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Personalized medicine: New perspectives in cancer treatments

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Abstract

Prostate cancer is the most common non-cutaneous cancer in men. PSA as a prostate cancer biomarker has served many years for the initial screening for prostate cancer, later there has been sincere efforts to complement this diagnostic test due to its variations. Our studies covered signal transduction pathways in primary prostate cancer cell lines, cultured human prostate cancer cells, and animal model prepared by knocking out the VDR gene. We aimed searching new prostatic genes starting from their cDNA in Human Genome Data Base, and translational bioinformatics has been widely used. We validated the down-regulation of heat shock proteins (Hsp)-70 and bcl-2, and up-regulation of Apaf1, Hsp-90, estrogen receptor-α (ERα), Her-2/neu, and paxillin genes at the protein level. A steroid hormone, vitamin D_3 (VD_3) was used for inducing apoptosis of prostate cancer cells through specific gene targets We also discovered that VD_3 is capable of inhibiting expression of multiple anti-apoptotic proteins in VDR-expressing prostate cancer cells, leading to activation of the mitochondrial, caspase-9 dependent, pathway for apoptosis. VD_3 induces declines in anti-apoptotic proteins and also stimulates cytochrome *c* release from mitochondria by a caspase-independent mechanism.

Our studies emphasized the importance of personalized cancer diagnostics in the field of prostate cancer since earlier dates. It is necessary moving from one gene–one test approach to the complete sequencing in molecular cancer diagnostics, which will possibly be completed cost effectively for clinical cancer genomics in the near future.

Biography

Meral Guzey is an Adjunct Associate Professor at UMUC-Europe, Heidelberg for Distance Education, and teaches Cancer Biology at the Department of Math and Life Sciences. Guzey worked at Harvard Medical School as Visiting Scientist under the auspices of NIH, which made her possible to develop ideas in personalized cancer diagnostics.