ARSENOPLATINS - POTENT ANTICANCER AGENTS AGAINST TRIPLE-NEGATIVE BREAST CANCER

Denana Miodragovic[1,2], Zohra Sattar Waxali[2], Annie Fritz[1], Mathew Martin[1], Wenan Qiang[3], Thomas O'Halloran[2]

[1]Northeastern Illinois University, 5500 N St Louis Ave, Chicago, IL 60625

[2]Chemistry of Life Processes Institute, Northwestern University, 2170 Campus Dr, Evanston, IL 60208

[3]Center for Developmental Therapeutics at the Chemistry of Life Processes Institute; Department of Obstetrics and Gynecology, Feinberg School of Medicine, Northwestern University, 2145 Sheridan Road, Evanston, IL 60208

d-miodragovic@neiu.edu

Triple-negative breast cancer (TNBC) is a more aggressive breast cancer with a poorer prognosis than other types of breast cancer. TNBC mortality is 42% higher in African American women compared to other American women, which is one of the most significant examples of racial disparity in oncology. TNBC does not express the common receptors estrogen and progesterone or the human epidermal growth factor receptor 2 (HER2), making targeted hormone therapies ineffective. Thus, there is an urgent medical need for the development of novel potential drug candidates for TNBC. In clinics, platinum-based regimes provide overall survival advantages for TNBC patients compared to non-platinum regimens. It was recently shown that Arsenic Trioxide alone or in combination with other therapeutics such as Cisplatin inhibits the growth of triple-negative breast cancer cells *in vitro* and *in vivo*. The synergy between Cisplatin and Arsenic Trioxide was established in a variety of triple-negative breast cancer cell lines. This inspired us to synthesize a new class of anticancer agents that contain pharmacophores of both drugs, which we refer to as arsenoplatins. According to the NCI-60 screen (NCI, National Cancer Institute), the first member of this class, Arsenoplatin-1 (AP-1), has shown better anticancer activity than Arsenic Trioxide in all 9 tumor types tested and better than Cisplatin in 4 indications and comparable in two. Importantly, according to this screen, AP-1 is the most potent against triple-negative breast cancer cell lines. Several new arsenoplatin compounds are synthesized and characterized. The results of *in vitro* studies of new arsenoplatin compounds against triple-negative breast cancer cell lines will be presented. These results are the first step in determining the lead compound for *in vivo* studies, which may lead to develop a potential therapeutic drug candidate against TNBC.