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High nitric oxide-adapted breast cancer cell lines showed down-regulation in cell division cycle protein 27 (CDC27)

Umar Ahmad, Juel Chowdhury¹, Mahsa Vahdatian¹, Narmatha Kennet, Hani Pharaon, Kamsika Uthayaseela, John Thomas and James A Radosevich^{1,2}¹University of Illinois, USA²Jesse Brown VAMC, USA

Hypothesis: High nitric oxide (NO) causes adaptation in breast cancer cell lines which results in decreased expression of genes involved in the cell cycle arrest.

Objectives: Unregulated progression of a cell through its cell cycle is a prime characteristic of cancer. Observation demonstrated that adaptation to high concentration NO (HNO) caused the decreased expression of crucial genes necessary for cell cycle regulation. One such gene in the comparative observation between the affected cells lines (HNO cancer cells) and the parent cell lines reveal that expression of the CDC27 gene was evidently decreased in HNO cancer cells (breast cancer cell lines). CDC27 functions to provide a subunit of the APC/C (anaphase-promoting complex/cyclosome) which is essential for keeping the spindle checkpoint in order.

Methods: Three breast cell lines were exposed to HNO using DETA-NONOate (a NO donor) namely: Hs578t, MCF7, and T47D. Constant exposure to HNO led to adaptation of the cell lines. Expression levels between the HNO cancer cell lines and parent cell lines (control) were evaluated by a genome-wide gene chip experiment.

Results: In the HNO adapted breast cancer cell lines Hs578t, MCF7, T47D and T47D, CDC27 gene was down-regulated.

Conclusions: Decreased Expression resulted in the CDC27 gene of breast cancer cell lines when exposed to HNO in contrast to the parent cell lines. High level of NO led to different expression of CDC27 which may prove to be beneficiary in understanding its effect on cell growth when compared to their parent cell lines. Further exploration is needed in the effects of nitric oxide on cell proliferation and the varying expression levels of other genes.

Biography

Umar Ahmad is a Medical student from New York. He started his medical education by doing pre-med in the Dominican Republic in Spanish. From there, he went to Medical school in the Caribbean. He is currently in Chicago working with some of the best doctors in the US. Currently, he is learning to combine clinical skills, doctor's experience, hospital protocols, and ethics.

doctor.umar@hotmail.com

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