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IMPACT OF COCAINE ON GASTROINTESTINAL BARRIER INTEGRITY

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Cocaine (COC) is the most widely used drugs worldwide, and its widespread presence in aquatic environments highlights its emerging role as an environmental contaminant. Beyond its well-known effects on the central nervous system - where it inhibits dopamine reuptake, increasing extracellular dopamine levels - recent studies suggest its involvement in the "leaky gut" phenomenon associated with various gastrointestinal disorders. This study evaluated the effects of COC on cell homeostasis in a non-tumoral colon epithelial cell line (CCD841) and a human colorectal adenocarcinoma cell line (Caco-2), aiming to compare their respective responses. Cells were exposed to three concentrations of COC, corresponding to environmental, recreational, and toxic levels. MTT and Crystal Violet assays were performed to assess the relationship between cell metabolism and proliferation. Reactive oxygen species (ROS) production was evaluated using the DCF assay. To confirm the COC capability to promote the leaky gut, intestinal barrier integrity was analyzed by immunofluorescence targeting adherens and tight junctions, combined with computational analysis to compare treated and control cells. Our preliminary data showed that COC acts even at low doses, disrupting cellular homeostasis in both cell types, although with distinct effects. In CCD841 cells, proliferation decreased at all concentrations tested. In contrast, Caco-2 cells showed increased proliferation, inversely related to COC concentration. Overall, these findings suggest that COC alters cellular homeostasis and intestinal barrier integrity in a non-monotonic manner, supporting its potential role as a harmful environmental contaminant even at low exposure levels.