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# Predictors of The Gut Microbiome In The Development of Hypertension In Patients With Insulin Resistance

Cardiovascular diseases are the leading cause of mortality worldwide. Numerous clinical and experimental data indicate the important role of the gut microbiota as an independent factor in blood pressure regulation.

## Aim

To assess the relationship between the gut microbiome and arterial hypertension (AH) in patients with insulin resistance in the Kazakh population.

## Materials and Methods

The study group included 199 individuals with insulin resistance, among whom 103 patients had hypertension. The average duration of hypertension was about 6 years, with a mean age of 49.4±6.9 years, a body mass index of 27±4.8 kg/m$^2$, and 50% of patients having an increased waist circumference. Obesity was observed in 27 individuals, and 29% of the participants were smokers.

## Research Materials and Methods

Total DNA was extracted from 250.0 mg of homogenized wet fecal sample using the PureLink™ Microbiome DNA Purification Kit (ThermoFisher Scientific, USA) according to the manufacturer's instructions. 16S rRNA gene sequencing was performed using the Ion GeneStudio S5 Plus.

## Research Results

Patients with insulin resistance and hypertension showed a decrease in bacterial diversity. Significant differences were observed for several bacteria phylum Bacteroidetes and Firmicutes. The Bacteroidetes was represented by species such as dorei ($p \leq 0.05$), massiliensis ($p \leq 0.0005$), and plebeius ($p \leq 0.01$). The Firmicutes included species such as Streptococcus tobetsuensis ($p \leq 0.0008$) and Dialister invisus ($p \leq 0.02$).

The results highlight a possible link between dysbiosis associated with hypertension and the balance of organic acids produced by gut bacteria, which may lead to changes in the composition of metabolites and the induction of inflammatory responses underlying the pathogenesis of many chronic non-communicable diseases.

## Biography

Abildinova Gulshara Zhusupovna was born in 1961 in the Republic of Kazakhstan. Geneticist of the highest category, doctor of medical sciences, professor, head of the laboratory of personalized genomic diagnostics in the hospital of the Presidential Administration of the Republic of Kazakhstan.

Experience of scientific and pedagogical work for 36 years. Published 200 scientific articles, including 65 after the defense of doctoral dissertation, in international editions and recommended by the Higher Attestation Commission of the Republic of Kazakhstan, 5 methodical recommendations, 7 patents and 4 monographs.



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As a chief freelance geneticist of the Ministry of Health of the Republic of Kazakhstan . plays a major role in the improvement of medical and genetic care to the population of the Republic of Kazakhstan, effective implementation of the program of genetic screening of pregnant women and newborns, takes an active part in the system of protection of reproductive health of the population of the Republic of Kazakhstan; contributes to improving the level and quality of medical and genetic knowledge of doctors-geneticists and general practitioners, promotion of medical and genetic consultations.



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