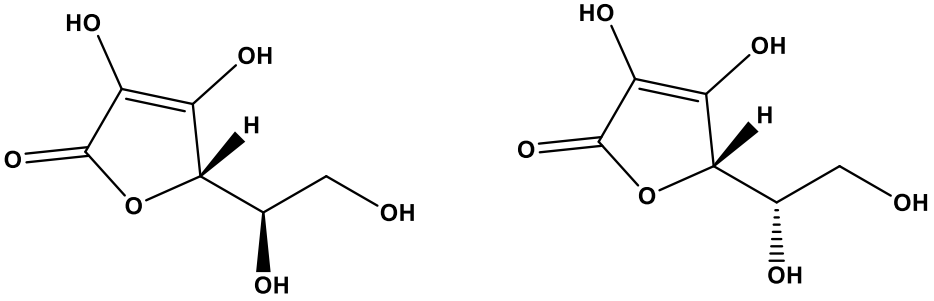
Vitamin C/ L-Ascorbic Acid

is a ***cofactor*** in several ***hydroxylation*** and ***amidation*** reactions by functioning as a ***reducing agent***. As a result, vitamin C plays an important role in the ***synthesis of collagen, carnitine, folinic acid, and norepinephrine***. It also influences the processing of hormones such as ***oxytocin, antidiuretic hormone, and cholecystokinin***. Vitamin C *reduces* iron from the *ferric to the ferrous state* in the stomach, thereby *increasing* intestinal absorption of iron. Vitamin C may be involved in ***steroidogenesis*** in the adrenals. *Vitamin C also has a* ***pro-oxidant*** *effect in vivo which may occur in the setting of* ***overdose***.

Some of Ascorbate-Dependent Enzymes

Enzyme	Its role
Procollagen-proline dioxygenase	Collagen synthesis
Procollagen-lysine 5-dioxygenase	Collagen synthesis
Procollagen-proline 3-dioxygenase	Collagen synthesis
Phytanoyl-CoA1 dioxygenase	Fatty acid metabolism
Dopamine beta-monooxygenase	Norepinephrine synthesis
Peptidylglycine monooxygenase	Peptide hormone synthesis



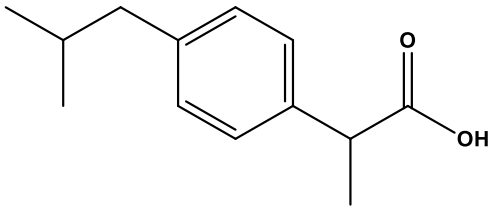
a **b**

***Structure of L*-Ascorbic Acid (a) and *D*-Ascorbic Acid (b).**

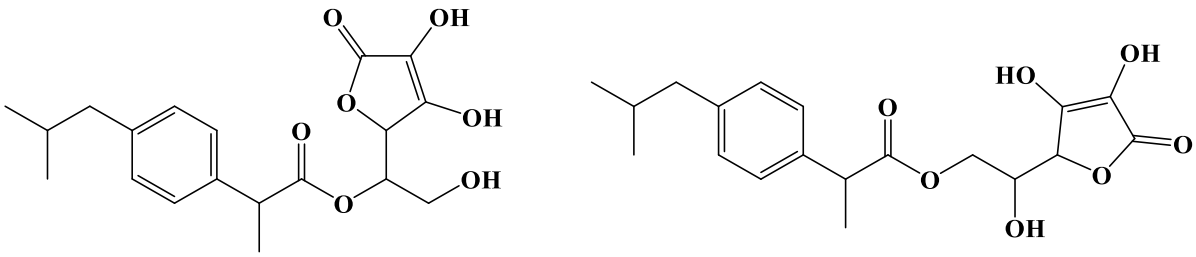
ASCORBIC ACID IN DRUG DESIGN

The intake of vitamin C (AA) in the body compartments of mammals is guaranteed by a class of Na^+ dependent transporters recently characterized and called SVCT. In particular, $SVCT_1$ allows the absorption of vitamin C from the intestine and its recovery by the kidneys, while $SVCT_2$ allows accumulation of the vitamin C in the brain and eye, so that recent researches revealed that *AA can be used as tool to improve brain drug delivery.*

In order to achieve the satisfactory therapeutic effect, ibuprofen in the CNS needs to reach a higher concentration. However, because of the poor permeability of NSAIDs, the larger doses are required to achieve the desired therapeutic effect. This will cause a lot of gastrointestinal adverse effects and some toxicity, and may cause some damage to the body; so that conjugation of ibuprofen with ascorbic acid may resolve this problem.



Structure of Ibuprofen



Structures of ibuprofen prodrugs with ascorbic acid

1. *Of which type these prodrugs are?*
2. *Draw the mechanism for synthesis of these prodrugs.*