subcardinal vein. “Ascension” of growing kidneys at the 7th week into abdominal cavity is accompanied by fast pass of sacrocardinal and intersubcardinal anastomosis, mesocardinal veins – longitudinal vein anastomosis, connecting supracardinal (ascendant lumbar) and subcardinal veins, upper (paranephric) and lower (gonadal). Right parts of subcardinal and sacrocardinal sinuses, right lower mesocardinal vein compose IVC. Subcardinal sinus is devided into left renal vein (central part) and retroperitoneal lymphatic sac, sacrocardinal sinus – into left general iliac vein and subaortic sac. Left lower mesocardinal vein is switched off from the blood flow and turns into left lumbar trunks. Abdominal parts of posrcardinal veins are reducted, chest parts become azygos and hemiazygos veins. Chest subcardinal veins are switched off from the blood flow and turn into two thoracic ducts. Thus, IVC is formed in the sub-basin of posrcardinal veins involving hepatic sinusoids in the process of intensive growth of caudate lobe of liver, adrenals and kidneys, displacing mesonephros.

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CONSTRUCTION OF HUMAN CARDIOVASCULAR SYSTEM

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Cardiovascular system is formed as closed circular system of blood vessels with anastomoses and collaterals including lymphatics which are many in peripheral vascular bed. Undirect anastomoses (semishunts) are “connected up” tissues: together they organize metabolism between blood and tissues. Peripheral vascular bed, especially microcirculatory bed (MCB), in functional plan is the hydraulic reductor – the construction for reduction of blood flow (lymphatic bed as supplementary to veins drainage of organs begins in micro-districts of MCB) and blood pressure to level when metabolism between blood and tissues can take place (frequent branching of arteriae and arteriolae) and for constant blood pressure is preserved in MCB (frequent and different anastomoses on different levels of MCB organization). From the point of view cardiovascular system consists of pump (heart) and reductor (microvessels in connection with tissues), between them conduits stretched – pressure (aorta and its branches, venae cavae and their roots – closed system of blood circulation together with heart and MCB) and unpressure (lymphatic bed). Lymphatic bed beginning from its roots in micro-districts of MCB plays role of venous collaterals and develops from it in phylogenesis and ontogenesis by means of reducing of connections with magistral vascular bed (pressure conduit) on gradient of blood pressure. In result lymphatic bed unloads venous bed by means of accumulation of surplus tissue fluid as lymph including large particles and cells which cannot penetrate through thickenning walls of venous capillaries. Their basal membrane cuts off lymphatic collaterals.

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DEVELOPMENT OF CELL BIOMATRITS BASED ON HYALURONIC ACID

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Nowadays there a lot of researches of different organic and inorganic materials are done for the purpose of creating biocompatible matrices, at the base of which cells can be cultivate and transplant (including stem cells). The sphere of use of such materials is rather wide: implants of vitals; transplantation of cells; transdermal or implant systems with the controlled yield of bioactive substances. One of the key problems of creating of bioartificial organs and tissues is development of biodegrade three-dimensional matrices (bearers) for cells at the base of different chemical-biological complexes.

In the capacity of matrix materials there were researched a whole number of synthetic polymers [Robert Lanza,1997], such are polydiaxononones, polylactides, polyglicilids [Spychkyna O.G.,2006; Shved U.A.,2006]; polyethers of bacteriological origin (polymer β-hydrohybutyric acid (polyoxibutyrate, POB), polymer of oxioctanoic acid and two-component copolymer of β-oxi-butyrate and β-oxivalerate (POB-co-POV) [Volova T.G.,2003]. But metabolization of these polymers leads to the formation of acids, which lower cell survival.

Use of natural polysaccharides (chitin and its derivative chitosan) in the capacity of biomatrices in cell technologies demonstrated its low effectiveness.

The most optimal base of cell biomatrix by the dates of many researchers is biopolymer – hyaluronic acid (HUA) [Brown T.J. et al.,1999; Burg KJL et al., 2000; Greco R.M. et al.,1998; Jia C. et al.,1998; Kuzuya M. et al.,2006; Livesey S. et al.,2004].

Hyaluronic acid, briefly (HUA) is long linear polysaccharide, which consists of repetitive disaccharide units N-acetyl-D-glucosamine and D-glucuronic asid. HUA has unique rheological qualities that allow polymer to make viscoelastic gel while its low concentrations. These physicochemical qualities with the biological compatibility and not immune origin of

molecule HUA create the basis for guarantying of cell adherence.

Nowadays in order to receive biomatrices at the base of hyaluronic acid there is used the method of chemical modification (cross-linking) – partial or full esterification of HUA by means of chemical reaction of carboxyl polymer group with the alcohol. According to this technology at the first stage stable ether compounds were received through cross-linking of hydroxyl groups. The second step draws synthesis of ether compounds, which were received by cross-linking through the carboxyl groups, into [Syaobyn Jao, Jane Freither, 2008].

But use of these technology requires special conditions of use of biomatrices and leads to their considerable rise in price.

We have the goal of development of biocompatible cell matrix at the base of polymer of hyaluronic acid with the use of method of holographic photopolymerization.

For prevail there is planning to develop the technology of forming of side cross-link between linear subunits of hyaluronic acid with the help of ultraviolet radiation with the length of wave 246 nanometers, which is received with the help of laser (deep ultraviolet). Such technology will allow to receive the matrix template with the minimal stepping interference 100 nanometers. It is supposed that biomatrix received by this way will have optimal bioengineering qualities for the cell adherence, migration and mitotic activity.

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