



Seminars in Biotechnology BTEC 591 & BTEC 691

“Green Functional Polymers and Nanomaterials for Biomedical Applications”



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13:30

Biotechnology Institute Amphitheatre-1

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Pinar Çakır Hatır is currently working as an associate professor at İstinye University in the Department of Biomedical Engineering. She graduated from Boğaziçi University with B.Sc. degree in Chemistry in 2004. After that, she finished her M.Sc. programme at Bogazici University. She received her Ph.D. in Biotechnology from Sorbonne Universities, University of Technology of Compiègne, France in 2012. During her Ph.D. she worked on the topic of “Molecularly imprinted polymer nanostructures”. Additionally, she worked for the EU research networks IRMED and NASCENT as an early-stage researcher. She returned to Turkey after receiving her Ph.D. and spent over a year working as a project manager at Sampaş Nanotechnology, where she was involved in 5 FP7 projects (PCATDES, Mu-Tool, EFFESUS, Tex-Shield, S-Varnish). She has participated as a researcher and coordinator in various national and international research projects since 2013. Currently, she is conducting the TÜBİTAK 3501 project titled “Development of targeted nanocarriers for CRISPR/Cas9 system using renewable resources”. Recently, she completed an EuroNanoMed project under Horizon 2020 titled “Nanofabricated nanocomposite nanobioactive and nanofunctional replacements of tympanic membrane as advanced drug delivery and regenerative platforms (4NanoEARDRUM)”. She also serves as one of the two members of the management committees for the COST Actions CA16215, CA21121, and CA21164 and as the working group members for the COST Actions CA21113 and CA21145. She received MSCA Seal of Excellence Award for her proposal in 2019 (Score: 88.40%). Her research focuses on developing environmentally friendly synthesis methods for polymer biomaterials, green nanomaterials, molecular imprinting, functional polymers, smart hydrogels, micro/nanostructured materials for biomedical applications.

Abstract

Green chemistry aims to increase efficiency while reducing risks to human health and the environment during the chemical production process. Utilizing biobased renewable resources to produce energy-efficient functional polymers and nanomaterials for biomedical applications is a desirable and environmentally acceptable solution. Specific functional monomers are needed to develop biocompatible functional polymers and nanobiomaterials. Castor oil is one of the potential biobased raw materials, because it is a long-chained unsaturated fatty acid with a hydroxyl group that allows for chemical modification. Thus, various monomers and polymers can be designed from castor oil.

Molecularly imprinted polymers (MIPs) are bioinspired synthetic materials with specific recognition properties for target molecules. They are considered an alternative to antibodies and are characterized by higher chemical and physical stability, better availability, and lower cost. Due to the specific recognition characteristics, MIP-based biomimetic systems can successfully be employed in sensing, catalysis, and separation, including chromatography, pseudo-immunoassays, and drug delivery. Nanogels are three-dimensional crosslinked polymer networks on the sub-micron scale. They can be designed with several functionalities and implemented into industrial applications. Nanogels with unique recognition characteristics can be considered valuable for sensing, bioseparation, and drug delivery systems. This talk aims to highlight significant aspects of developing of novel bioinspired functional polymers and nanomaterials for biomedical applications using renewable resources, as well as their environmentally friendly manufacturing processes.