Abstract

The present work focuses on the anti-neoplastic role of non steroidal anti-inflammatory drugs (NSAIDs) in modulating the biophysical parameters of the colonic membranes in 1,2-dimethylhydrazine dihydrochloride (DMH) induced carcinogenesis. The steady-state fluorescence polarization technique was applied to assess membrane fluidity, membrane polarity and lipid phase states. The decline in cholesterol content, biosynthesis and cholesterol: phospholipids ratio with DMH treatment indicates more fluidity associated with carcinogenesis. The DMH group had shown lower order parameter indicating more fluidity whereas NSAIDs resulted in increasing the membrane lipid order. The converging effects of these changes were more in membrane phase separations and membrane phase state. In DMH treatment membrane shows lesser phase separation or high polarity, and more liquid crystalline state while for NSAID groups membranes have higher phase separations or low polarity, and more of the gel phase. Further, NSAIDs induced anti-proliferative effects were evidently observed by apoptosis in the colonocytes by using acridine orange-ethidium bromide fluorescent staining and Terminal de-oxynucleotidyl transferase dUTP nick end labeling (TUNEL) assay. The results suggest that NSAIDs induced alteration in the membrane biophysical parameters may be an important initiating event for the chemopreventive action.

Keywords

Lipid phase separations, Membrane polarity, Membrane fluidity, Apoptosis, NSAIDs.