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In 1976, Judah Folkman and his colleagues reported on the isolation of a factor from the scapular cartilage of calves that inhibited the growth of new blood vessels supporting implanted tumors in rabbits. It also stopped the growth of the tumors.

Subsequently, it was found that factors in shark cartilage had similar effects (see Shark Cartilage). Bovine cartilage, marketed as a nutritional supplement and for other indications, is primarily derived from bovine trachea.

ACTIONS AND PHARMACOLOGY

ACTIONS

Bovine cartilage has putative antitumor and anti-arthritis actions. Topical bovine cartilage may have wound-healing activity.

MECHANISM OF ACTION

The mechanism of the putative antitumor activity of bovine cartilage is unknown. Substances in bovine cartilage may have some anti-angiogenic activity. It has been suggested that chondroitin sulfate in bovine cartilage may have immunomodulatory activity and that such activity may play some role as well.

Bovine cartilage's putative anti-arthritis activity may be accounted for, in part, by the presence of chondroitin sulfate (see Chondroitin Sulfate).

Topical bovine cartilage appears to have wound-healing activity by stimulating granulation within the wound, thus establishing a matrix that induces wound repair.

PHARMACOKINETICS

The pharmacokinetics of collagen in bovine cartilage should be similar to those of dietary proteins. See Chondroitin Sulfate for pharmacokinetics of that substance.

INDICATIONS AND USAGE

As with shark cartilage, claims for bovine cartilage include anticancer, anti-inflammatory and anti-arthritis effects. Accelerated wound-healing effects are also claimed for oral bovine cartilage. There is little support for these claims. Topical bovine cartilage does appear to aid in wound healing.

RESEARCH SUMMARY

There are no well-controlled clinical studies showing efficacy of bovine cartilage in any cancer. There is one ongoing study on the effects of bovine cartilage in metastatic renal cell cancer. Similarly, there is no credible evidence that it is helpful in any form of arthritis. It contains chondroitin sulfate, which has been shown to be helpful in some with osteoarthritis, but studies showing similar activity with the use of bovine cartilage are lacking. Some anti-inflammatory and antitumor effects have been shown in animal and *in vitro* studies.

Bovine Cartilage

DESCRIPTION

Bovine cartilage is mainly comprised of the protein collagen and proteoglycans. Proteoglycans are composed of a core protein to which polysaccharides, known as glycosaminoglycans (GAGs) or mucopolysaccharides, are attached. The main glycosaminoglycan in bovine cartilage is chondroitin sulfate.

CONTRAINDICATIONS, PRECAUTIONS, ADVERSE REACTIONS**CONTRAINDICATIONS**

Bovine cartilage supplements are contraindicated in those who are hypersensitive to any component of a bovine cartilage-containing product.

PRECAUTIONS

Pregnant women and nursing mothers should avoid using bovine cartilage supplements.

Those with renal failure or liver failure should exercise caution in the use of bovine cartilage.

Those with cancer who wish to try bovine cartilage must do so under medical supervision.

ADVERSE REACTIONS

These are occasional reports of gastrointestinal complaints, such as nausea, bloating and diarrhea. Also, fatigue has been associated with the use of this supplement.

DOSAGE AND ADMINISTRATION

Bovine cartilage is available in capsules and powders and in combination products. There are no typical doses. Bovine cartilage is also available as a wound dressing and as a dermatologic cream for skin care.

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Bovine Colostrum

DESCRIPTION

Colostrum is the pre-milk fluid produced from the mother's mammary glands during the first few days after birth. Bovine colostrum is derived from cows. Colostrum is a rich source of antibodies, growth factors and nutrients for the suckling neonate and may provide passive immunity to the newborn against various infectious microorganisms, particularly those that affect the gastrointestinal tract. It may also have other health benefits.

The protein content of bovine colostrum is three to four times higher—up to 150 grams per liter compared to 30 to 40 grams per liter—than it is in regular cow's milk.

The greater part of this protein is comprised of whey proteins (see Whey Proteins). Immunoglobulins, mainly IgG, make up about 75% of the whey proteins. Other substances found in bovine colostrum include casein, lactoferrin, alpha-lactalbumin, beta-lactoglobulin, and the growth factors insulin-like growth factor-1 (IGF-1), insulin-like growth factor-2 (IGF-2), transforming growth factor beta (TGFbeta) and epidermal growth factor (EGF). In addition, bovine colostrum contains vitamins, minerals, lipids and lactose. Bovine colostrum may also contain colostrinin, also known as proline-rich polypeptide (PRP), a substance found in ovine (sheep) colostrum.

Bovine colostrum is marketed in several forms. Bovine colostrum prepared by microfiltration is mainly composed of whey proteins and their associated immunoglobulins and the growth factors IGF-1, IGF-2, TGFbeta and EGF.

Substances such as lactose, fats, casein and lactalbumin are significantly reduced in microfiltered bovine colostrum. Hyperimmune bovine colostrum is rich in immunoglobulins of the IgG type, which are protective against such infectious microorganisms as *Cryptosporidium parvum* (a major cause of AIDS-associated diarrhea), diarrheogenic *Escherichia coli* strains, *Shigella flexneri*, *Clostridium difficile*, and rotavirus, the most common cause of severe diarrhea in young children.

Hyperimmune bovine colostrum is prepared from cows previously immunized with specific antigens. Hyperimmune bovine colostrum IgG concentrate is an orphan drug for the treatment of diarrhea in AIDS patients caused by infection with *Cryptosporidium parvum*.
