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Gold nanoparticle-peptide conjugates for biomedical applications

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Curriculum Vitae

Elena Aleksandrovna Egorova was born on May 28th 1989, in Serpukhov, Russia. She graduated from a high school in Serpukhov 2006 and entered Moscow State Academy of Fine Chemical Technology named after M.V. Lomonosov the same year. In 2010 Elena received a bachelor degree in chemistry. Two years later, she graduated from the Academy with a master degree in chemistry with specialization in polymer chemistry. Her master project was shared between the Academy and the Moscow State University, where Elena was conducting Reversible addition-fragmentation chain transfer (RAFT)-polymerization experiments under supervision of Prof. dr. Elena Chernikova. Her master's thesis was devoted to development of magneto-responsive hydrogels combining superparamagnetic properties of magnetite nanoparticles and biocompatible polymers. This work was reflected in two published papers.

From 2012 until 2016 Elena worked as a Junior Researcher at Institute of Biomedical Chemistry (IBMC), Moscow, Russia under supervision of Prof. dr. Ekaterina Kolesanova. There she was introduced to the field of peptide and protein chemistry, immunology and proteomics. Elena's main project focused on development of an epitope-based anti-hepatitis C virus (HCV) vaccine. The time at IBMC brought her two publications and a best poster prize at the International St. Petersburg Immunology Forum, 2015, Russia.

In 2016 Elena was granted a Global Education scholarship, a National Russian scholarship, which allowed Elena to start as a PhD candidate at the Supramolecular and Biomaterial Chemistry group of the Leiden Institute of Chemistry under supervision of Prof. dr. Alexander Kros in October of the same year. Her work was dedicated to expanding the use of gold

nanoparticles in biomedical applications *via* peptidic modification thereof. By virtue of collaborations with LACDR and CML (in the person of Bram Slütter, Gert Gooris, Joke Bouwstra, Redmar Vlieg, John van Noort and Fazel Abdolurphur Monikh) her thesis became a multi-disciplinary piece. Furthermore, four experimental chapters of this thesis were either published or submitted as scientific publications. During her stay at Leiden, she supervised five students and reported her work at several conferences:

Chains 2016

Dutch Polymer Days 2017

Dutch BioPhysics Days 2017

Chains 2017

Dutch Peptide Symposium 2018

European Peptide Symposium 2018

Chains 2018

GRC Meeting on Self-assembly and Supramolecular Chemistry 2019

Chains 2019

Chains 2020 (oral presentation)

List of Publications

1. Elena A. Egorova, Mark M. J. van Rijt, Nico Sommerdijk, Gert S. Gooris, Joke A. Bouwstra, Aimee L. Boyle, Alexander Kros, One peptide for them all: gold nanoparticles of different sizes are stabilized by a common peptide amphiphile. *ACS Nano*, **2020**, *14* (5), 5874-5886. doi.org/10.1021/acsnano.0c01021
2. Elena A. Egorova, Gert S. Gooris, Joke A. Bouwstra, Aimee L. Boyle, Alexander Kros, Self-assembly of conventional *versus* thiolated peptide amphiphiles, submitted
3. Elena A. Egorova, R. Vlieg, G. Arias Alpizar, J. van Noort, Gert S. Gooris, Joke A. Bouwstra, Aimee L. Boyle, Alexander Kros, Peptide amphiphile-stabilized gold nanorods for applications in two-photon microscopy, submitted
4. Elena A. Egorova, Gerda E. M. Lammers, Fazel A. Monikh, Bram A. Slütter, Aimee L. Boyle, Alexander Kros, Gold nanoparticles decorated with ovalbumin-derived epitopes: effect of shape and size on T-cell immune responses, in preparation

Publications issued before 2016:

5. E. Kolesanova, B. Sobolev, A. Moysa, E. Egorova, A. Archakov, Way to the peptide vaccine against hepatitis C. *Biochem Moscow Suppl. Ser. B*, **2015**, *61* (2), 254-264. doi.org/10.1134/S1990750815030026
6. V.F. Shalak, A.A. Vislovukh, O.V. Novosylina, A.I. Khoruzhenko, M.I. Kovalenko, E.F. Kolesanova, E.A. Egorova, A.A. Mishin, M.S. Krotevych, L.V. Skoroda, B.S. Negrutskii, Characterization of novel peptide-specific antibodies against the translation elongation factor eEF1A2 and their application for cancer research, *Biopolymers and Cell*, **2014**, *30*, 454-461. doi.org/10.7124/bc.0008C0
7. I. V. Bakeeva, E. A. Egorova, V. P. Zubov, N.S. Perov, I.V. Dementsova, E. V. Chernikova, Magnetosensitive organic-inorganic hybrid hydrogels. *Polymer Science Series B*, **2014**, *56* (3), 384-392. doi.org/10.1134/S1560090414030038
8. E. A. Egorova, V. P. Zubov, I. V. Bakeeva, E. V. Chernikova, E. A. Litmanovich, Controlled synthesis of oligomeric poly(acrylic acid) and its behavior in aqueous solutions. *Polymer Science Series A*, **2013**, *55* (9), 519-525. doi.org/10.1134/S0965545X13080026