Mazzucchelli Serena, Pharm Anal Acta 2016, 7:1 (Suppl)
http://dx.doi.org/10.4172/2153-2435.C1.027

OMICS International
conferenceseries.com

8th International Conference and Exhibition on

Pharmaceutics & Novel Drug Delivery Systems

March 07-09, 2016 Madrid, Spain

Nanometronomic treatment of breast cancer with Doxorubicin loaded H-Ferritin prevents drug resistance and circumvents cardiotoxicity

Mazzucchelli Serena
University of Milan, Italy

Chemotherapeutic treatment of breast cancer is based on maximum tolerated dose (MTD) approach. This strategy, however, presents several disadvantages, including prolonged time intervals between treatment cycles and development of therapeutic resistance. However, advanced stage tumors are not effectively eradicated by MTD owing to suboptimal drug targeting, onset of therapeutic resistance and neoangiogenesis. In contrast, "metronomic" chemotherapy is based on frequent but lower dose drug administrations, resulting in neovascularization inhibition and induction of tumor dormancy. For this reason, metronomic chemotherapy is now envisaged as an interesting alternative for either primary systemic therapy or maintenance therapy. However, low drug accumulation at the tumor and poor effectiveness against highly aggressive metastatic cancer limit the applicability. Here we show the potential of H-ferritin (HFn)-mediated targeted nanodelivery of metronomic doxorubicin (DOX) in the setting of a highly aggressive and metastatic 4T1 breast cancer mouse model with DOX-inducible expression of chemoresistance.We find that HFn-DOX administered at repeated doses of 1.24 mg kg−1 strongly improves the antitumor potential of DOX chemotherapy arresting the tumor progression. We find that such a potent antitumor effect is attributable to multiple nanodrug action beyond cell killing, including inhibition of tumor angiogenesis and controlling the rise of chemoresistance. Multiparametric assessment of heart tissues, including histology, ultrastructural analysis of tissue morphology, and measurement of markers of ROS, provided evidence that metronomic HFn-DOX allowed us to overcome cardiotoxicity. In conclusion, our results suggest that HFn-DOX has potential for the development of novel nanometronomic chemotherapy for the next generation of safe and personalized oncological treatments.

Biography

Mazzucchelli Serena, PhD is a Research Associate at the University of Milan (UNIMI). She completed Bachelor's degree in Biological Sciences in 2004, degree in Biology in 2006 and PhD in Biological Sciences in 2009 at the Department of Biotechnology and Biosciences (University of Milan-Bicocca-Italy). From 2009 to 2012 she did a Post-doc fellowship at the Department of Biomedical and Clinical Sciences "L. Sacco" (UNIMI). Until 2015, she was researcher at the "L. Sacco" University Hospital. At present, she is carrying out her research focused on the development of nanodevices for diagnosis and therapy of breast cancer at the Department of Biomedical and Clinical Sciences "L. Sacco" (UNIMI). She is author of more than 20 papers and also is a reviewer.

serena.mazzucchelli@gmail.com

Notes: