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Title: Kitchen Waste derived Carbon nanodot in the treatment on Triple Negative Breast Cancer: A waste to wealth approach

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Breast cancer is the most commonly diagnosed malignancy in women, and the second leading cause of cancer-related mortality worldwide. The objective of the WHO Global Breast Cancer Initiative (GBCI) is to reduce global breast cancer mortality by 2.5% per year, thereby averting 2.5 million breast cancer deaths globally between 2020 and 2040. Early detection, timely diagnosis and comprehensive breast cancer management are the three bastion to achieve the ambitious target of WHO. The scenario is more complex in Triple-negative breast cancer (TNBC) which accounts for 10–20% of breast cases. Triple-negative breast cancer (TNBC) cells are deficient in estrogen, progesterone and ERBB2 receptor expression, presenting a particularly challenging therapeutic target due to their highly invasive nature and relatively low response to therapeutics. There is an absence of specific treatment strategies for this tumor subgroup, and hence TNBC is chemotherapy sensitive and common chemotherapy includes anthracyclines and taxanes. The problems associated with conventional drugs are unfavorable pharmacokinetics, lack of selectivity and serious cumulative toxicity. Due to their cheap and easy synthetic strategy, carbon nanodot with large number of surface functional groups provides high surface area suitable for high drug loading. Further conjugation of targeting moiety on the surface helps the therapeutics to achieve better delivery efficiency thereby reducing side effects and improving drug tolerance. Carbon nanodots also inherit special optical properties due to quantum confinement effect, hybridization of carbon backbone, molecule state and crosslink enhanced emission. Unique photoluminescence property of carbon nanodot makes them ideal theranostic agent suitable for simultaneous therapeutic and diagonostic application. Our research focused on developing kitchen waste derived carbon dot as drug carrier for anthracyclin epirubicin with specific targeting moiety for the treatment of TNBC. Moreover the unique excitation dependent emission fluorescence added detection potential to this low toxic arsenal making them unique theranostic agent against TNBC.

Biography

Dr. Suvadra Das [Ph.D.(Tech.) in Pharmaceutical and Fine Chemical Technology] is currently working as Professor (chemistry) at University of Engineering and Management Kolkata. Her research focuses on nanotherapeutics development with different insoluble plant bioactives as alternative medicines in disease specific conditions. Dr Das has successfully developed flavonoid tagged gold nanotherapeutics for resistant leshmaniasis and different polymeric nanotherapeutics with plant bioactive payload for diabetes, hepatic dysfunctions and cancer onditions. She has also worked on in silico molecular modeling studies and application of quantitative structure performance relationship (QSPR) tools to derive theoretical models for optimal molecular loading in polymer based nanotherapeutics. Presently Dr Das is working on development of target specific theranostic carbon naodot for the treatment of breast cancer following waste to wealth approach.