Nanocomposites and nanomaterials

Electrospray technology for the apatite-biopolimer composite material granulation

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In the modern materiology the phigh emphasis is placed on the biological, physical, and crystal-physical properties of the composite materials based on calcium phosphates, including hydroxilapatite (HA), as the basic material for orthopedics and stomatology. Such materials refer to the third biomaterial generation for which the osteoconductive (the support of ostoforming cells) and osteoinductive (the new bone osteosynthesis stimulation *de novo*) properties are typical.

In the previous researches we've described the biomimetical technology of the spherical HA beads receiving by the ionotropic gelation method with the usage of natural polysaccharide sodium alginate capable of bioresorption [1]. The polymeric envelope formation around the calcium phosphate layer is semipermeable, and it can be removed by annealing if necessary (fig. 1a).

This work is dedicated to the usage of the electrospray technology for receiving of phosphate calcium granulated forms, including HA in the electric field with the voltage of 6kV (fig. 1b). Electrospray or ionization by spraying in the electric field is the method that is used in the mass-spectrometry to receive ions in the gas-phase from the solution. After the high voltage supply on the Taylor cone the redistribution of the charge into the hydrogel drops, that are sprayed, occurs. Drops accelerate and decompose into smally particles on the way to the electrode with the negative charge (fig. 1c).

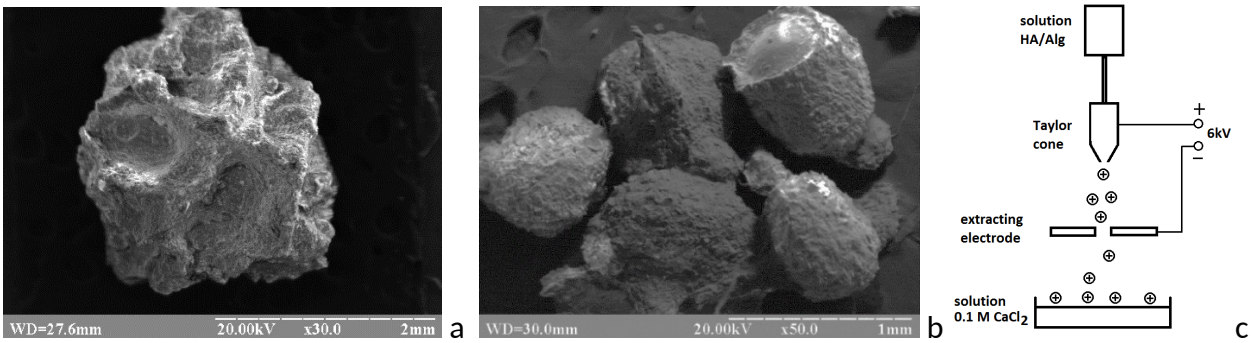

Fig. 1. The morphology of bead surface HA/Alg: biomimetical technology (a), electrospray technology (b), electrospray flow diagram (c)

Applied method gives the possibility to decrease the granulate product dispersion, that in it's turn contributes to the more effective implantation [2]. Created beads can be used as the carrier for drug controlled release by virtue of apatite sorption properties and polymeric semipermeable envelope combination [3,4].

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