How Do Gastrointestinal Microorganisms React with 5-fu?

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Chemotherapy is an effective, yet destructive way to treat most cancers. Mucositis, characterized by the ulceration of mucosal membranes, is a common negative side-effect of gastrointestinal (GI) cancer treatments. The exact cause of mucositis is unknown, but research shows it is likely due to the damage of epithelial cells and bacterial disruption. To observe the disturbance of bacterial growth in vitro, a chemotherapy drug, 5-fluorouracil (5-fu), was administered to Escherichia coli Strain K12 and Enterococcus faecalis, two universal gut bacteria. Reproductive behavior was noted over 24 h by measuring optical density. Higher doses of 5-fu decreased reproductive rates of E. coli and E. faecalis, while lower concentrations had minimal effect. Finally, 18 Minimal Inhibitory Concentration (MIC) Panels were loaded with E. coli and E. faecalis that were either untreated or treated with 950 µg/ml of 5-fu, or 120 µg/ml of 5-fu. They were incubated for 24 h, then read. The results showed that there are instances where a MIC value can be drastically decreased when chemotherapeutic agent is present in the sample. This study demonstrated the cytotoxic effects of 5-fu and proves that 5-fu can cause greater bacterial susceptibility of antimicrobial agents.

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