The Association Between SNRK and Vascular Endothelial Aging

Version: 1.0

Date: April 30th, 2026

Ethics Committee

Tianjin Medical University General hospital

Information Sheet of Informed Consent Form

Dear potential research participants,

We sincerely invite you to participate in a study titled **Research on the Association Between SNRK and Vascular Endothelial Aging**. This research is supported by **Xuefu Street Community Health Service Center of Tianjin Nankai District, Santan Hospital of Tianjin Nankai District，Tianjin Hongqiao District Hospital of Traditional Chinese Medicine**. The principal investigator is **Dr. Minghui Zou**.

The ethics committee of Tianjin Medical University General Hospital has reviewed the research plan of this study, and agreed to conduct the clinical research program (Grant No. **IRB2026-YX-172-01**, Approved starts on: **05/01/2026**, Approval expires on: **04/30/2029**). The study has been registered at the global clinical research authority database, **ClinicalTrials.gov**. The research program is funded by **National Natural Science Foundation of China**.

Please read the following text carefully as much as possible before deciding whether participate in this study. It can help you understand the purpose, content, procedures and duration of the study, and the possible benefits, risks and discomforts of being a participant. If you prefer, you can also discuss with your family and friends, or ask your doctor for explanations to help you make a decision. In addition, taking part in this study is entirely voluntary. You can refuse to participate, which will not affect your relationship with the doctor and the investigator. In addition, you will not be charged any additional fee.

1. Research Background and Objectives

Cardiovascular diseases pose a serious threat to public health, and their prevalence is on the rise year by year. Vascular aging is an independent risk factor for cardiovascular diseases, and endothelial cell senescence is an early event in vascular aging. Its occurrence can lead to endothelium-dependent vasodilation dysfunction, reduced vascular permeability, and the release of the senescence-associated secretory phenotype (SASP). These vascular pathological changes further damage the vascular media, leading to vascular remodeling and reduced compliance, accelerating the progression of atherosclerosis, and ultimately resulting in cardiovascular diseases such as coronary heart disease and hypertension. Recent research of the investigators has revealed that SNRK, a new member of the AMPK family of cellular energy sensors, plays a key regulatory role in vascular development. Based on this finding, the investigators propose the scientific hypothesis that SNRK responds to both

physiological and pathological aging stimuli through differential mechanisms and regulates the process of endothelial cell senescence. In this study, the investigators will explore the correlation between *SNRKAS* and carotid vascular structure and endothelial function by measuring the levels of the SNRK upstream lncRNA (*SNRKAS*) in participants' peripheral blood, in conjunction with carotid ultrasound examinations. The findings will provide a solid scientific basis for elucidating new mechanisms underlying the onset and progression of vascular aging and for identifying novel therapeutic targets.

2. Estimated Number of Subjects

Estimated by statistical analysis, a total of 180 subjects were included. Enrollment will target three age groups, each consisting of 60 participants: <40 years, 40–60 years, and >60 years.

3. Inclusion and Exclusion Criteria

3.1 Athletes and Patients with TBI

Inclusion Criteria

1) Aged 18–80 years, with the capacity to make decisions independently or represented by an authorized legal guardian;

2) Able to provide complete personal information, medical history, and lifestyle history (e.g., smoking and alcohol consumption history);

3) No history of severe cardiovascular disease, and deemed eligible for inclusion by a physician.

Exclusion Criteria

1) Women who are pregnant or may become pregnant;

2) Patients with a history of neurological disorders, tumors, severe cardiovascular or pulmonary disease, liver failure, kidney failure, or blood disorders;

3) Patients who have undergone carotid stenting, carotid endarterectomy, or other similar procedures, or who have unilateral carotid artery occlusion due to any cause;

4) Patients who have participated in other clinical trial in the past 4 weeks;

5) Individuals deemed unsuitable for this clinical trial by the investigators.

Withdrawal Criteria

1) Failure to complete the required bilateral carotid ultrasound and blood tests within the study-specified timeframe;

2) Blood samples exhibiting severe hemolysis, lipemia, or improper storage, rendering subsequent parameter testing impossible;

3) Voluntary withdrawal from the study by the patient or their family;

4) Withdrawal of the patient from the study as determined by the physician or investigator.

4. Study Procedures

4.1 Before you enroll in the study, the doctor will record your basic information, present medical history and past medical history.

If you are a qualified subject, you could voluntarily participate in the study, and sign the informed consent.

If you do not meet the inclusion criteria, the investigators will suspend your participation in this study.

4.2 If you agree to participate in the study, an additional 10 mL of venous blood will be drawn during your physical examination to measure blood lipids and serum levels of SNRKAS, and to perform transcriptomic analysis.

4.3 If you agree to participate in the study, you will undergo a bilateral carotid ultrasound.

The blood samples collected during the study and the results of the carotid ultrasound will be used solely for this study.

5. Benefits

All examinations and treatments will help doctors monitor the changes in your condition and adjust the diagnosis and treatment plan.

6. Risks, Discomforts and Inconveniences

During the study, you will need to have a blood draw (10 mL) and a carotid ultrasound. These procedures are part of a routine physical examination and may cause some discomfort. Other than that, this study will not pose any risks or cause any discomfort to you.

7. Financial Information

You will not be charged for participating in this study.

8. Privacy

Your research records will be kept by Tianjin Medical University General Hospital. The investigator and the clinical trial management agency will be permitted to assess your records. Any public report on the results of this study will not reveal your personal information. The investigators will make every reasonable effort to protect the privacy of your personal research records.

According to medical research ethics, the research data will be available for public inquiry and sharing. The query and sharing will be limited to web-based electronic data, ensuring that no personal privacy information will be disclosed.

9. How to obtain more information about the study?

You can ask any questions about this research at any time and get answers. The investigators will keep you informed if there is any critical new information during the research course that may affect your willingness to continue participating in the study.

10. Voluntary Participation and Withdrawal

Participating in this study is completely voluntary. You may refuse to take part in this research, or stop participation at any time that you wish without losing any of your rights.

For your best interests, the doctor and the investigator may stop your participation at any time during the study.

11. What need to do now?

Thanks for reading the materials. Before making a decision on whether to take part in this study, please ask the doctor or the investigator about the research as much as possible. If you decide to participate, please tell your research coordinator, he will arrange everything for your participation.

Please keep this form properly.

12. Sharing the Results

Your test reports can be accessed at any time during or after hospitalization. In addition, the results of this study will be published and shared through academic papers, professional academic conferences, internet, Wechat, etc., so that the practitioners in the medical field can learn.

13. Who can I contact about this study?

Project executor: Dr. Minghui Zou; E-mail: mhzou@tmu.edu.cn; Telephone: 022-83336616

Principal Investigator: Dr. Xintong Ge; Telephone: 022-60362237

Research Coordinator: Dr. Wei Guo; Telephone: 022-87053565

Research Coordinator: Dr. Jinyi Yang; Telephone: 022-27377327

Research Coordinator: Dr. Tan Zhang; Telephone: 022-86512204

Program Assignment No. IRB2026-YX-172-01

Certificate of Informed Consent Form

Study Title: Research on the Association Between SNRK and Vascular Endothelial Aging

Participating Organizations: Tianjin Nankai District Xuefu Street Community Health Service Center, Tianjin Nankai District Santan Hospital, Tianjin Hongqiao District Traditional Chinese Medicine Hospital

Consent Statement:

I have read the above introduction to this study, and have the opportunity to discuss it with **Dr. Minghui Zou** (project executor), **Dr. Xintong Ge** (principal investigator), **Dr. Wei Guo** (research coordinator) or **Dr. Jinyi Yang** (research coordinator) or **Dr. Tan Zhang** (research coordinator). All the questions I asked have been satisfactorily answered.

I know that participating in this study is completely voluntary. I understand the risks and benefits that may arise from taking part in this study. I confirm that I have enough time to consider, and realize that:

- I can ask the doctor and the investigator for more information about the study at any time.
- I can withdraw from the study at any time without discrimination or retaliation, and my rights will not suffer any loss.
- If I have more questions or concerns about this research, I can contact with **Dr. Minghui Zou**.

I agree that the investigator and the ethics committee could review my research materials.

I will receive a copy of this form with my signature and the date.

Finally, I decide to agree to participate in this study, and promise to do my best to follow the instructions from the doctor and the investigator.

Name of participant: _____ Telephone: _____ Date: _____

I confirm that the details of this study have been stated to the participant, including his/her power, potential benefits and risks. The participant has been given opportunities to put questions about the study, and all the questions have been answered accurately. I confirm that the participant was not coerced into giving consent, and a copy of this form has been provided to him/her.

Name of Doctor: _____ Date: _____