

Pseudocolloid formation of Uranium with soluble surface glycoprotein of Paramecium

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Roles of microbes on environmental migration of radionuclides have received intense attention because microbial transformation of chemical forms of radionuclides is different from abiotic one. Bacteria and fungi have been the subjects for this research. Although protozoa are key members of microbial communities in aquatic ecosystems, little is known about roles of protozoa. This study reports interaction of aqueous inorganic U(VI) with *Paramecium*, a representative single celled protozoan. This study tested *Paramecium* cells of two kinds of states, living cells and prekilled cells. Prekilled cells were prepared using a fixative. After 24 h exposure of *Paramecium* cells to an inorganic U(VI) aqueous solution, micro-PIXE analysis did not detect U in the living cells, while U was clearly detected throughout the prekilled cells. SEC-UV-Vis-ICPMS analysis for the aqueous phases collected after the living cell experiments revealed that a fraction of the U in the aqueous phase bound to large (ca. 25 kDa) biomolecules of *Paramecium* origin and formed pseudocolloid. The biomolecules contained sugar chains and were released from *Paramecium* cells regardless of the presence of U. These characteristics are consistent with the characteristics of the soluble glycoproteins covering surfaces of *Paramecium* cells. These results clearly show that *Paramecium* cells transform the chemical form of aqueous U(VI) species from inorganic one to organic pseudocolloid and suggest that the soluble surface glycoproteins reduce the adsorption of U on living *Paramecium* cells.