



BTEC 591 & BTEC 691 Seminars *

“Comparative Plasma Membrane Protein Analysis Utilizing TurboID: Harnessing the Power of a Superactive Biotin Ligase Enzyme”



Prof. Dr. Murat KASAP

Kocaeli University Medical School

Department of Medical Biology and Genetics

Protein Research and Proteomics Lab

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13:30

Biotechnology Institute Amphitheatre-1

*** These seminar series are offered conjointly with the GTU 110 course for the entire Gebze Technical University community.**

Abstract

In this study, our objective was to identify candidate cell surface biomarker proteins in breast cancer cell lines, MCF-7 and MDA-MB 231 and a healthy breast cell line, MCF-10A. To achieve this, we employed a novel enzymatic biotinylation approach, opting for TurboID—a promiscuous biotin ligase—over the commonly-used chemical biotinylation approach to mitigate potential off-target effects on cell metabolism. To begin, TurboID was produced in *Escherichia coli* and subsequently purified to homogeneity. Following purification, the enzyme was introduced into the cell culture medium, facilitating the biotinylation of cell surface proteins (CSPs), cell junction proteins and as well as proteins secreted into the medium. The biotin-labeled proteins were then enriched using streptavidin-coated magnetic beads and subjected to analysis via nHPLC nLC-MS/MS. A total of 194 differentially regulated proteins were identified, some of which have not been previously associated with breast cancer in the literature. These proteins were categorized based on their relative abundance in cancerous versus healthy breast cell lines. Notably, several of these proteins were not only linked to cancer but also implicated in metastatic processes.

Murat KASAP

Dr. Murat Kasap earned his BSc degree from Istanbul Technical University in the Department of Chemistry. He further pursued his academic journey with Master's and Ph.D. studies in the Department of Biochemistry at Virginia Tech, USA. Following the completion of his Ph.D., he conducted postdoctoral research in cell biology at the University of Arkansas Medical School. Returning to Kocaeli University, Dr. Kasap joined the faculty and began contributing to the Department of Medical Biology. Recognized for his expertise, he was awarded Associate Professorship both in the fields of Biochemistry and Medical Biology, by YÖK. In 2016, Dr. Kasap was appointed as a full-time professor in the Department of Medical Biology at Kocaeli University. Since 2007, Dr. Kasap has been working in the field of Proteomics. He set up a Proteomics Laboratory at Kocaeli University, specializing in 2DE- and LC-MS/MS-based proteomic studies. Dr. Kasap's research interests span Neurobiology and Cancer, leading to the publication of over 60 SCI-based articles. In 2022, he received the prestigious Dr. Clubs award in the field of biotechnology, as a testament to his significant contributions. Dr. Kasap continues to be an active researcher, passionately advancing the field of proteomics.