

Immunological Studies of the Edible and Medicinal Mushroom *Lentinus edodes* (Berk.) Sing.

Nina A. Bis'ko,¹ M. A. Gulich,² O. D. Olishevskaya,² E. A. Yatchenko,²
Victor T. Bilay,¹ and Nadezhda Yu. Mitropolskaya¹

¹N. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, 2 Tereshchenkivskaya Str., Kiev 01601, Ukraine, and ²Hygiene Center, Academy of Medical Sciences, 50 Popudrenko Str., Kiev 03660, Ukraine

Shiitake [*Lentinus edodes* (Berk.) Sing.] is a popular cultivated edible mushroom with high nutritious value and excellent medicinal properties.

Fruiting bodies of *L. edodes* were grown on a mixture of oak sawdust with wheat bran. Dried fruiting bodies were pounded and added to rat food. Instead of using casein protein in the food, mushroom protein was substituted in the amounts of 5% (group I), 10% (group II), and 25% (group III).

The immunological studies were based on the following tests: the determination of total leukocytes; the leukocytes' formulas; phagocytic activity of neutrophils; absolute and relative quantity of T and B lymphocytes; the reaction of basophile degranulation; and the slowing down of sprawl macrophage.

Results indicate that groups I and II did not show a negative influence on the T-linked immune system. At the end of a 1- and a 3-month period, group III reflected changes in the indices of non-specific resistance, including phagocytic activity and T-system immunity. After 6 months the T-linked immune system indices and the non-specific protection of organism factors in group III were normal. On the other hand, B-system indices were increased in all groups.

The considerable increase of sprawl macrophage, based on serum samples taken from all groups, indicates the stimulation of the lymphocyte-producing ability of T cells by shiitake.

Analysis showed no significant differences in the total amount of leukocytes in the blood of the three groups. However, the phagocytic activity of

neutrophilic granulocytes in group III was considerably increased.

The reaction of basophil degranulation (groups I and II) did not differ from that of the control group. An increase of up to 11.2% in basophil degranulation was noted only in group III.

The data obtained after a 3-month period (in group III) showed a decrease in the amount of neutrophils (lower than that of the control group) and an increase of rosette-producing cells. The level of lymphocytes in the blood of the three groups did not change significantly.

The possibility of a hypersensitivity delayed-type reaction during a test of the slowing down of sprawl macrophage was studied. No increase in T-cell sensitivity was noted in any of the groups—slowing down indices were 1.02–1.24 during a period of 6 months. A 25% dose of shiitake stimulated the increase in the level of sprawl macrophage during this period.

After 3 months of experiments the level of neutrophils in the rat blood of group III significantly decreased to indices below those of the control group. The total amount of active phagocytic neutrophils in groups I and II was also reduced. In this period, T-cell indices in all groups did not differ from those of the control group.

It has been found that the amount of rosette-producing cells increased in group III; however, there was no immediate hypersensitivity reaction.

After 6 months, the investigated indices of nonspecific resistance in all groups were normal. The studies demonstrated that shiitake stimulates B-system immunity in all groups of rats.