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## ORAL PRESENTATION - Bioconjugated nanozeolites labeled with <sup>223,224,225</sup>Ra

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Ra-223, Ra-224 and Ra-225, among others alpha-emitting radionuclides, have attractive properties for use in targeted radionuclide therapy. Unfortunately, Ra<sup>2+</sup> cations like other cations of the II group, forms very weak complexes, therefore labeling of the biomolecules with <sup>223,224,225</sup>Ra is a very difficult task. On the other hand, some zeolites exhibit very high affinity for Ra<sup>2+</sup> cations.

In our studies we propose to use nanozeolite as a carrier for transportation of <sup>223,224,225</sup>Ra radionuclides to the tumor sites. Due to high ion exchange affinity, nanozeolites strongly bind radium cations and additionally, as aluminosilicates, nanozeolites could be easily attach to biomolecules by silanol-amine/carboxyl linkers.

Nanozeolite of type A (20-70 nm diameter) were synthesized by hydrothermal method. Next, the surface of the nanozeolites was modified by attaching polyethylene glycol (500 - 600 daltons) containing silanol group on the one end and active ester on the second end. The obtained samples were examined for encapsulation of <sup>224</sup>Ra and <sup>225</sup>Ra (milked from <sup>228</sup>Th/<sup>224</sup>Ra and <sup>229</sup>Th/<sup>225</sup>Ra generators). The stability of radiolabeled nanozeolites were examined in 0.9% NaCl, 0.02 M PBS, 0.001 M cysteine and glutathione and human serum. In the case of <sup>224</sup>Ra, about 2% of gamma-radioactivity was found in the solution, which has been attributed to <sup>212</sup>Pb - the decay product of <sup>224</sup>Ra, while, in the case of <sup>225</sup>Ra even above 15% of activity was found in the solution. The activity has been ascribed to <sup>225</sup>Ac and <sup>213</sup>Bi - the decay products of <sup>225</sup>Ra. In the next steps we plan to stabilize <sup>225</sup>Ra and all daughter radionuclides in nanozeolite structure. After that, the conjugation of the modified nanozeolites with two vector peptides –octreotide and substance P will be made.

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