Rad 530. Medical Sciences, 44(2017) : 121-136
4th Scientific Symposium on *Apoptosis and Neoplasms*

# CHANGES IN APOPTOTIC ACTIVITY DRIVEN BY DNA METHYLATION EPIMUTATIONS IN HUMAN CANCER

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Apoptosis is one of the fundamental biological phenomena, well known to be crucial in cancer development for its vital role in a subtle interplay between proliferation and cell death. Programmed cell death is indeed a powerful physiological frontier cancer cells have to overcome along the way of fulfilling their full malignant potential. Therefore, complex signalling networks developed in the frame of apoptosis which can be crashed not only by gene mutations but disruption in gene expression regulation as well. DNA methylation is one of the most prominent epigenetic mechanisms strongly effecting gene expression by organizing chromatin status and its permissiveness to transcription. Aberrant DNA methylation is an epimutation already recognized as an early event, sometimes even preceding other well-known molecular carcinogenic incidences. Reports from literature, which will be discussed in this lecture, point to DNA methylation epimutations as underlying mechanism of aberrant apoptotic gene expression resulting in a breach of cell homeostasis regulatory mechanisms toward carcinogenesis.

***Keywords***: Epigenetics; DNA methylation; apoptosis; epimutation; cancer.

# APOPTOSIS AND COLORECTAL CANCER

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Programmed cell death, or apoptosis, is a fundamental mechanism of tissue homeostasis. In the normal colon, as much as 10^10 cells per day undergo apoptosis and are shed into the lumen. One of the hallmarks of cancer is escape from mechanisms regulating apoptosis, such as cellular response to extrinsic growth factors