: quality control research of medicinal materials/Chinese Herbal Slices; research and establishment of industrial feasible intermediate preparation technology; research and establishment of preparation technology suitable for large-scale production and clinical application; carry out quality control research and establish a complete quality control system; complete the pilot magnification of the production process to further determine the feasibility and stability of the process industry; carry out stability studies to determine the inner packaging materials, storage conditions and expiration date.

Preparation of VEGF-loaded trihydroxyflavone-copper ion complex microflower and its application in promoting angiogenesis

Principal Investigator	Xiaoli Wang, PhD, Assistant Professor
PI Primary Affiliation	Institute of Biomedical Engineering, Chinese Academy of Medical Sciences & Peking Union Medical College
Co-Investigator(s)	Jing Yang, PhD, Professor; Hailing Zhang, MD, Assistant Professor; Xiaoyu Liang, MD, Postgraduate; Huiyang Li, Postgraduate; Youlu Chen, Postgraduate; Rong Xu, Postgraduate; Kaijing Liu, Postgraduate; Xue Fu, Postgraduate; Limei Liu, Postgraduate

PROJECT DESCRIPTION

Improving the blood perfusion of patients with lower limb ischemia, improving the life quality of patients, and reducing the disability and mortality rates have been clinical practical problems that need to be resolved urgently. In this project, baicalein coordinated with copper ions to form microflowers, and VEGF was loaded into the microflowers to construct a multifunctional delivery system. Its therapeutic effect was verified through in vitro cell culture and in vivo mouse hindlimb ischemia models. The advantages combination of biomaterials and growth factor therapy may find new strategies for the clinical treatment of lower limb ischemic diseases. The research include: 1) VEGF was loaded into baicalein-Cu(II) complexes microflowers, obtaining a multifunctional delivery system; 2) The cytotoxicity, anti-inflammatory effects and angiogenesis of the delivery system were evaluated in vitro; 3) The therapeutic effect and mechanism verification of hindlimb ischemia in diabetic mice. Baicalein and copper ions, which can regulate inflammation and promote angiogenesis, respectively. The system coupled with the functions of growth factors and biomaterials, and effectively overcomes the difficulties faced by current factor therapy, bringing new hope for the treatment of lower extremity arterial disease.

Promotion and Research of the Reduction Strategy with Supporting Stick on Geriatric Hip Fractures

Principal Investigator	Wen Liangyuan, MD, Department of Orthopaedics, Beijing Hospital, National Center of Gerontology, Institute of Geriatric Medicine, Chinese Academy of Medical Sciences, Beijing (Professor Michael Smith)
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Co-Investigator(s)	Zhang Ze, Sun Fengpo, Liu Junchuan, Zhang Tongyi, Zhang Yawen, Ji Quan, MD, Department of Orthopaedics, Beijing Hospital, National Center of Gerontology, Institute of Geriatric Medicine, Chinese Academy of Medical Sciences, Beijing (Professor Michael Smith)

PROJECT DESCRIPTION

At present, geriatric hip fractures had become a significant public health issue worldwide due to the high mortality and disability rate and huge medical expenses. For the treatment of fracture, the good reduction is the key factor to success. Generally speaking, for irreducible femoral neck fractures and intertrochanteric fractures, open reduction or limited open reduction combined with other tools are usually used to achieve the restoration of the fracture. However, this conventional method of reduction has the characteristics of larger trauma, unstable reduction effect, long operation time, and high risk of complication.

To this end, our team has successfully established a new strategy for hip fractures based on the concept of non-invasive reduction and the biomechanical principle. The implementation of this strategy relies on the support stick which is independently developed by our team. Our strategy can achieve a nearly non-invasive reduction of irreducible hip fractures. Our strategy has the following advantages: ① Shorter reduction time; ② Less destruction in blood supply and less blood loss during the operation; ③ The support for the lower limb is stable and the reduction could be firmly maintained; ④ Less frequency of X-ray and lower radiation damage for the operators.

Our reduction method with a supporting stick is innovative in the field of geriatric hip fractures, especially for irreducible hip fractures. By using our scientific, simple, and efficient strategy, the complex problems of reduction of the irreducible hip fracture could be solved with great ease.

Rebounding posterior scleral reinforcement device in the treatment of macular diseases of pathologic myopia

Principal Investigator	Rongping Dai , MD, Department of Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences , Professor Rong-ping Dai
PI Primary Affiliation	Department of Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences
Co-Investigator(s)	Youxin Chen , MD, Department of Ophthalmology, Peking Union Medical College Hospital, Chinese Academy of Medical Sciences , Professor You-xin Chen.

PROJECT DESCRIPTION

There are about 10 million patients with pathologic myopia in China. Pathologic myopia has now become one of the major fundus diseases which may cause blindness. The operation of posterior scleral reinforcement or compression is a feasible method to treat macula disease by preventing scleral expansion for patients with pathologic myopia. Allogeneic sclera reinforcement is now mostly applied, but accompanied by many problems, such as many surgical complications, the limited source of materials and the involvement of ethical issues.

The patented rebounding posterior scleral reinforcement device is made of elastic resin and will be implanted into patients with pathologic myopia. The rebound device is expected to be easy to operate with highly effectiveness. The device will solve the problem of limited sources of autologous scleral materials.

The objective of this research is to demonstrate its effectiveness and safety of the device, laying the foundation for the following clinical trials.

Research and development of a system for the fabrication and collection of autologous morselized bone for spinal fusion surgery

Principal Investigator	Zan Chen
PI Primary Affiliation	Capital Medical University Xuan Wu Hospital
Co-Investigator(s)	Dr Wanru Duan, Dr Qiang Jian

PROJECT DESCRIPTION

Most spinal surgery requires bone fusion. Bone grafts or bone substitutes are often used to achieve bone fusion during the spinal fusion surgery. Compared with allograft, bone xenograft and artificial bone substitutes, patient-derived autogenous bone granules are the best choice. The researchers designed an autologous bone preparation system that consisted of an autologous bone pulverizer and an autologous bone collection system. The bone fragments can be quickly broken to the appropriate granularity in a sterile sealed device after the bone mass is obtained. The bone fragments collection system can be connected to the surgical aspirator to collect the bone fragments cut by grinding drill for bone grafting.

Research and Development of Bioactive and Antibiotic Spinal Bone Cement Products

Principal Investigator	Dr Zhang miaozi
PI Primary Affiliation	Beijing Bonsci Technology Co., Ltd
Co-Investigator(s)	None

PROJECT DESCRIPTION

PMMA bone cements are widely used in percutaneous vertebroplasty and kyphoplasty surgeries for the treatment of osteoporotic vertebral compression fractures. However, currently available PMMA bone cements cannot form osseointegration with the host bone tissue because they are bioinert, nor can they prevent or cure

infections. This project will develop a series of spinal bone cement products with bioactivity and/or antibacterial properties, and provide total product solutions with patient-specific instruments. Project activities include determining the types, combinations and dosages of antibiotics and bioactive agents, investigating the interactions among antibiotic drugs, bioactive agents and cement materials, determining the best material system for the novel cement products; and developing innovative processes and technologies to achieve mass production of cement products. A series of pre-clinical bench performance tests, long-term biocompatibility tests, and in vitro and in vivo functional tests will be conducted to complete product design verification and validation along with relevant research reports.

Research and implementation of VHF ultrasound panoramic imaging and automatic measurement technology for senile cataract lens

Principal Investigator	Zhou Sheng, PhD
PI Primary Affiliation	Institute of Biomedical Engineering, Chinese Academy of Medical Science & Peking Union Medical College
Co-Investigator(s)	None

PROJECT DESCRIPTION

Cataract is a common disease among middle-aged and elderly people, leading to most cases of vision impairment and blindness today. However, no particular device is clinically available for cataract diagnosis. In clinical practice, it's heavily reliant on the doctor's experience to obtain relatively accurate and objective lens imaging data and biometric parameters. Due to the diversity of cataract lenses, uneven hardness distribution, and individual differences, it is prone to make diagnostic errors, requiring even higher operation skills from surgeons.

Based on our long-term laboratory research and development of high-frequency ultrasound diagnosis and treatment technology, this project proposes real-time panoramic lens imaging to observe the shape and pathological characteristics of lens and its surrounding tissues using very-high-frequency (VHF) ultrasound. With real-time imaging data, a doctor can automatically measure anterior segment parameters and evaluate whether the anterior chamber angle is open or closed. According to the diagnosis results, the doctor can adjust the energy, frequency, negative pressure, incision mode and other parameters of intra-operative emulsification before a surgery is started, to optimize the treatment plan. Upon completion, this project will build a VHF panoramic imaging and automatic measurement software and hardware platform that meets the medical standards for safety and performance, improves imaging quality, mitigates surgery risks and reduces the incidence of complications. This project demonstrates great research significance and clinical application prospects.

Response evaluation of cryoablation focal therapy for low-intermediate risk prostate cancer guided by a novel molecular imaging – PET/MR

Principal Investigator	Dr. Ming Liu, Deptment of Urology, Beijing Hospital
PI Primary Affiliation	Beijing Hospital
Co-Investigator(s)	Yaqun Zhang; Min Chen; Chunmei Li; Zhi Yang (Peking University Cancer Hospital); Hui Zhu; Wei Zhang; Xuan Wang; Huimin Hou; Miao Wang; Qiuxia Yan

PROJECT DESCRIPTION

Prostate cancer is the most common malignancies among men worldwide. and seriously affects the health and quality of life of elderly men. Radical treatment (radical surgery, radiotherapy) is still the standard treatment for low- to intermediate-risk prostate cancer, but the incidence of related complications such as erectile dysfunction,

urinary incontinence, radiation proctitis is high, which greatly affect the quality of life of patients after treatment. The novel focal cryoablation has the potential to cure prostate cancer and preserve the function at the same time; however, cryotherapy is now guided by ultrasound which is not accurate enough to localize the lesion and guide the treatment. Moreover, there's no standardized strategy to monitor recurrence currently, which might impact the certainty of safety and would limit the spread of this technique. PSMA PET / MR is a novel molecular imaging technology, which combines the high sensitivity and specificity of molecular imaging with the good tissue resolution of mp-MRI. It has the potential to become a novel imaging choice to guide focal therapy and to monitor postoperative recurrence. The purpose of this study is to confirm that PSMA PET/MR can be used as a reliable examination for evaluation of therapeutic effect and diagnosis of recurrence. Eventually, a standardized system of PSMA PET/MR guided cryoablation therapy and postoperative efficacy and recurrence monitoring will be established for the treatment of low- to intermediate-risk prostate cancer patients, ultimately extending the "healthy life span" of high quality in those patients.

Risk assessment of mild cognitive impairment(MCI) in the elderly and identification of high risk population

Principal Investigator	Jinlei Li, PhD, School of Population Medicine and Public Health, Peking Union Medical College (Dr. Jinlei Li)
PI Primary Affiliation	Peking Union Medical College
Co-Investigator(s)	None

PROJECT DESCRIPTION

Cognitive problems of the elderly require urgent attention in the context of population aging. As the transitional state between the cognitive decline of normal aging and that of dementia, mild cognitive impairment (MCI) serves as an important stage for the early intervention and prevention of dementia. Previous work of the applicant has discovered that lifestyle and demographic features play an important role in the risks of dementia, and generally available risk factors can be used to perform risk assessment and prevention of dementia. This study will move the subject matter ahead by building and verifying an MCI risk assessment model. It will also develop a tool to evaluate MCI risks and identify high-risk population, thereby creating conditions for conducting cognitive intervention of high-risk population and for delaying the occurrence and development of dementia. The project will 1) streamline the general risk factors of MCI and their level of significance with MCI ; 2) build models for MCI individual risk assessment of the elderly based on the general risk factors, and validate the model with data of 2,300 people aged at or over 60; and 3) on the basis of the theoretical model, develop a WeChat-based convenient MCI risk assessment tool, which could give out the MCI risk value based on the specific feature indicators entered by the elderly and GPs, identify high-risk population, and put forward suggestions.

Systematic Research and Development of a Novel Stentoplasty System with Metallic Stents and Ceramic Bone Void Fillers

Principal Investigator	Professor Guo qian
PI Primary Affiliation	Beijing KeYi Medical Device Technology Co.,Ltd
Co-Investigator(s)	Dr.Nie yongjia; Dr.Jiao zengxiao; Dr.Sun lingli;

PROJECT DESCRIPTION

Percutaneous kyphoplasty (PKP) for the treatment of osteoporotic vertebral compression fractures has issues such as balloon "rebound" effect, loss of the vertebral height, and loss of vertebral stability due to the high stress concentration caused by the mismatch between acrylic bone cement and vertebral body in terms of elastic modulus. This project aims to develop a novel stentoplasty system that is composed of metallic stents and

ceramic bone void fillers. The project will use the finite element analysis to innovatively design the cobalt-based metallic stents, and apply laser cutting technology and stent compression technology to manufacture metallic stents of various specifications. Under the theoretical guidance of tissue-inducing biomaterials originated in China, the project will also develop calcium phosphate-based osteoinductive bone void fillers, and thus provide a total product solution with a minimally invasive stentoplasty system composed of both ceramic bone void fillers and metallic stents. This project is expected to effectively solve the existing clinical issues of PKP, bring zero-to-one breakthroughs of minimally invasive stentoplasty in China, and fill the gap in Chinese domestic market of percutaneous vertebral augmentation products.

The Development Of Instantaneous Heating and Flow Monitoring Device For Peritoneal Dialysis

Principal Investigator	Jie Dong, PhD, Peking University First Hospital, Dr. Jie Dong
PI Primary Affiliation	Peking University First Hospital
Co-Investigator(s)	Chi Liu, Bachelor, Peking University, Mr. Chi Liu

PROJECT DESCRIPTION

As the older population continues to grow, China has seen rising prevalence of chronic kidney disease. According to China's renal disease data registry, more than 800,000 people have received dialysis treatment by the end of 2020, with the annual cost exceeding 50 billion. Administered at home, peritoneal dialysis (PD) is simple and effective, with a survival rate comparable to that with hemodialysis. However, PD mainly relies on a manual procedure during which patients warm dialysate, weigh dialysate, and finally calculate the ultrafiltration volume manually. This complex procedure takes nearly one hour per session, totaling four hours a day, greatly limiting the time and scope of patient's activities and impairing their quality of life.

At present, automated peritoneal dialyzers are generally used worldwide to address the problems of peritoneal dialysate heating and flow monitoring. However, the dialysis tubing is connected to the patient's body during treatment, which restricts their activities and travels; The equipment is large in size and not easy to carry; The costs of equipment and consumables are high, making it difficult to expand the use to a wider population.

Therefore, we intend to work with the team of Peking University School of Information Science and Technology to develop equipment with real-time heating and flow monitoring for PD to eliminate the steps of heating dialysate and manual weighing by patients, thereby saving patients 40 minutes for each dialysis operation. This will help patients maintain normal social function and improve their quality of life.

The mechanism study and innovative drug research of Ethoximod,a class1 medicine,for the treatment of idiopathic pulmonary fibrosis

Principal Investigator	Prof. Jing Jin
PI Primary Affiliation	Institute of Materia Medica, Chinese Academy of Medical Sciences & Peking Union Medical College
Co-Investigator(s)	Prof. Xiaoguang Chen, Prof. Xiaoxi Lv, Prof. Ming Ji, Mr Mingjin Wang, Miss Huimin Jiang, Miss Mengyao Hao

PROJECT DESCRIPTION

Idiopathic pulmonary fibrosis (IPF) is a respiratory disease with high mortality rate. It mostly occurs in men aged from 50-70. As a country with serious aging, the incidence rate of IPF is increasing year by year, but the exact pathogenesis of IPF is still unknown, and there are no specific therapeutic drugs.

Ethoximod is a novel sphingosine-1-phosphate receptor-1 (S1P1) agonist developed by our group, which was approved by the CFDA for the treatment of psoriasis in 2016, and is now in clinical I trial for psoriasis therapy. Our preclinical study found that Ethoximod has great therapeutic effect on bleomycin induced mice fibrosis by protecting the homeostasis of the alveolar capillary barrier, suggesting S1P1 may be a potential drug target for IPF. In this study, we will further clarify the mechanism of S1P1 on IPF and develop Ethoximod as a “First-in-Class” drug for IPF therapy.