



## Research Highlight

# ADMINISTRATION OF 5-FLUOROURACIL CAN LEAD TOWARDS MUCOSAL DAMAGE

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The 5-fluorouracil (5-FU) (Brand name: Adrucil) is an anti-metabolite drug which is widely used for the treatment of various cancers<sup>1</sup>. Fluorouracil was first developed by Heidelberger and coworkers in 1957 and it came into medical use in 1962. The 5-fluorouracil inhibits the thymidylate synthase enzyme which results in lowering production of pyrimidine thymidine and thus stopping the production of DNA<sup>2</sup>.

5-FU is considered as one of the most effective medicines and hence it is listed in World Health Organization's (WHO) List of Essential Medicines. However, it possesses mucotoxic effect as it can cause mucosal damage. The mucositis is an inflammatory and ulcerative lesions of any part of the gastrointestinal tract that results into a variety of symptoms that negatively affect patient's quality of life as well as capability to tolerate chemotherapy. Common side effects of 5-FU includes: mouth sores, inflammation of the mouth, severe throat pain, throat infection, watery eyes, nausea and possible occasional vomiting, low blood counts (RBC, WBC and platelets decrease temporarily), dysphagia, abdominal pain and diarrhoea<sup>3</sup>.

A new study was conducted in order to evaluate the light as well as electron

microscopic aspects of 5-fluorouracil induced cytotoxicity on the small intestinal mucosa. For this purpose, scientists selected 16 adult male albino rats and categorized them into 2 groups; control and FU groups. Control group rats were injected intraperitoneally with phosphate-buffered saline (PBS) which is equivalent to the 5-fluorouracil dose.

On the other hand, FU group rats were injected with a single intraperitoneal dose of 5-fluorouracil (150 mg kg<sup>-1</sup>). This group was further subdivided into two subgroups (FU3 and FU9). Four rats from each subgroup which were injected with 5-FU were killed at 3rd and 9th day. Scientists then obtained the specimens from the jejunum. These specimens were later processed for transmission electron microscopic study<sup>4</sup>.

During this experiment, ultra structural degenerative alterations were observed in rats. These changes were in the form of loss of microvilli, several lysosomes, cytoplasmic vacuolations, dilated and vesiculated rER, degranulated goblet cells as well as swollen mitochondria with disintegrated cristae.

However, these changes got recovered and restoration of the normal structure was also noticed in FU9 group with only few residual ultra structural changes.

### Key words:

Fluoropyrimidine 5-fluorouracil

anti-metabolite drug

chemotherapeutic agent

mucotoxic effect

transmission electron microscopy

It is concluded that 5-FU leads towards marked histological as well as ultra structural degenerative changes in rat small intestinal mucosa, most of which gets recovered in 9 days after 5-FU injection.

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