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Toxicity Assessment of Wastewater by Proteomics Analysis

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The effects of effluent from a wastewater treatment plant (EWWTP) on intestinal epithelial Caco-2 cells, a human intestinal epithelial cell line derived from a human colon carcinoma, were investigated. Previous studies have shown that the wastewater constituents nonylphenol and lipopolysaccharide (LPS) induce the overexpression of specific proteins (galectin-3, glutathione S-transferase A2 subunit, peroxiredoxin-1, and heat shock protein 90, beta (HSP90b)). In this study, the first screening of EWWTP was carried out using the HSP47-transformed cell assay, which is a highly sensitive toxicity assay. From the results of proteomics analysis of human intestinal Caco-2 cells treated with EWWTP, we found the overexpression of specific proteins, namely, elongation factor 1β and enolase 1. These results suggest that specific proteins can be used as biomarkers for the risk assessment of water and wastewater.