Plants for diabetes

Identification of partial PPAR agonists from medicinal plants

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PLANTS FOR DIABETES: IDENTIFICATION OF PARTIAL PPARΓ AGONISTS FROM MEDICINAL PLANTS

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"Plants for diabetes" is a 3-year EU Interreg IIIA project that was commenced in 2005 with the primary purpose of identifying plant candidates with potential anti-diabetic effects. Twenty-four plant species were selected for the project and a screening platform for assessment of bioactivity including a series of bioassays was applied. The platform included tests for peroxisome proliferator-activated receptor (PPAR) γ, α, and δ transactivation, adipocyte differentiation, and insulin stimulated glucose-uptake, allowing identification of plant extracts containing PPAR agonists with activities comparable to those of known partial agonists. Today, total PPARγ agonists are used in the clinical treatment of type 2 diabetes (T2D) as insulin sensitizers, but it cause severe side effects. Partial agonists are associated with fewer side effects and still seem to have the desired effect on insulin sensitivity. In total, 133 extracts of the selected plant species were tested in the platform and 18 of these were found to activate PPARγ, 11 to activate PPARα, 15 to activate PPARδ, 3 to be dual activators of PPARα and γ, 6 to be dual activators of PPARδ and γ, and 9 to activate all three PPARs. The bioactive compounds responsible for the observed activities were identified in extracts of elderflowers (*Sambucus nigra*), purple cornflower (*Echinacea purpurea*) and savoury (*Satureja* sp.) using bioassay-guided fractionation. Bioactive compounds included flavonoids, terpenes, fatty acids, and alkamides. Cultivation experiments were carried out in order to determine whether the content of these compounds could be optimized in the plant material. In perspective, the results obtained in this project may lead to the development of herbal medicinal products or functional foods with a documented effect on T2D.