

The increase in cancer cases caused the need to seek ways of saving lives of patients. Scientific interest aroused fungal extracts which the Far East for 2000 years are used as alternative components of natural medicine. There are ongoing studies on the antitumor activity and immunomodulatory polysaccharides of fungal origin. Conclusions resulting from the analysis of the research of these compounds are promising, because some isolates derived from the fungus mycelium or fruiting bodies belonging to the type *Basidiomycota*, has been in some countries (not applicable to Polish yet) admitted to treatment as dietary supplements and as a medicine with anticancer activity.

In Japan, in the top ten most frequently used drugs with anticancer remains is leninan - licensed drug antitumor used since 1985 by the Japanese pharmaceutical company Ajinomoto. Lentinan is a highly purified fraction exopolysaccharides, demonstrating a high level of immunomodulatory activity. It was first isolated in 1970 by Chihara from fruiting bodies of *Lentinula edodes* (Shii-take mushroom, shiitake), and today is extracted using the same method. Unfortunately, the time of fruiting culture *L.edodes* is relatively long and complex procedure to isolate affects the low yield and high price obtained pharmaceutical preparation. Antitumor activity has also selenium. The mechanism by which selenium exerts anticancer and immunomodulatory activity differs from *L.edodes* polysaccharide fractions (β -glukans), but a similar pharmacological effects suggests a possible synergism of these two agents. Selenium added to the medium may enhance the immunomodulatory effect of polysaccharides from the medium culture.

The objective of the proposed project is explore the mechanism of incorporation the selenium to structure exopolysaccharides secreted to the medium in submerged culture of the mycelium therapeutic fungus *Lentinula edodes* in liquid medium supplemented with selenate (IV) sodium.

Research carried out in the project should give answers to questions:

- Do incorporation of the selenium to the exopolysaccharides structure affect the immunomodulatory activity, cytotoxic and antioxidant fraction?
- What influences the binding of the receptors of the immune system of the B-glucans?
- If it is possible, that in the future breeding *L.edodes* can contribute to the design of the immunomodulatory drug which would be significantly cheaper and less toxic than today available on the pharmaceutical sector?