The dysfunction of quantum-mechanical sensitive cGMP-activated Na/Ca exchange as a target for cancer therapy**Prof. Sinerik Ayrapetyan**

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It is known that cancer cells are characterized by overhydrated state and contain more than 90% of water (Kircuita et al., 1973). Cell overhydration serves as one of the diagnostic parameters for carcinogenesis (Damadyan 1971). However, the nature of metabolic mechanism, the dysfunction of which causes generation of cancerous cells has not been elucidated yet. The discovery of our laboratory reveals that the electro-genic Na/K pump-induced net water efflux from the cell is a fundamental mechanism controlling semipermeable properties of cell membrane, the dysfunction of which is a common consequence of cell pathology, including cancer.

Two quantum-sensitive families of high affinity (10^{-11} - 10^{-10} M and 10^{-9} - 10^{-8} M) ouabain receptors in cell membrane have been identified which, unlike low affinity ouabain ($>10^{-7}$ M) receptors with inactivation effect on Na efflux, have activation effect on Na efflux, which is accompanied by water efflux from the cells. The highest affinity receptors stimulate Na/K pump by activation of cGMP-activated Ca efflux from the cell, while the receptors with middle affinity stimulate the cAMP-activated Na/Ca exchange in reverse (R) mode, which controls Na gradient on membrane by pushing out Na and decreasing membrane permeability for these ions.

Thus, the dysfunction of cGMP-dependent Ca efflux from the cells leading to cAMP-dependent RNa/Ca exchange-induced elevation of intracellular Ca is suggested as a primary mechanism for cell pathology, including cancer and cGMP-stimulated Ca efflux from the cell is considered as an effective tool for detection of earlier periods of carcinogenesis, thus becoming a target for tumor therapy.

Keywords: cancer, Na/K pump, cGMP, Na/Ca exchange**Biography:**

Prof. Sinerik Ayrapetyan has received his PhD in Cell Biophysics in the Institute of Physiology of Ukraine Academy of Sciences, Kiev during the period of 1966-1970. Currently, he is the coordinator of UNESCO/UNITWIN Network in Biophysics, Biotechnology and Environmental health Control. His research includes the study of metabolic regulation of cell function in norm and pathology. He is serving as a Chief Editor for the Journal of "Bioequivalence and Bioavailability", "Biomedical Engineering Current Research", "Basic, Applied Pharmacy and Pharmacology" and "Pharmacology & Pharmaceutical Research". He is also an editorial member of several reputed journals like "Electromagnetic Biology and Medicine", "BBA General Subjects" etc. Prof. Sinerik Ayrapetyan is a member of a number of international societies. He has authored 7 international books and 115 research articles.