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Methylation of the polycomb group genes in colorectal cancer

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Background: Colorectal cancer (CRC) is the second most common cancer in the Kingdom of Saudi Arabia with ever increasing incidence rates. DNA methylation is a common event in CRC where it is now considered an important phenomenon in CRC carcinogenesis and useful for the classification and prognosis of CRC.

Methods: To gain insight into the molecular mechanisms underpinning CRC in Saudi Arabian patients, the DNA methylation frequency of key genes were profiled (MLH1, MSH2, RASSF1A, SLIT2, HIC1, MGMT, SFRP1, MYOD1, APC, CDKN2A, as well as five CIMP markers) in 120 sporadic CRC cases. CRC tumors originating from the rectum, left, and right colons are represented in this cohort of formalin-fixed paraffin-embedded tissues.

Results: The most common methylation frequency was detected in the polycomb group target genes (PCGT) including SFRP1 (70%), MYOD1 (60.8%), HIC1 (61.7%), and SLIT2 (56.7%). In addition, MGMT methylation was detected at a high frequency (68.3%). RASSF1A, APC, and CDKN2A methylation frequencies were 42.5%, 25%, and 32.8%, respectively. K-means clustering analysis of the methylation events results in the clustering of the CRC samples into three groups depending on the level of methylation detected.

Conclusion: Group II (PCGT methylation and CIMP-negative) methylation signature carried a favorable prognosis for male patients, whereas older patients with group I rare methylation signature have a potentially poorer clinical outcome.

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Devise and manufacture of cysteamine functionalized-gold nanoparticles for detecting and expunging the tumor cells

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The aim of this study is to devise and manufacture intelligent inorganic nanoparticles that will be used imaging and expunging the tumor cells. Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells and if the spread is not controlled, it can result in death. If malignancies be detected before cells become cancerous or at an early stage, the disease will be most treatable. First gold nanoparticles were synthesized about 13-15 nm in diameter. Turkevich method was used for manufacturing gold nanoparticles. In this synthesis, into the 150 ml 2.2 mM sodium citrate solution at the situation of boiling was added 1 ml 46.8 mM HAUC₄ solution. The suspension was centrifuged at 9000 rpm for 20 min. Then the synthesized gold nanoparticles were examined by Zetasizer and Atomic Force Microscopy. In order to introduce positive charge, cysteamine molecules have two different end groups (SH and NH₂) were coated as self-assembled monolayers (SAMs) onto gold nanoparticles. These molecules were reacted with the gold surface by SH groups and NH₂ was given the positive charge. For this step, we have prepared of 1 mM solution of cysteamine. Then were prepared a solution with 1 ml gold nanoparticles and 225 µl cysteamine and shaken in the dark for 1 hour. Specific receptors exist on tumor cells that can be used to identify them. Antibodies are connecting specifically to receptors surface on the tumor cells. On the surface of nanoparticles can be immobilized siRNA for silent therapy and monoclonal antibody for cancer therapy.

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