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Increased Nitric Oxide (NO) exposure in pseudogenes may play a role in cancer stem cell formation

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**Hypothesis:** The high exposure of CeRNA and microRNA to HNO effects the pseudogenes and the coding along causing their over expression in cancer cells.

**Objective:** Evidence regarding pseudogenes being functional have recently emerged. MicroRNA isolation due to CeRNA adds to pseudogenes and their influence on the growth of cancer. One well studied gene is the BRAF pseudogene and its functional BRAF gene. Studies have shown that high levels of the BRAF pseudogene are directly proportional to the formation of aggressive malignancies.

**Methods:** Gene chip analysis of ten HNO adapted cell lines (Squamous cells: SCC-016, SCC-040, SCC-056, SCC-114, SCC-116; Adenocarcinomas: A549, BT20, Hs578, MCF7, and T47D) was carried out. Known pseudogenes were identified in each line, as well as their coding counterparts.

**Results**: The adenocarcinoma cell lines *RP6-159A1.2*, *RP11-255N24.3*, *AC004490.1*, *LDHBP*, *RP11-572H4.2* were down regulated pseudogenes, and there were no up regulated pseudogenes. The squamous cell carcinomas (SCCs) had the following up regulated pseudogenes: *RPL37AP1*, *AC138972.1*, *RP11-641D5.1*, *AC005534.6*, *AC022431.1*, *RPL26P12*, and they had these down regulated pseudogenes: *RP6-159A1.2*, *RP11-255N24.3*, *RBMXP1*, *RP11-20023.1*, *RP11-551G24.2*. All cell lines followed the hypothesis, showing an increase in a pseudogene expression indicating an increase in the corresponding gene (with the exception of the adenocarcinoma cell lines).

**Conclusions:** The high concentration of CeRNA may reduce expressions of microRNA, which would then lead to high concentrations of pseudogenes (likely due to high levels of HNO). Pseudogenes, along with BRAF, in turn reduce the expression of microRNA. Therefore, the pseudogenes and BRAF take the same role as the CeRNA. This results in a feedback loop of over expression of the coding gene.

## Biography

Madhusudan Patel is a Medical Doctor from Gujarat, India who began his medical education at University of Seychelles - American Institute of Medicine and graduated in 2013. He travelled to UAE, Seychelles, Mauritius and India for clinical exposure, throughout his medical education. After moving to the United States, he has actively pursued his medical education with many established doctors. He volunteered at the 43rd ISOBM Annual Conference held during September, 2016 in Chicago, IL, which was attended by established academics such as Dr. Ferid Murad and Dr. Robert Winn. Recently, he has enthusiastically started developing his skills in medical research and is a Board Member of Oncomarks.org where he is working towards helping other people who share similar fields of interest. He is a very passionate medical doctor who aims to acquire a position in Internal Medicine residency program and is actively working towards stretching his academic boundaries.

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