

Grapefruit Juice and Its Flavonoids Inhibit 11 β -Hydroxysteroid Dehydrogenase(11 β -OHSD)

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The enzyme 11 β -hydroxysteroid dehydrogenase(11 β -OHSD) oxidized cortisol to inactive cortisone. Its congenital absence or inhibition by licorice causes mineralocorticoid effects. We tested the hypothesis that flavonoids found in grapefruit juice inhibit this enzyme in vitro and grapefruit juice itself inhibits it in vivo.

Microsomes from guinea pig kidney cortex were incubated with cortisol and NAD or NADP and the oxidation to cortisone measured using HPLC analysis. In addition, healthy human volunteers drank grapefruit juice and the ratio of cortisone to cortisol in their urine was measured by HPLC and used as an index of endogenous enzyme activity.

Both the NAD and NADP utilizing forms of 11 β -OHSD were inhibited in a concentration dependent manner by the flavonoids in grapefruit juice. Normal males drinking grapefruit juice had a fall in their urinary cortisone/cortisol ratio indicating in vivo inhibition of the enzyme.

Dietary flavonoids can inhibit this enzyme and, at high dose, may cause an apparent mineralocorticoid effect.