

**DESIGN, SYNTHESIS, AND BIOLOGICAL INVESTIGATION
OF NEW PEPTIDES AND PEPTIDOMIMETICS OF COSMECEUTICAL INTEREST**

Doctoral dissertation

Abstract

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Cosmeceuticals, i.e., cosmetic products with active ingredients possessing the scientifically proven and thoroughly evaluated biological activity, are becoming progressively more common on the market. Consumer awareness has prompted manufacturers to create formulas with a valuable composition, good permeability through the skin, and prolonged stability. Peptides, short chains of amino acids, are good candidates for active ingredients. Due to the ease of their modification, uncomplicated synthesis, and the possibility of giving them the desired properties, they are becoming frequent ingredients in cosmeceuticals. This doctoral dissertation discusses two enzymes contributing to the appearance of signs of skin aging – elastase, responsible for the breakdown of collagen fibers, and tyrosinase – directly affecting the synthesis of melanin and skin discoloration. Design, synthesis, biological investigation, and molecular modeling of peptides and their conjugates with small organic molecules were discussed. *In vitro* studies of these compounds indicated inhibitors of the abovementioned enzymes, some of them with micromolar activity. The correlation between the structure of obtained compounds and their activity was discussed, and special attention was paid to the role of peptide conjugates (**Figure 1**) in the design of biologically active compounds.

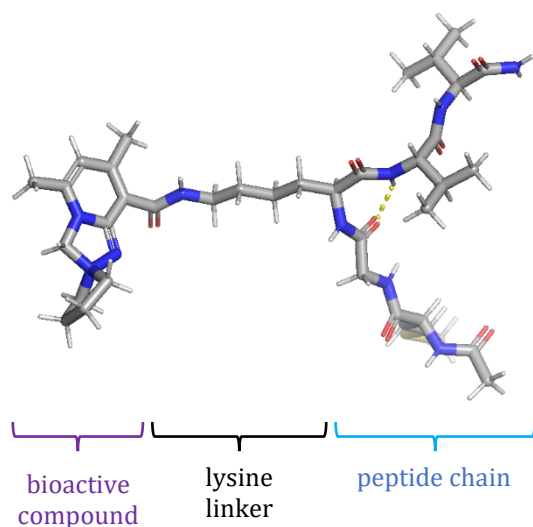


Figure 1. An example of the structure of peptide conjugate, including the lysine linker. The structure presented in this figure is one of the novel compounds included in the dissertation.