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Curcumin Conjugates as Potential Therapeutics for Breast Cancer

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ABSTRACT

Breast cancer, the target of this study, is one of the most salient forms of cancer in the United States. Among U.S. women, 1 in 8 are diagnosed each year. Current treatment for breast cancer includes dichloroacetic acid (DCA), which is primarily effective at a specific high dosage and leads to side effects such as neuropathy. In a search for an alternative solution with less negative effects, curcumin is studied. Curcumin is a component of turmeric and has an array of health properties, including the alleviation of gastrointestinal complications and certain pulmonary diseases, and the inhibition of cancer growth. However, curcumin's main drawback lies in its low bioavailability, thus allowing little to be absorbed into the body upon ingestion. The objective of this study was to design the synthesis for the improvement of DCA as well as increase the bioavailability of curcumin by conjugating the two components with an amino acid linker in between DCA and curcumin. Prior to synthesis of the amino acid-linked hybrid conjugates, the preceding procedures are standardized. Upon conjugation, it is anticipated that the overall bioavailability will increase, and the effective dosage will decrease, resulting in a potentially more effective breast cancer treatment. The final synthesized compounds will then be analyzed and subsequently studied in breast cancer line cells and animal tests.

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