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Changes In Brain Tissues In Alloxan-Induced Diabetes

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Abstract: Alloxan using harvest made sugary diabetes model pancreatic β - cells selective destruction and hyperglycemia with This in the model central nerve system, in particular brain tissues, metabolic stress and oxidizing to injury as a sensory organ is studied. This in the article alloxan in diabetes in the brain morphological, biochemical and molecular changes analysis will be done.

Keywords: Brain tissues, oxidizing stress, neuron, alloxan.

Introduction: Sugary diabetes central nerve to the system noticeable impact shows that and cognitive disorders, neuron degeneration and oxidizing stress increase with Alloxan model experimental diabetes in learning wide used because it is hyperglycemia and hypoinsulinemia harvest brain in cells metabolic stress As a result, the brain in tissues oxidative stress, inflammation and neuron of injury complicated mechanisms develops.

METHODS

Experimental developments 30 males weighing 180–210 g in a rat take Alloxan monohydrate in 0.9% NaCl solution prepared, mouth space through sent. From experience before animals known term from food deprived water free Experience Tashkent medicine academy scientific in the laboratory standard under the circumstances done increased.

Brain tissue histological and biochemical analysis for from experience after obtained. Biochemical indicators (oxidative stress markers) standard laboratory methods with measured.

RESULTS

1. Morphological changes

- **Neurons degeneration and apoptosis**: hyperglycemia and as a result of oxidative stress many in quantity neurons damaged.

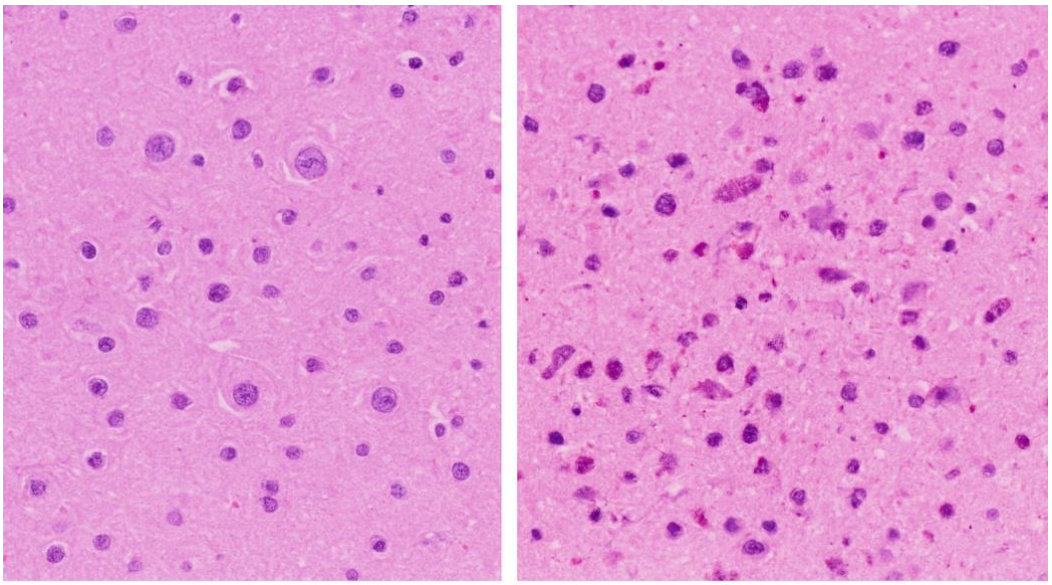

Figure 1. Nerve cells normal on the left and on the right sick in appearance.

Supervision in group: Cell nuclei orderly and one in a way located. Cells normal density between and structure saved.

Alloxan in group: Cells damaged or missing. Nucleus forms steady not, some falling apart gone appears (karyopyknosis and karyorrhexis symbol). Cell density decreased, some in places degeneration or necrosis Alloxan is observed. this on the ground through oxidative stress cells perish did.

Table 1. Oxidative stress markers Increased: malondialdehyde (MDA) levels .

	MDA
Healthy	2.612
Alloxan under the influence	5.616

Table 2. Healthy and sick in the body differences.

Process / Biomarker	Status normally	Alloxan in diabetes	Explanation / Mechanism
β- cells status	Normal	Damaged / reduced	Alloxan selective accordingly β - cells hurts
ROS level	Low / physiological	High	Alloxan H_2O_2 and superoxide harvest does
Lipid peroxidation	Low	High	Membrane lipids oxidizes
Malondialdehyde (MDA)	Low	Increased	Lipid peroxidation last product
NO (nitrogen) oxide)	Physiological at the level	Increased	Oxidative stress and inflammation stimulation
Nitrite / Nitrate	Low / normal	Increased	NO metabolism through harvest will be

Alloxan diabetes brain in tissues hyperglycemia and hypoinsulinemia as a result oxidative stress and inflammation processes strengthens. Neurons and in glial cells to the surface coming morphological injuries central nerve system functional to the disorders take Glutamate and the balance of GAMK violation, as well as apoptosis process activation cognitive and neurophysiological violations This model is central nerve in the system diabetic injury mechanisms study and new therapeutic approaches test for important experimental platform is considered.

CONCLUSION

Alloxan with induction made diabetes central nerve in the system complicated pathological to changes take comes: neuron and in glial cells degeneration, apoptosis, oxidative stress increase, inflammation mediators expression and neurotransmitter balance sheet violation. This changes to diabetes related cognitive disorders and neurodegenerative processes reflection Model brain in the tissues diabetic injuries in learning and therapeutic strategies in evaluation high scientific importance has.

REFERENCES

1. Minossi JG, Lima Fde O, Caramori CA, Hasimoto CN, Ortolan EV, Rodrigues PA, Spadella CT. Alloxan diabetes alters the tensile strength, morphological and morphometric parameters of abdominal wall

healing in rats. // Acta Cir Bras. 2014 Feb;29(2):118-24.

2. Eprintsev AT, Selivanova NV, Moiseenko AV. Vliianie extract Jerusalem artichoke neither functioning malate dehydrogenase in the liver rat price alloxan diabetes [Effect of Jerusalem artichoke extract on the functioning of malate dehydrogenase in the liver of rats with alloxan diabetes]. // Biomed Chem . 2021 Mar;67(2):144-149. Russian.
3. Khazratkulova M. I., Salaeva R. A., Elova N. A. Determination of hypoglycemic effect of strains of lactobacter and alloxan model of hyperglycemia //Fundamentalnaya nauka i klinicheskaya meditsina. - 2021. - S. 197-198.
4. Eprintsev AT, Selivanova NV, Moiseenko AV. Vliianie extract Jerusalem artichoke neither functioning malate dehydrogenase in the liver rat price alloxan diabetes [Effect of Jerusalem artichoke extract on the functioning of malate dehydrogenase in the liver of rats with alloxan diabetes]. // Biomed Chem . 2021 Mar;67(2):144-149. Russian.
5. Ighodaro OM, Adeosun AM, Akinloye OA. Alloxan-induced diabetes, a common model for evaluating the glycemic-control potential of therapeutic compounds and plant extracts in experimental studies. // Medicine (Kaunas). 2017;53(6):365-374.
6. Abuladze K, Khvichia N, Papava M, Pavliashvili N, Turabelidze-Robakidze S, Sanikidze T. [Morphological alterations in the internal organs of rats with alloxan diabetes]. // Georgian Med News. 2021 Dec;(321):131-135. Russian.
7. Shidakov Yu. M., Sharova E. V., Abdumalikova I. A. Morfofunktsionalnaya charakteristicsika of the hypoglycemic rat in experimental hyperglycemia with food sugar // Bulletin of science and practice. - 2020. - T. 6. – no. 5. - S. 89-96.
8. Malikova G. Yu., Juraeva A. A., Tashmatova M. A. Mechanism of hypoglycemic effect of polysaccharides shelkovitsy //Vestnik Permskoy Gosudarstvennoy farmatsevticheskoy akademii. - 2021. - S. 158-162.
9. Shaksufbekova O. M. i dr. Vliyanie gustogo extracta klubney topimnambura sarvat na pokaseteli markersov cytolyticheskogo syndrome pri experimentalnom aloxanovov diabetes u krys //Zdravookranenie Tadjikistana. – 2017. – no. 1. – S. 49-54.