DESCRIPTION FOR THE GENERAL PUBLIC (ENGLISH)

Proteins are key biological molecules, which play critical role in structure and function from one single cell to whole organism. Proteins are long and complex chain polymers, which are built of amino acids. There are 20 amino acids, which are building blocks of both: plants and animals proteins. Beside 20 "standard" amino acids, many amino acids which do not built protein chains, were identified. Some of them play a crucial role as intermediates in primary metabolism but most of them have other functions such as toxic agents. L-canavaninie (CAN) is one of the non protein amino acids, it is a structural analogue of arginine. CAN is produced only by Fabaceae plants and stored mostly in seeds. Some tropical plants like jack beans are hyper-producers of CAN. Seeds and sprouts of alfalfa are also rich source of this non protein amino acid. CAN is toxic for various groups of organisms from bacteria, through plants, insects to mammals (including human). CAN could be integrate instead arginine in protein structure. CAN-containing proteins lose their biological function.

Plants accumulating CAN are utilized as natural medicines. It is possible that CAN might be used in oncotherapy. CAN inhibits proliferation of cancer cells. What is more, CAN sensitizes tumor cells to chemo- and radiotherapy.

Nitirc oxide (NO) is a small, gaseous signal molecule which regulates growth and development. Moreover, NO plays critical role in response to stresses. NO is product of arginine oxidation. CAN lowers NO biosynthesis in cells. In plants, NO together with auxin (plant hormone) are key molecules involved in controling growth and development of root. Concentration of auxin is crucial to regulation of root system development. Auxin content in cells of roots depends on auxin transport from shoot to root. PIN proteins transport auxin across membrane. We demonstrated that CAN in very low concentration inhibits growth of roots of tomato seedlings roots and do not affect cells viability. In CAN treated roots reduction of NO emission and over-accumulation of auxin was detected.

Aim of the study is to connect CAN negative effect on growth of tomato seedlings roots with differences in cells ultrastructure, proliferation of cells and cell cycle. We are also interested in expression and localization of PIN proteins, which play crucial role in polar auxin transport.

As a material will be used roots of tomato (*Solanum lycopersicum* L. cv Malinowy Ożarowski) seedlings treated with CAN (10 μM, 50 μM), which inhibit root growth in 50 and 100%, respectively. All analysis will be performed after 24 and 72 h of culture

We hypothesize that CAN treatment lead to disturbance in cell division, cell cycle and cellular ultrastructure disorders. The over-accumulation of auxin in the roots of CAN treated seedlings may be due to modification in texpression/or localization of PIN.Auxin

We hope that this study help us to propose model describing **mode of action of CAN in plants**. Furthermore, the model will include how CAN affect cell cycle, cells ultrastructure and transport of auxin - key hormon in growth of cells. **Obtained data also could be helpful in determining CAN properties in oncotherapy.**