

# Effect of Alcoholism on the Aggravation of Colon Cancer

## Background

Alcoholism has become a threat to global health issues. The National Institute of Alcohol Abuse and Alcoholism (NIAAA) attributes more than 200 human diseases, including cancer, to alcohol consumption [1].

This study examines the effect of alcohol consumption in colon cancer progression via conventional bright field microscopy. This study, conducted using mice models, shows that alcoholism enhances the aggravation rate of colon cancer by increasing the micron scale fluctuations in the structural rearrangement.

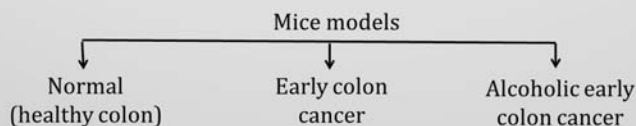
➤ **Alcoholism** is a cancer causing behavior for different body sites. It causes the deficiency of a special type of vitamin B, folate. This, in turn, could change cell functions, potentially causing cancer [2].

➤ **Colon cancer** is a cancer of the large intestine, which stores consumed chemicals and drugs before being excreted through stool.

➤ **Goal of the Study** is to identify the effect of alcohol consumption on colon cancer by quantitatively analyzing spatial fluctuations in the microscopic image intensity of the colon tissues of various mice models. The quantitative analysis of intensity fluctuation provides a more precise identification of the stage of cancer than the visual inspection of microscopic images [3].

## Models and Methods

➤ The tissue slides were collected from different cases of AOM colon cancer mice models



**Note:** Animal growth, chemical administration, and slide preparation were done in collaboration with scientists from University of Tennessee Health Science Center, UTHSC.

**Mice:** C57BL6 female (10-12 weeks)

**Azoxymethane (AOM):** a carcinogen used to induce colon cancer.

**Deaxtran sodium sulfate (DSS):** causes colitis to ensure the presence of colon cancer.

**LieberDeCarli liquid diet with 4% ethanol:** provides chronic ethanol effect in rodents.

➤ These slides were viewed on a Olympus BX50 microscope in NanoBioPhotonics Lab at the University of Memphis.

➤ The microscopic images obtained were quantitatively evaluated in terms of spatial fluctuation of intensity patterns in each pixel.

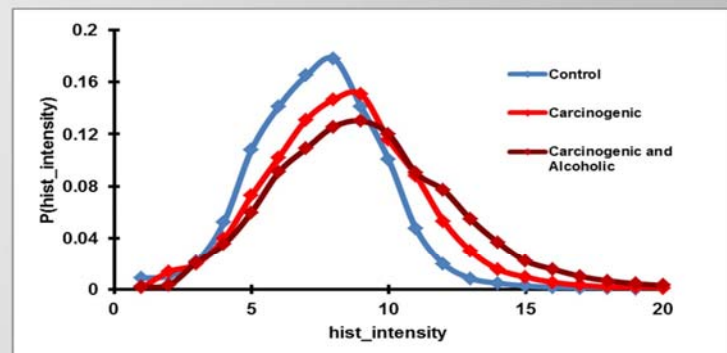
## References

- [1] Gunzerath, Lorraine, Vivian Faden, Samir Zakhari, and Kenneth Warren. "National Institute on Alcohol Abuse and Alcoholism report on moderate drinking." *Alcoholism: Clinical and Experimental Research* 28, no. 6 (2004): 829-847.
- [2] Kim, Young-In. "Role of folate in colon cancer development and progression." *The Journal of nutrition* 133, no. 11 (2003): 3731S-3739S
- [3] M.J. Costello, T. N. Oliver, and L. M. Cobo, Cellular architecture in age-related human nuclear cataracts, *Investigative ophthalmology & visual science* 33 (1992) 3209-3227

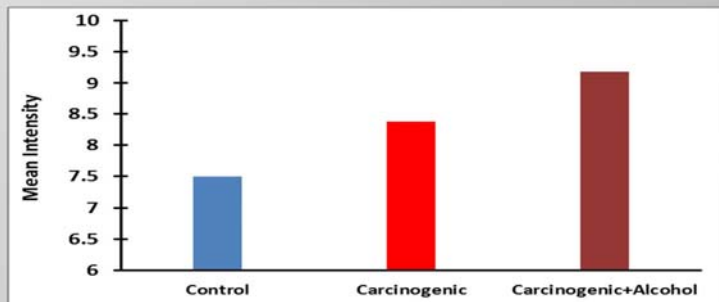
## Results



Sample images: of colon tissues with different levels of malignancy



Relative Intensity distribution: for Control (normal), Carcinogenic and Carcinogenic plus alcoholic



Mean intensity values: for Control, Carcinogenic, and Carcinogenic and Alcoholic

## Conclusion and Future Work

➤ The spatial fluctuations of the microscopic image intensity are the highest for carcinogenic plus alcoholic, lowest for control and in middle for carcinogenic.

➤ More clinical studies would be required to provide a better analysis of the progression of colon cancer as affected by alcoholism. This study was conducted using 90 day samples. Studies using samples from a longer time period may shed new light on the effect of alcohol on colon cancer.

➤ The analysis of micron scale morphological alteration shows that the practice of alcoholism aggravates the colon carcinogenesis by enhancing the spatial fluctuation of cellular/tissue macromolecules.

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