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Nano-Architectural Alterations in Mucus Layer Fecal Colonocytes in Field Carcinogenesis: Potential for Screening


A Double-Blind, Randomized, Neoadjuvant Study of the Tissue Effects of POMx Pills in Men with Prostate Cancer Before Radical Prostatectomy

Stephen J. Freedland, Michael Carducci, Nils Kroeger, Alan Partin, Jian-ruo Rao, Yusheng Jin, Susan Kerkoutian, Hong Wu, Yunfeng Li, Patricia Creel, Kelly Mundy, Robin Gurganus, Helen Fedor, Serina A. King, Yanjun Zhang, David Heber, and Allan J. Pantuck

Acacetin Inhibits In Vitro and In Vivo Angiogenesis and Downregulates Stat Signaling and VEGF Expression

Tariq A. Bhat, Dhanya Nambiar, Dhanir Tailor, Arttatrana Pal, Rajesh Agarwal, and Rana P. Singh

β-Escin Inhibits NNK-Induced Lung Adenocarcinoma and ALDH1A1 and RhoA/Rock Expression in A/J Mice and Growth of H460 Human Lung Cancer Cells

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ABSTRACT

Current fecal tests (occult blood, methylation, DNA mutations) target minute amounts of tumor products among a large amount of fecal material and thus have suboptimal performance. By exploiting field carcinogenesis as a modality to amplify the neoplastic signal, the present study demonstrates that endoscopically normal rectal brushings have striking nano-architectural alterations which are detectable utilizing a novel optical technique, partial wave spectroscopic microscopy (PWS). Mucus layer fecal colonocytes (MLFCs) at preneoplastic and neoplastic time-points in azoxymethane (AOM)-treated rat models were examined using PWS analysis to derive the nano-architectural parameter, disorder strength (\( L_d \)). MLFCs from both control and AOM-treated animals appeared microscopically normal and identical under bright field microscopy. However, superimposing \( L_d \) pseudocolor maps on the images (cover micrograph; saline-treatment; AOM treatment not shown) revealed marked differences (elevation) in \( L_d \) in the AOM-treated rats in the areas of nucleus and cytoplasm when compared to control animals. Thus, by utilizing a biophotonics proof of principle approach to fecal assay, the present study demonstrates that targeting the nano-architectural changes of field carcinogenesis rather than the detection of tumor products may provide a novel paradigm for colorectal cancer screening. See article by Roy and colleagues (beginning on page 1111) for more information.