

ABSTRACT

Vanadium Pentoxide (V_2O_5) Activity in Preventing Pancreatic β -Cell Damage by Lowering Free Radical Concentration

Cinantya Meyta Sari

Vanadium complexes is expected to inhibit lipid peroxidation, thus can prevent the formation of reactive oxygen species (ROS) and antioxidant imbalance causing cell damage and dysfunction. This experiment is aimed to investigate the V_2O_5 effect on lowering blood glucose and lipid peroxidation products (malondialdehyde) as a protective mechanism in protecting pancreatic β -cell upon free radical.

There were five groups of treatment i.e. placebo, diabetic, and treatment groups with three doses of V_2O_5 (0,5, 1, and 5 mg/kg BW). Diabetic mice model was induced by alloxan intraperitoneally, 150 mg/kg BW in the first day of experiment. Administration of V_2O_5 was given in day 3 to day 10. The pancreatic tissue was taken on day 10, being prepared to determine the concentration of malondialdehyde with TBARS method using spectrophotometry UV-VIS. Diabetic condition occurred on day 3 after alloxan injection and glucose levels increased significantly ($p = 0,001$). Administration of three different doses of V_2O_5 for 7 days significantly reduces blood glucose concentration ($p < 0,05$). The determination of MDA also showed that V_2O_5 has a free radical lowering effect upon pancreatic β -cell, proven by the decreased concentration of MDA in pancreatic β -cell after V_2O_5 administration ($p < 0,05$). On the other hand, pancreatic islets of the diabetic group given V_2O_5 showed significant increase in amount of compiler's cell and islet Langerhans' diameter, indicated that V_2O_5 has a protective effect against free radical.

According to the measurement of blood glucose level, malondialdehyde concentration and histochemical result after 7 days of administration with V_2O_5 , it was concluded that V_2O_5 can significantly reduces blood glucose level and protects pancreatic β cells by inhibiting malondialdehyde formation, thus can be a protective mechanism against free radical in pancreatic β -cell of diabetic mice

Keyword(s) : diabetes mellitus, vanadium pentoxide, alloxan, pancreatic β cell, blood glucose, malondialdehyde, free radical.