

### **CS 3.**

## **EFFECTS OF EXPERIMENTAL IRRADIATION ON STROMAL VESSELS**

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Radiation damages both normal and abnormal tissues. Radiation therapy for malignant disease therefore, produce side effects as a necessity. Signs such as altered bowel activity and dry mouth are two common side effects of irradiation treatment and if severe may interfere with the treatment schedule. The severity of these signs is variable and subjective and is largely due to damage to the intestines and salivary glands. The exact mechanisms underlying the causation of the signs are not understood fully. Early experimental studies attributed these effects to cytotoxic injury caused by irradiation. However, subsequent studies addressing functional impairments have shown that the structures in the stroma such as blood vessels and nerves also contribute to the development of undesirable side effects. This study therefore, aims to investigate the effect of irradiation on the structure of the stromal blood vessels, of the small intestine and the salivary glands. Techniques of light microscopy, scanning electron microscopy and transmission electron microscopy will be used for structural observations.

**Methodology:** Three groups of BALB C male mice, group 1 -- control, group 2 -- sham control and group 3 -- experimental. Groups 1 and 2 had 24 mice, group 3 had 36 mice, each weighing 30 grams. Twenty-four mice from group 3 were exposed to a single dose of 15 Gray, whole body gamma irradiation. The remaining twelve mice were exposed to a single dose of 15 Gray gamma radiation to the head and neck region. The radiation was delivered from mega volt, Cobalt 60, radiotherapy unit. The mice were killed 18 hours and 72 hours after the radiation exposure. The jejunum was removed from twelve out of the twenty-four mice exposed to whole body irradiation. The tissue was then processed for resin histology and ultrastructure. The remaining twelve mice were injected with Mercox resin to obtain vascular casts. The casts were processed for scanning electron microscopy. The submandibular salivary glands were dissected out from mice exposed to head and neck irradiation. These tissues were also processed for resin histology and ultrastructure.

Light microscopy of both jejunum and submandibular salivary glands, showed dilated blood vessels. Endothelial cells were granular and their orientation appeared disordered. The severity of damage increased with advancement of time. Ultrastructural observations confirmed endothelial damage. The jejunal resin casts also showed capillary dilatation in the irradiated samples. The capillary architecture followed structural changes of the overlying villus.

This study confirms, that the stromal blood vessels are dilated after irradiation. Vascular endothelial cells are also damaged.