

NEW VANADIUM COMPLEXES IN THE TREATMENT AND PREVENTION OF CIVILIZATION DISEASES



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The subject of the offer are new vanadium complexes with hydrazide-hydrazones as inhibitors of phosphatases and their use in the prevention and treatment of civilization diseases, including e.g. diabetes, cancers, neurodegenerative and cardiovascular diseases.

Civilization diseases are defined as occurring globally, widespread diseases, and affects not only older people or adults, but also teenagers and even children. Treatment of most of them is difficult, slow and also very costly. The civilization diseases are: cardiovascular, respiratory, gastrointestinal, allergic and infectious diseases, diabetes, obesity, cancers and mental health problems. It is estimated that these diseases are the cause of more than 80% of all deaths (according to the *World Health Organization*). Each risk of developing one of the civilization diseases significantly increases the risk of developing another. Therefore it is so important to implement the pro-health politics, promotion of healthy lifestyle and an appropriate **pharmacotherapy**.

Unfortunately, the currently used pharmacological agents are affected by **many disadvantages**, which show the need for continuous search for drugs with greater efficacy and favorable safety profile. One of the possible strategies for development of innovative therapies is the identification of drug candidates that **inhibit the activity of phosphatases**, the **enzymes responsible for the course of many reactions in the body**.



The phosphatases inhibit the activity of many cellular proteins, which is one of the basic regulatory mechanisms of the cells. They influence the regulation of numerous signal transduction pathways that determine basic functions of cells, including metabolism, cells division and their death by apoptosis. These mechanisms are also responsible for the formation, development and the course of many disorders and diseases. Thus, modulation of them may be an effective preventive and therapeutic strategy.

The subject of the offer are new complexes of vanadium (III, IV and V) with hydrazide-hydrazones and their compositions with ligands, that are of potential use in the prevention and treatment of many disorders and diseases. The presented compounds inhibit the activity of different phosphatases, which in consequence leads to several changes in the functioning of the regulatory mechanisms of the cells. The appropriate modification of these processes may provide new approaches to cancer, diabetes, cardiovascular and neurological diseases treatment.

The major advantages of the offered complexes are:

- high-performance method of complexes synthesis, which can be carried out both under anaerobic conditions and in air atmosphere;
- the possibility of use in the prevention and treatment of many disorders and diseases;
- a wide range of potential routes of administration - oral, injectable, subcutaneous and inhalation.

The offered vanadium complexes with hydrazidehydrazones are the subject of a patent application. Further research and development efforts are continued at the Faculty of Chemistry of the Jagiellonian University. Currently the Centre for Innovation, Technology Transfer and University Development (CITTRU) is looking for companies and institutions interested in further development and commercial application of the invention.

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