Metabolism of endogenous and synthetic catecholamines

**Monoamine Oxidase (MAO)**
- Concentrated in the liver and kidney, but otherwise present all over the body
- Present mainly in the outer mitochondrial surface
- Present in sympathetic nerve terminals, and metabolizes released neurotransmitter
- Deaminates catecholamines, **BUT**...
  - They have to have an amine group without too large a substituent, **AND**
  - They cannot have a substituent at the alpha carbon (like, say amphetamine does)

**MAO-A**
- Peripherally, located in the syncytiotrophoblast of the term placenta, and in the liver
- Centrally, found in noradrenergetic neurons, mainly locus coeruleus

**MAO-B**
- Peripherally, located in the platelets, lymphocytes and the liver
- Centrally, found in serotonergic neurons

**Catechol-O-methyltransferase (COMT)**
- Concentrated in the liver and kidney, but otherwise present all over the body
- Present mainly in the cytoplasm
- THIS IS THE ENZYME that metabolizes most of intravenously administered catecholamines
- Exchanges the hydroxyl group at the 3 position on the catechol ring for a methyl group, **BUT**...
  - The catecholamine ring MUST be intact with 2 hydroxyl groups, otherwise it won't work

All these COMT and MAO enzymatic steps are first steps in a long process which results ultimately in vanillyl mandelic acid (VMA).

From Peck and Hill "Pharmacology for Anaesthesia and Intensive care" as well as the mighty "Handbook of Pharmacology and Physiology in Anaesthetic Practice" by Stoelting and Hillier. Overall, Goodman And Gilman (12th edition) were the most useful in getting straight answers.