ENZYMATIC SYNTHESIS OF MULTILABELED L-TYROSINE

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L-Tyrosine (L-Tyr) doubly labeled with isotope of carbon-14 and with isotopes of hydrogen in 3-*R* and 3-*S* positions was synthesized using specific properties of an enzymes PAL (Phenylalanine Ammonia Lyase, E.C. 4.3.5.1.) and L-phenylalanine hydroxylase (E.C. 1.14.16.1.) from rat liver. The synthesis of selectively labeled L-Tyr via cinnamic acid and L-phenylalanine (L-Phe) applying combined chemical and enzymatic methods has been elaborated. Potassium [C-14]-cyanide, heavy and tritiated water have been used as the sources of stable or radioactive labels. In the first step, L-Phe labeled with carbon-14 was obtained by addition of ammonia to (*E*)-[1-C-14]-cinnamic acid using enzyme PAL as a catalyst. Next, L-Phe was enzymaticaly converted into doubly labeled L-Tyr (with deuterium or tritium in 3-*S* and 3-*R* positions and with carbon C-14 in carboxylic group) applying L-phenylalanine hydroxylase activity. Yields of obtained isotopomers of L-Tyr have been determined by enzymatic and radiochemical methods.