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Carrier-Free ^{11}C -Labeled Catecholamines in Nuclear
Medicine and Biochemical Research

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INTRODUCTION

The catecholamines--dopamine, norepinephrine and epinephrine--are synthesized and secreted by tissues such as brain, sympathetic nerve endings and chromaffin cells. Dopamine and norepinephrine are primarily neurotransmitters while epinephrine functions mainly as a hormone. The biosynthesis of the catecholamines from tyrosine is shown in Figure 1.

Abnormalities in the quantities and metabolism of these compounds are associated with many pathological conditions such as hypertension, Parkinsonism and chromaffin tissue tumors.¹

Many studies such as those which deal with the effects of drugs on the biosynthesis, storage and metabolism of catecholamines² are providing a firm foundation of knowledge applicable to the solution of problems of fundamental and practical importance.

We have recently been engaged in a program designed to devise rapid synthetic methods leading to ^{11}C -labeled catecholamines and to explore the potential use of these catecholamines as organ scanning agents and as unique tracers in biochemical research.

The following topics are discussed: 1) The Use of Carbon-11 as a Tracer; 2) The Use of ^{11}C -Labeled Catecholamines as Scanning Agents; 3) Preliminary Evaluation of the Catecholamines as Scanning Agents; and 4) The Pharmacological Interaction of Catecholamines and the Metabolites of Alcohol.

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