

Naringenin and Metformin Enhance the Antitumor Effect of Doxorubicin Against Experimental Models of Breast Carcinoma

Bharat Pateliya (✉ bbpateliya@gmail.com)

Gujarat Technological University <https://orcid.org/0000-0003-2686-9508>

Vinod Burade

Sun Pharmaceutical Industries Ltd

Sunita Goswami

LM College of Pharmacy

Research Article

Keywords: Naringenin, Metformin, Doxorubicin, Breast carcinoma

DOI: <https://doi.org/10.21203/rs.3.rs-182895/v1>

License:  This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Breast cancer is the most common malignancy in women worldwide and is curable in patients at an early stage. The present work is aimed to evaluate the potential of naringenin and metformin concomitant addition with doxorubicin chemotherapy against experimental breast carcinoma models. The antitumor potential of drugs under the study was evaluated in vivo against methylnitrosourea (MNU)- induced breast cancer in rats and 4T1- induced orthotropic mouse model. Tumor-bearing animals were randomly divided into various groups to assess the effect of each single drug and concomitant drug treatments. Parameters like tumor growth, body weight, survival rate, blood glucose, hematology and histology study were determined. There was significant reduction in tumor weight and an observed decrease in tumor multiplicity in naringenin and metformin concomitant addition with doxorubicin treatment as compared to doxorubicin alone against MNU-induced breast carcinoma. Likewise, significant reduction of tumor volume and tumor weight was also observed in 4T1 mouse model suggesting combination treatment enhanced antitumor activity in vivo. Further, histology of tumor biopsies presented enhanced antitumor activity of doxorubicin through increasing tumor necrosis. Hematological parameters, body weight and survival data presented better safety of combination treatment without compromising efficacy using lower dose of doxorubicin as compared to large dose of doxorubicin alone. These results demonstrate that naringenin and metformin enhanced the antitumor effect of doxorubicin in animal models of breast carcinoma and useful as an adjunct to increase the effectiveness of doxorubicin at lower dose.

Full-text

Due to technical limitations, full-text HTML conversion of this manuscript could not be completed. However, the manuscript can be downloaded and accessed as a PDF.

Tables

Due to technical limitations, table 1-4 is only available as a download in the Supplemental Files section.