

# Investigating the levels of extrachromosomal circular DNA in serum of newly diagnosed type 2 diabetes mellitus patients

<b>Submission date</b> 07/12/2020	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered
		<input type="checkbox"/> Protocol
<b>Registration date</b> 21/12/2020	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan
		<input checked="" type="checkbox"/> Results
<b>Last Edited</b> 21/01/2025	<b>Condition category</b> Nutritional, Metabolic, Endocrine	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Extrachromosomal circular DNA (eccDNA) has long been known to form from proto-oncogenes which are normal genes present in the human genome which, when altered by mutation, can become a gene that can contribute to cancer (an oncogene). The formation of eccDNA has also been linked to aging.

The levels of eccDNA circulating in the body outside of cells in type 2 diabetes patients have not previously been investigated. The aim of this study is to assess the levels of serum of eccDNA in newly diagnosed type 2 diabetes patients.

### Who can participate?

Newly diagnosed type 2 diabetes patients and healthy volunteers.

### What does the study involve?

Participants will provide blood samples which will be tested to find eccDNA that are present at high or low levels in newly diagnosed type 2 diabetes.

### What are the possible benefits and risks of participating?

There is no direct benefit to the participant by taking part in this study. Data collected may be used to support future clinical studies in this population.

There are no risks of participating in this study. Participants will receive treatment for their illness that follows the National Chinese guidelines for treating this type of illness.

### Where is the study run from?

The First Affiliated Hospital of Wannan Medical College, Yijishan Hospital (China)

### When is the study starting and how long is it expected to run for?

From May 2020 to May 2021

Who is funding the study?

The National Natural Science Foundation of China (China) and "Peak" Training Program for Scientific Research of Yijishan Hospital, Wannan Medical College (China)

Who is the main contact?

Prof. Xiang Kong

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## Contact information

### Type(s)

Scientific

### Contact name

Prof Xiang Kong

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## Additional identifiers

### EudraCT/CTIS number

Nil known

### IRAS number

### ClinicalTrials.gov number

Nil known

### Secondary identifying numbers

Nil known

## Study information

### Scientific Title

Pilot study to assess abnormal expression of serum extrachromosomal circular DNA between newly diagnosed type 2 diabetes mellitus patients and healthy participants.

### Study objectives

To determine the abnormal expression of cell-free circulating extrachromosomal circular DNA in newly diagnosed type 2 diabetes mellitus patients.

### **Ethics approval required**

Old ethics approval format

### **Ethics approval(s)**

Approved 20/07/2020, Scientific Research and New Technology Ethics Committee of Wannan Medical College Yijishan Hospital (2 Zheshanxi Rd, Wuhu, 241001, China; +86 (0)5535939912; lvkun315@126.com), ref: 2020022

### **Study design**

Observational study of cases and controls

### **Primary study design**

Observational

### **Secondary study design**

Case-control study

### **Study setting(s)**

Hospital

### **Study type(s)**

Diagnostic

### **Participant information sheet**

No participant information sheet available

### **Health condition(s) or problem(s) studied**

Type 2 diabetes mellitus

### **Interventions**

Peripheral blood samples will be collected from newly diagnosed type 2 diabetes mellitus patients and healthy participants. Serum DNA extractions were performed using QIAamp Circulating Nucleic Acid Kit (Qiagen). For elimination of linear DNA and enrichment of eccDNA, 25 ng of plasma/serum DNA will be treated with 5 units of Plasmid-Safe ATP-dependent DNase (Epicentre) in a 50 µl reaction system at 37°C for 5 min, followed by column purification using MinElute Reaction Cleanup Kit (Qiagen). EccDNA enriched from 25 ng of plasma/serum DNA will be processed using Nextera XT DNA Library Preparation Kit (Illumina). DNA libraries will be sequenced on Illumina NovaSeq 6000 with 150 bp paired end mode according to the manufacturer's instructions. Real-time PCR will be used to verify the differentially expressed eccDNA candidates. The correlation between the differentially expressed eccDNA and other clinical factors will also be evaluated.

### **Intervention Type**

Other

### **Primary outcome measure**

1. Serum eccDNA levels in peripheral blood samples of newly diagnosed type 2 diabetes mellitus patients measured using high throughput sequencing at the time of data collection

### **Secondary outcome measures**

1. Clinical factors associated with the differentially expressed eccDNA measured using patient records at the time of data collection

### **Overall study start date**

01/05/2020

### **Completion date**

01/07/2021

## **Eligibility**

### **Key inclusion criteria**

1. Type 2 diabetes mellitus diagnosed according to the 1999 World Health Organization diagnostic criteria

### **Participant type(s)**

All

### **Age group**

Adult

### **Sex**

Both

### **Target number of participants**

30 newly diagnosed type 2 diabetes mellitus patients and 12 healthy volunteers

### **Total final enrolment**

146

### **Key exclusion criteria**

1. No clinical evidence of severe kidney or liver diseases, chronic viral or bacterial infection, inflammatory diseases, tumors, or diabetic ketoacidosis

### **Date of first enrolment**

21/07/2020

### **Date of final enrolment**

01/03/2021

## **Locations**

### **Countries of recruitment**

China

**Study participating centre**  
**The First Affiliated Hospital of Wannan Medical College**  
Yijishan Hospital  
2 Zheshanxi Rd  
Wuhu  
China  
241001

## **Sponsor information**

**Organisation**  
Wannan Medical College

**Sponsor details**  
2 Zheshanxi Rd  
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+86 5739912  
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**Sponsor type**  
University/education

**Website**  
<https://www.yjsyy.com/>

**ROR**  
<https://ror.org/037ejjy86>

## **Funder(s)**

**Funder type**  
Government

**Funder Name**  
National Natural Science Foundation of China

**Alternative Name(s)**

Chinese National Science Foundation, Natural Science Foundation of China, National Science Foundation of China, NNSF of China, NSF of China, , National Nature Science Foundation of China, Guójiā Zìrán Kēxué Jījīn Wěiyuánhui, NSFC, NNSF, NNSFC

### **Funding Body Type**

Government organisation

### **Funding Body Subtype**

National government

### **Location**

China

### **Funder Name**

'Peak' Training Program for Scientific Research of Yijishan Hospital, Wannan Medical College

## **Results and Publications**

### **Publication and dissemination plan**

Planned publication in a high-impact peer-reviewed journal

### **Intention to publish date**

01/06/2021

### **Individual participant data (IPD) sharing plan**

The datasets generated and/or analysed during the current study during this study will be included in the subsequent results publication.

### **IPD sharing plan summary**

Other

### **Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		12/01/2024	21/01/2025	Yes	No