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The use of tyrosinases in a chemoenzymatic cascade as a peptide ligation strategy

AUTHORS
Yeke NI / UCL, 20 GORDON ST, LONDON

PURPOSE OF THE ABSTRACT
N-terminal tyrosine-containing peptides play many key roles in biological systems, but the lack of reliable coupling methods under mild conditions limits the generation of natural and unnatural peptieds.[2-7] The Pictet-Spengler reaction (PSR) has been reported to synthsize tetrahydroisoquinolines and tetrahydro-β-carboline alkaloids via enzymatic process or non-enzymatic method in phosphate buffer.[8-13] In our work, a new N-terminal tyrosine-containing peptide ligation method, with aldehydes, utilising a Pictet-Spengler reaction, has been established. In a key step, tyrosinase enzymes (TYR) have been used to convert L-tyrosine to L-3,4-dihydroxyphenyl alanine (L-DOPA) residues, generating suitable functionality for the Pictet-Spengler coupling. Then, L-DOPA was use in the PSR in phophate buffer with aldehydes to afford tetrahydroisoquinolines. Diverse aldehydes, including benzaldehydes, fluoreseceent aldehydes and peptide aldehydes, were used to study the reacrtion scope. Indicating this new chemoenzymatic coupling strategy can be used for fluorescent-tagging and peptide ligation purposes.

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FIGURES

FIGURE 1

FIGURE 2

KEYWORDS
Pictet-Spengler | tyrosinase

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