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Effect of prenatal exposure to alcohol on the development of brain vessels in human embryos and fetusesA. Solonsky^{1,*}, T.V. Shushpanova¹, E.G. Solonskaya², N.A. Bokhan³, S.V. Logvinov⁴¹ Mental Health Research Institute- Tomsk National Research Medical Center- Russian Academy of Sciences, Laboratory of Clinical Psychoneuroimmunology and Neurobiology, Tomsk, Russia² Siberian Federal Scientific-Clinical Center, Tomsk, Russia³ Mental Health Research Institute- Tomsk National Research Medical Center – Russian Academy of Sciences, Administration, Tomsk, Russia⁴ Siberian State Medical University, Tomsk, Russia

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Introduction Human embryos are most susceptible to exogenous effects during the first weeks of development.

Aim Study the effects of prenatal alcohol intoxication on morphometric measures of developing vessels in the human embryonic and fetal cerebrum.

Methods Embryos and fetuses (7–12 weeks): 23 obtained from alcoholic women with stage II alcoholism (the experimental group) and 30 from healthy women (the control group). The research involved electron microscopy, computer morphometry, parametric method of variational statistics and Scion software to determine mean vascular cross-sectional area, the relative cross-sectional area of vessels, the number of vessels per unit area, and the perimeter of vessels.

Results From 10 weeks, vessels in the human brain start to differentiate into arteries and veins. At 12 weeks, capillary basal membranes were already clearly visible. We established a series of characteristics distinguishing brain tissues in the experimental group vs. that in controls: mean vessel cross-sectional areas and vessel perimeters were significantly reduced by 11 weeks vs. controls. The tendency persisted at 12 weeks. Relative vessel cross-sectional area in the experimental group was greater than in controls.

Conclusions Maternal alcoholization during pregnancy significantly influences the development of the cerebral circulatory system, manifesting mainly in changes in the vascularization of the growing brain.

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