Insulin-Like Growth Factor 1 (IGF-1)

DESCRIPTION
Insulin-like growth factor-1 (IGF-1) is a single-chain polypeptide of 70 amino acids. It is a trophic factor that circulates at high levels in the blood-stream and mediates many, if not most, of the effects of growth hormone. Although the main source of IGF-1 in the serum is the liver, many other tissues synthesize it and are sensitive to its trophic action. IGF-1 was called somatomedin in the older literature. IGF-1 and insulin have similar three-dimensional structures.

IGF-1 appears to influence neuronal structure and functions throughout the life span. It has been shown to have the ability to preserve nerve cell function and promote nerve growth in experimental studies. Because of these properties, recombinant human IGF-1 is in clinical trials for the treatment of amyotrophic lateral sclerosis (ALS).

Recently, recombinant human IGF-1 has entered the dietary supplement marketplace, as have recombinant human growth hormone and several so-called growth hormone secretagogues or releasers.

ACTIONS AND PHARMACOLOGY
ACTIONS
Supplemental IGF-1 has putative anabolic and lipolytic activities.

MECHANISM OF ACTION
The mechanism of the putative actions of supplemental IGF-1 is unknown.

PHARMACOKINETICS
Orally administered IGF-1 has very poor bioavailability. There is no credible evidence that IGF-1 is absorbed from the oral mucosa if administered as a spray. It is likely that orally administered IGF-1 is digested in the small intestine to the amino acids that comprise the molecule.

INDICATIONS AND USAGE
Claims for supplemental IGF-1 are sweeping and include antiaging, promotion of lean muscle mass, enhanced athletic and sexual performance, joint protection, antidiabetic and antiatherosclerotic effects, sleep aid, immune enhancer, neuroprotector and much more. There is no credible evidence to support these claims for oral IGF-1. High levels of IGF-1 have been associated with elevated risk of several cancers, especially prostate cancer.

RESEARCH SUMMARY
There is no research to support the use of IGF-1 as a nutritional supplement, whether in oral or injected form. There is research showing associations between high levels of circulating IGF-1 and several cancers.

Claims that IGF-1 supplements significantly increase lean muscle mass are unsubstantiated. Use of IGF-1 in doses far higher than those used by most bodybuilders failed to produce more than very modest anabolic effects in AIDS patients. It is possible that some clinical indications, but not supplemental indications, will emerge from experimental work currently underway with IGF-1. There is a hint in some of this work that IGF-1 might, for example, have some neuroprotective and neurorestorative effects in some conditions.

CONTRAINDICATIONS, PRECAUTIONS, ADVERSE REACTIONS
CONTRAINDICATIONS
Supplemental IGF-1 is contraindicated in those with any evidence of active malignancy. It is also contraindicated in those who are hypersensitive to any component of an IGF-1-containing product.

PRECAUTIONS
Pregnant women and nursing mothers should avoid the use of supplemental IGF-1-containing products.

Adolescents should avoid the use of supplemental IGF-1-containing products.

Supplemental IGF-1 is not meant to be used parenterally and should never be used in such a manner.

ADVERSE REACTIONS
None known for supplemental IGF-1-containing supplements.

INTERACTIONS
There are no known interactions for supplemental IGF-1-containing supplements.

OVERDOSAGE
No reports for supplemental IGF-1-containing supplements.
DOSAGE AND ADMINISTRATION
Supplemental IGF-1 is available and marketed as a dietary supplement, typically in the form of an oral spray. There are no recommended doses.

LITERATURE


Inulins
DESCRIPTION
Inulins refer to a group of naturally occurring fructose-containing oligosaccharides. They belong to a class of carbohydrates known as fructans. Fructans, in addition to inulins, include another group of naturally occurring fructose-containing oligosaccharides called levans. Inulins are usually of plant origin, while levens are found in fungi and bacteria. Inulins are mainly comprised of fructose units and typically have a terminal glucose. The bond between fructose units in inulins is a beta-(2-1) glycosidic linkage. Plant inulins contain 2 to 150 fructose units. The smallest inulin is called 1-kestose and is composed of two residues of fructose and one of glucose. Inulins are naturally synthesized from sucrose.

Chemically, inulins with a terminal glucose are known as alpha-D-glucopyranosyl-[beta-D-fructofuranosyl](n-1)-D-fructofuranosides, which is abbreviated GpyFn. Inulins without glucose are beta-D-fructopyranosyl-[D-fructofuranosyl](n-1)-D-fructofuranosides, abbreviated as FpyFn. Lower case n refers to the number of fructose residues in inulin; py is the abbreviation for pyranosyl. The basic structural formula follows:

Inulin
n or m equal the number of fructose units
G = glucose, F = fructose

Inulins are present in onions, leeks, garlic, bananas, asparagus and artichokes, among other vegetables and fruits. Because of their sweet taste and their texture, inulins are added to various foods. Inulin intake in the U.S. ranges from 1 to 4 grams daily. It is higher in the European diet.

Inulins are only slightly digested in the small intestine. They are, however, fermented by a limited number of colonic bacteria. This could lead to changes in the colonic ecosystem in favor of some bacteria, such as bifidobacteria, which may have health benefits. Inulins are considered to be bifidogenic factors. Their energy content is about half that of digestible carbohydrates or about 1 to 2 kcal/grams.

Substances such as inulins that promote the growth of beneficial bacteria in the colon are called prebiotics. Prebiotics are typically nondigestible oligosaccharides.

Inulins are marketed as nutritional supplements and functional foods. The sources of these inulins are roots of chicory (Cichorium intybus) and Jerusalem artichokes (Helianthus tuberosus). Oligofructose refers to the partial enzymatic hydrolysate of inulins. Fructooligosaccharides usually refer