9th WORLD CONGRESS ON IMMUNOLOGY AND CANCER

December 09-10, 2019 | Barcelona, Spain

Dietrich Büsselberg

Weill Cornell Medicine, Qatar

Intracellular calcium regulation in neuroblastoma chemotherapy

Calcium signaling controls various process within the cell. Calcium (Ca2+), it is an important second messenger whose concentration is tightly controlled. A dysregulated calcium concentration is implicated in many pathological conditions including cancer. Here it modulates proliferation, evasion of apoptosis, invasion, migration, angiogenesis.

The presentation gives an overview of channels and pumps involved in the regulation of intra cellular calcium $[Ca2+]_i$. We present the effects of two anticancer drugs cisplatin (CDDP) and arsenic trioxide (AS_2O_3) in calcium dynamics of Neuro Blastoma (NB) chemotherapy. We show that anticancer drugs increase $[Ca2+]_i$ by different mechanisms in a time and concentration dependent manner. Assay for apoptosis demonstrated proportional increase in apoptotic cell with the increase in $[Ca2+]_i$ in NB cells exposed to CDDP. Quantification of protein expression (confocal microscopy) of IP3R1, IP3R3, RYR1, RYR3 or S100A6 following exposure to either 1 µM 72h CDDP showed upregulated protein expression. Development of resistance to chemotherapy is another problem developed in the course of cancer treatment. Our data show that calcium regulating protein expression varies between the wild type and resistant NB cell lines. Such as S100A6 protein had an altered cell distribution in resistant cell compared to the wild type. Microarray mRNA analysis reveals the calcium-dependent activation of signaling pathways involved in p53 signaling, cell cycle control and RNA transport. Also, the difference in mRNA micro array profile was evident between the wild type and the resistant cell line. In conclusion, pharmacological modulation of the $[Ca2+]_i$ response to cytotoxic drugs induced apoptosis in NB cells. Manipulating the $[Ca2+]_i$ signaling in anticancer chemotherapy opens the chances for more studies in combinatory therapy using $[Ca2+]_i$ regulating drugs (blockers/ promoters).

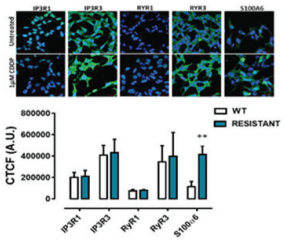

Figure 1: Calcium regulating protein expression in wildtype and neuroblastoma exposed to cisplatin

Biography

Dietrich Büsselberg is Professor of Physiology and Biophysics at Weill Cornell Medicine in Qatar and Assistant Dean for Premedical Student Affairs. Prior to coming to WCM-Q, he served as Professor of Physiology and Neuroscience at Texas Tech University, Health Science Center, Paul L. Foster School of Medicine. Dr. Büsselberg holds a State Exam for Teaching from the University of Hannover, Germany (1981) a B.S and M.S. from University of Hohenheim, Stuttgart, Germany (1987) and a Ph.D. from the University of Hohenheim (Germany), Institute of Zoology in collaboration with the University of Albany (U.S.), School of Public Health (1989).

dib2015@qatar-med.cornell.edu