

Vitamin P: Flavonols as Vitamins

VARIOUS chemical and clinical observations have led to the assumption that ascorbic acid is accompanied in the cell by a substance of similar importance and related activity. In absence of both substances, the symptoms of lack of ascorbic acid (scurvy) prevail and conceal symptoms of the deficiency of the second substance. In the lack of suitable experimental animals or conditions, progress was dependent on spontaneous pathological conditions, caused or influenced by this second factor.

In collaboration with L. Armentano and A. Bensáth, we have found that in certain pathological conditions, characterised by an increased permeability or fragility of the capillary wall, ascorbic acid is ineffective, while the condition can readily be cured by the administration of extracts of Hungarian red pepper ('vitapric') or lemon juice. The extracts were effective in cases of decreased resistance of the capillary wall toward whole blood (vascular type of hæmorrhagic purpura) as well as in cases in which the capillary wall showed an increased permeability towards plasma protein only (various septic conditions). The extracts were fractionated. The active substance was found in the end in a fraction consisting of practically pure flavon or flavonol glycoside. 40 mgm. of this fraction given daily intravenously to man restored in a fortnight regularly the normal capillary resistance. Spontaneous bleeding ceased, the capillary walls lost their fragility towards pressure differences and no more plasma protein left the vascular system on increased venous pressure.

These results suggest that this great group of vegetable dyes, the flavons or flavonols, also play an important role in animal life, and that the dyes are of vitamin nature. The group is not to be confused with the yellow dye, discovered by one of us and termed 'flaves' (like cytoflave), which dye forms the prosthetic group of Warburg's yellow enzyme and has later been renamed by R. Kuhn 'flavins'. We propose to give the name 'vitamin P' to the substance responsible for the action on vascular permeability.

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