

Microtubule-Targeting NAP Peptide-Ru(II)-polypyridyl Conjugate As a Bimodal Therapeutic Agent for Triple Negative Breast Carcinoma

According to a recent WHO report, breast cancer caused 670,000 deaths globally in 2022 (<https://www.who.int/news-room/fact-sheets/detail/breast-cancer>). This report also states that the occurrence of fatalities is linked to the human development index (HDI); 1 in 71 women die of it in countries with high HDI—while this ratio is 1 in 48 women for countries with lower HDI. Certain subtypes of breast cancer like triple-negative breast cancer (TNBC) is highly metastatic breast cancer with impaired expression of estrogen (ER), progesterone (PR), and human epidermal growth factor receptor 2 (HER2). Poor prognosis and its low response to therapeutics add to therapeutic challenges compared to non-TNBC cases.

Amitava and Jana and their coworkers from IISER Kolkata, in collaboration with Benubrata's research group at IACS have come up with a unique tubulin-specific N-stapled short peptide conjugate that interferes with microtubule dynamics. This is coupled with photo-induced reactive oxygen (cytotoxic) species to cause an efficient cell apoptosis process. The efficacy of this serum-stable reagent is demonstrated with the MDA-MB-231 (TNBC) cell line, as well as with MDA-MB-231 xenograft models in nude mice

The findings, published in the *Journal of the American Chemical Society* (Chatterjee et. al, 2025, DOI: 10.1021/jacs.4c11820), mark a significant step forward in the fight against TNBC.

This research highlights the potential of cutting-edge therapeutic strategies to address pressing global health challenges, particularly in low-HDI regions where breast cancer mortality rates remain disproportionately high. This finding is relevant for India having HDI of 0.644 (at 2022).

