Natural extracts to treat or prevent neurological and neurodegenerative disorders

Technology #1630

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Ginseng dammaranes in high concentration to lower production of neurological disease protein:
The amyloid-beta peptide (A-beta), a 39-43 amino acid fragment of the amyloid-B precursor protein, participates in the pathogenesis of a number of diseases, including Alzheimer’s Disease, A-beta-mediated dementia, and cancers such as breast and endometrial cancer. A-beta has been found to be too toxic to neuronal cells and causes apoptotic cell death in vitro. In particular, the formation of A-beta plaques inside and outside of nerve cells is strongly correlated with dementia.

Ginseng, the common name given to the dried roots of plants from the genus Panax, has been shown to improve liver function and enhance the immune system. The active compounds of ginseng are the ginseng saponins, also known as dammaranes. Specific dammaranes with known pharmacological effects, such as Rk1, Rg5, (20R)Rg3, and (20S)Rg3, normally occur at relatively low concentrations in wild ginseng, but may be concentrated by processing ginseng at high temperatures into a form called “Sun Ginseng.” Pharmacologically-active dammaranes have been proven to lower the production of A-beta42 in mammalian cells. There is therefore great interest in finding a way to produce dammaranes in high concentrations, either by improving the yield of these compounds from natural ginseng or by synthesizing their core backbones.

Dammaranes as pharmaceutical agents for neurological disorders:
This invention outlines ways to synthesize pharmacologically-active dammaranes from natural products which occur in high abundance, such as dammar resin or birch tree. Specifically, the invention details how to synthesize Rg3, Rg5, and Rk1 starting from natural extracts. Ways to administer active compounds to treat or prevent neurological disorders is also detailed.

Applications:
– Synthesis of pharmacologically active dammaranes
– Treatment of neurodegenerative diseases, including Alzheimer’s disease, A-beta42-related disorder, amyotrophic lateral sclerosis, Binswanger's disease, corticobasal degeneration, dementia lack distinctive histopathology, frontotemporal dementia, Huntington's chorea, multiple sclerosis, myasthenia gravis, Parkinson's disease, Pick's disease, and progressive supranuclear palsy

Advantages:
– Inhibits amyloid production and beta-amyloid peptide production
– Details a synthetic route to dammarane production, which facilitates the use of dammaranes as pharmaceutical agents
– Does not require high-temperature processing of ginseng to concentrate active agents
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