Scope of the study
2. SCOPE OF THE STUDY

Chronic inflammation is a culprit for various ailments including cancer. Epidemiological reports state that over 25% of all human cancer cases are related with chronic inflammation. The relationship between inflammation and malignant diseases is substantiating the risk of gastrointestinal (GI) cancer in patients with prolonged inflammation. The reason behind inflammation associated cancer is so evident in GI tract due to its continuous exposure to plethora of dietary and environmental factors that consist of pro-inflammatory mediators which provoke the tumorigenesis.

Animal models are still considered as suitable models for better understanding of the chemotherapeutic efficacy for inflammation associated colon carcinogenicity. In this study, Fischer 344 rat is moderately susceptibility to the combination of DMH/DSS within short period of 10 weeks. Tumors induced in rats exposed to DMH/DSS treatment accurately recapitulate the pathogenesis observed in human IBD.

Carvacrol (CAR, 2-methyl-5-isopropylphenol) is a phenolic monoterpenes abundantly present in the essential oils produced from Origanum vulgare. Carvacrol is recommended as a dietary supplement to relieving digestive problems. Pharmacological action of Carvacrol is reported in several animal models.

Protein SUMOylation is an emerging post translational modification event that plays a crucial role in governing cellular homeostasis and cancer development. The impact of Sumoylation in the pathogenesis of colitis associated colon cancer (CACC) is not completely elucidated. Ubc9 is an attractive novel drug target against a variety of human diseases which however, a dietary essential oil Carvacrol has
been identified as Ubc9 inhibitors by which it can play a major role in the SUMOylation pathway.

The following objectives were carried out to study the effect of Carvacrol on DMH/DSS induced colitis associated colon carcinogenesis in male Fischer 344 rats. The results of in vivo experiments are further extrapolated in vitro system using Human colorectal cancer cell line HCT-116.

- Carvacrol modulated biochemical parameters
- Carvacrol restored the histopathological alteration
- Carvacrol inhibited pro-inflammatory mediators
- Carvacrol ameliorated oxidative stress induced DNA damage
- Carvacrol abrogated proliferative markers
- Carvacrol reduced the extra cellular degrading enzymes during tumor cell migration and invasion
- Carvacrol induced apoptosis through ultra structural changes in tumor cells
- Carvacrol regulated SUMOylation pathway during colon carcinogenesis