Bioaffinity Assay Technology Research

Principal Investigator(s) and affiliation(s), contact information

Tero Soukka, Ph.D.,
Professor in Biotechnology
University of Turku
Department of Biochemistry/Biotechnology
Tykistökatu 6A 6. krs, 20520 TURKU
Phone: +358 2 333 8685
E-mail: tero.soukka@utu.fi

Members of the research group

Doctoral candidates:
Satu Lahtinen, M.Sc.
Susanne Lahdenperä, M.Sc.
Post-doc:
Henna Päkkilä, Ph.D.
Qi Wang, Ph.D.
Ari Lehmusvuori, Ph.D.
Technician:
Jaana Rosenberg, M.Sc.
Niina Perälä, M.Sc.
Annika Lyytikäinen, M.Sc. (tech)

Description of the scientific aims

Research aim is to respond to the modern challenges set for the assay methods employed in the in vitro diagnostics and to support development of platform technologies for next generation diagnostics. We have directed the research to novel label technologies and assay formats applicable in diagnostic assays, especially to study of properties and utilization of (i) long-lifetime luminescent lanthanide complexes, (ii) anti-Stokes photoluminescent inorganic lanthanide-doped nanomaterials (photon upconverting nanophosphors), (iii) analyte-triggered lanthanide-chelate complementation, and (iv) near-infrared excitation of visible luminescent molecular complexes.

Selected publications 2010-

1. Riikka Arppe, Iko Hyppänen, Niina Perälä, Riikka Peltomaa, Martin Kaiser, Christian Würth, Simon Christ, Ute Resch-Genger, Michael Schäferling and Tero Soukka (2015) Quenching of the upconversion luminescence of $NaYF_4$:Yb^{3+},Er^{3+} and $NaYF_4$:Yb^{3+},Tm^{3+} nanophosphors by water: the role of the sensitizer Yb^{3+} in non-radiative relaxation. *Nanoscale* 7: 11746-57, 2015.
2. Robert Meier, Johann Simbürger, Tero Soukka and Michael Schäferling. A FRET based pH probe with broad working range applicable to referenced ratiometric dual wavelength and luminescence lifetime read out. *Chem. Commun.* 51: 6145-6148, 2015.
3. Ari Lehmusvuori, Minna Soikkeli, Emilia Tuunainen, Titta Seppä, Anni Spangar, Kaisu Rantakokko-Jalava, Piia von Lode, Ulla Karhunen, Tero Soukka and Saara Wittfooth. Ready to use dry-reagent PCR assays for the four common bacterial pathogens using switchable lanthanide luminescence probe system. *J. Microbiol. Meth.* 118: 64-69, 2015.
4. Iko Hyppänen, Satu Lahtinen, Timo Ääritalo, Joonas Mäkelä, Jouko Kankare and Tero Soukka. Photon upconversion in a molecular lanthanide complex in anhydrous solution at room temperature. *ACS Photonics*, 1: 394–397, 2014.
5. Minna Ylihärsilä, Emilia Harju, Riikka Arppe, Liisa Hattara, Jorma Hölsä, Petri Saviranta, Tero Soukka, and Matti Waris. Genotyping of clinically relevant human adenoviruses by array-in-well hybridization assay. *Clin. Microbiol. Infect.* 19: 551–557, 2013.