ARSENOPLATINS - POTENT ANTICANCER AGENTS AGAINST TRIPLE-NEGATIVE BREAST CANCER

Denana Miodragovic1,2, Zohra Sattar Waxali2, Annie Fritz1, Mathew Martin1, Wenan Qiang3, Thomas O’Halloran2

1Northeastern Illinois University, 5500 N St Louis Ave, Chicago, IL 60625
2Chemistry of Life Processes Institute, Northwestern University, 2170 Campus Dr, Evanston, IL 60208
3Center 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.