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DUANGHATAI CHIRAPATHOMSAKUL : THE EFFECTS OF ARSENIC EXPOSURE ON BLOOD GLUCOSE AND VASCULAR CONTRACTION IN RATS. THESIS ADVISORS : JUTAMAAD SATAYAVIVAD, Ph.D., KRONGTONG YOOVATHAWORN, Ph.D., CHAITIP WANICHANON, Ph.D. 167 p. ISBN 974-663-140-3

The effects of acute and subchronic arsenic administration on blood glucose levels and vascular contractions were investigated in male Wistar rats. Intraperitoneal injection and oral administration of sodium arsenite (As^{3+}), or intraperitoneal injection of sodium arsenate (As^{5+}) showed dose-dependent hyperglycemia in rats, with the highest blood glucose levels within 2 hours. Conversely, oral administration of sodium arsenate (Na_2HAsO_4) resulted in hypoglycemia. As^{5+} 20 mg/kg BW, IP induced hyperglycemia and hyperactivity of isolated descending aorta of rats to norepinephrine which were not inhibited by pretreated rats with vitamin E 100 IU for 3 days. However, pretreatment with insulin 5 U/kg BW, SC attenuated the arsenic, both As^{3+} and As^{5+}, induced hyperglycemia and reduced the hyperresponsiveness of isolated descending aorta of rats to norepinephrine. When the glucose tolerance test was performed prior to sacrifice, isolated descending aorta of arsenic (both As^{3+} and As^{5+})-treated rats showed decrease in responses to norepinephrine. Furthermore, $NaAsO_2$ 7 mg/kg BW, IP could induce pronounced glucose intolerance. These effects could be prevented by prior administration of glyburide, an oral hypoglycemic drug, at the dose of 5 mg/kg, orally.

In the present study, the effect of subchronic exposure to As^{3+} was examined. Sodium arsenite in drinking water at the concentrations of 0.05 ppm and 50 ppm was given to rats *ad libitum*. Three-month exposure to sodium arsenite had no effect on basal blood glucose levels in rats. However, the slightly hypoglycemic effect was observed in rats receiving 0.05 ppm As^{3+} for 3 months. The effect of subchronic exposure to sodium arsenite on the alterations in isolated descending aorta responses to norepinephrine could occur as hyper- or hyposensitivity depending on doses and durations of arsenic exposure. Microscopically, there was a thickening of tunica media in descending aorta and enlargement of pancreatic islets in rats receiving sodium arsenite subchronically. The degree of histological changes was also dependent on dose and duration of arsenic exposure.