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Experience of decellularized diaphragm matrices creation on nonhuman primate model

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The main reason for diaphragm pathology is muscular damage: The congenital or acquired hernia or failure of innervation, eventration of the diaphragm, diaphragmatic paralysis or pacing. Recent advantages in tissue engineering have opened new prospects for the replacement of the skeletal muscle, especially diaphragm. It is also important for tissue engineered muscle to provide a patch of functional skeletal muscle with no atrophy and with a low risk of infection. Several routine surgical techniques have been used for diaphragmatic repair such as synthetic materials and autologous grafts. Unfortunately, these non-absorbable biomaterial patches do not grow with the child and mechanically-mismatching with native tissue also causes many complications. Decellularized xenograft extracellular matrix (ECM) provides an alternative biomaterial in diaphragm tissue repair. In our study we used four male macaques (*Macaca mulatta*) after all ethical requirements. Native diaphragms were used for detergent-enzymatic decellularization for biological scaffolds obtainment. The fresh diaphragms were decellularized by modified agitation detergent-enzymatic method: 4% sodium deoxycholate and bovine pancreatic DNase for two days. Obtained decellularized diaphragm matrix was preserved important biological (removal of cell important cellular components without significantly altering the matrix structure) and biomechanical (axial strength) components. The loss of cells was confirmed by DNA quantification (approximately 60% of the nuclei material was removed from the diaphragm by the decellularization process). Immunohistochemical study demonstrated safety proteins of the ECM. Additional investigations are needed to prove the statement that decellularized non-human primate diaphragm scaffolds provides an alternative source for diaphragmatic tissue reconstruction, which will provide relevant preclinical data regarding for a potential clinical transfer.

Biography

Elena A Gubareva has completed her MD and PhD from Kuban State Medical University in Russia. She works as Laboratory Head in International Research, Clinical and Education Center of Regenerative Medicine in Kuban State Medical University, Russia. She has published more than 80 papers in reputed journals both in Russia and abroad.

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