4. *Fellafit*

Fellafit as Complementary Therapy in Osteoarthritis

Osteoarthritis (OA) is a joint inflammatory disease which limits patient's activities. Inflammation in OA is associated with angiogenesis. Inflammation stimulates angiogenesis and angiogenesis facilitates inflammation.[1] In inflammation inflammatory cells (macrophages and mast cells) secrete inflammatory mediators: Interleukin-1β (IL-1β) and Tumor Necrosis Factor-α (TNF-α), which then stimulate matrix metalloproteinases that degrades joint proteoglycan and collagen. [1]

Fellafit is a shark cartilage extract which contains glycosaminoglycan (GAG) derivatives (chondroitin sulfate), glucosamine and anti-angiogenic factor (heat-stable proteoglycan) which have beneficial effects for joint. Chondroitin sulfate is a kind of GAG required in joint proteoglycan synthesis.[2] It is primarily formed from combining alternating residues of differently sulfated and/or unsulfated residues of glucuronic acid and N-acetylgalactosamine into a polysaccharide chain.[3] Chondroitin sulfates in shark cartilage is different from chondroitin sulfate of other sources such as bovine and porcine. The chondroitin sulfates in shark cartilage are chondroitin 4-sulfate (Chs A), chondroitin 6-sulfate (Chs C) and chondroitin 2,6-disulfate (Chs D, present only in shark cartilage).[4] The beneficial effects of chondroitin sulfate for OA are as anti-inflammatory, anti-degradative, neurite outgrowth promoting activity and cytoprotective. Chondroitin sulfate also has metabolic effects in joint proteoglycan synthesis. [5-9]

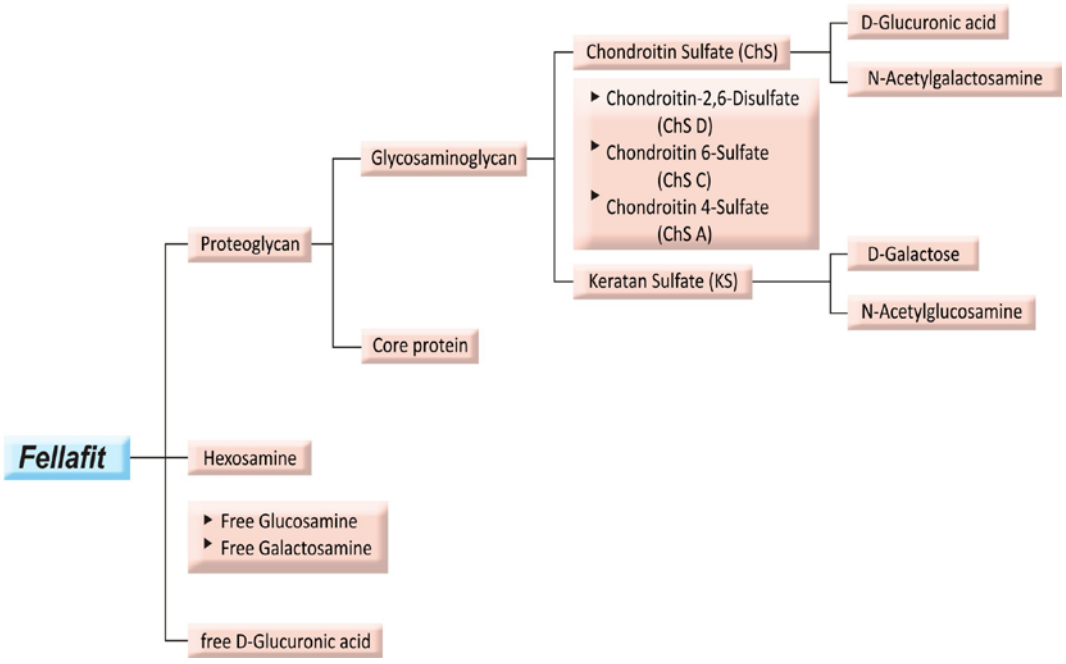

Fig.13. Bioactive Substances in *Fellafit*

Proteoglycan is heat stable, stable to extreme pH and stable to proteolytic digestion. This heat-stable proteoglycan has a molecular weight fraction of about 10 kDa that contains the majority of the antiangiogenic activity associated with shark cartilage.[10] The heat stable proteoglycan may help to reduce angiogenesis and inflammation in OA.

There are two kinds of glucosamine in ***Fellafit***: free glucosamine and N-acetylglucosamine. N-acetylglucosamine can reduce activity of inflammatory mediators more than free glucosamine. Free glucosamine can reduce IL-1β and Nitric Oxide (NO) production also Matrix Metalloproteinases (MMPs) activity, whereas N-acetylglucosamine can reduce IL-1β, NO, TNF-α production and Cyclooxygenase-2 (COX-2) activity.[11]

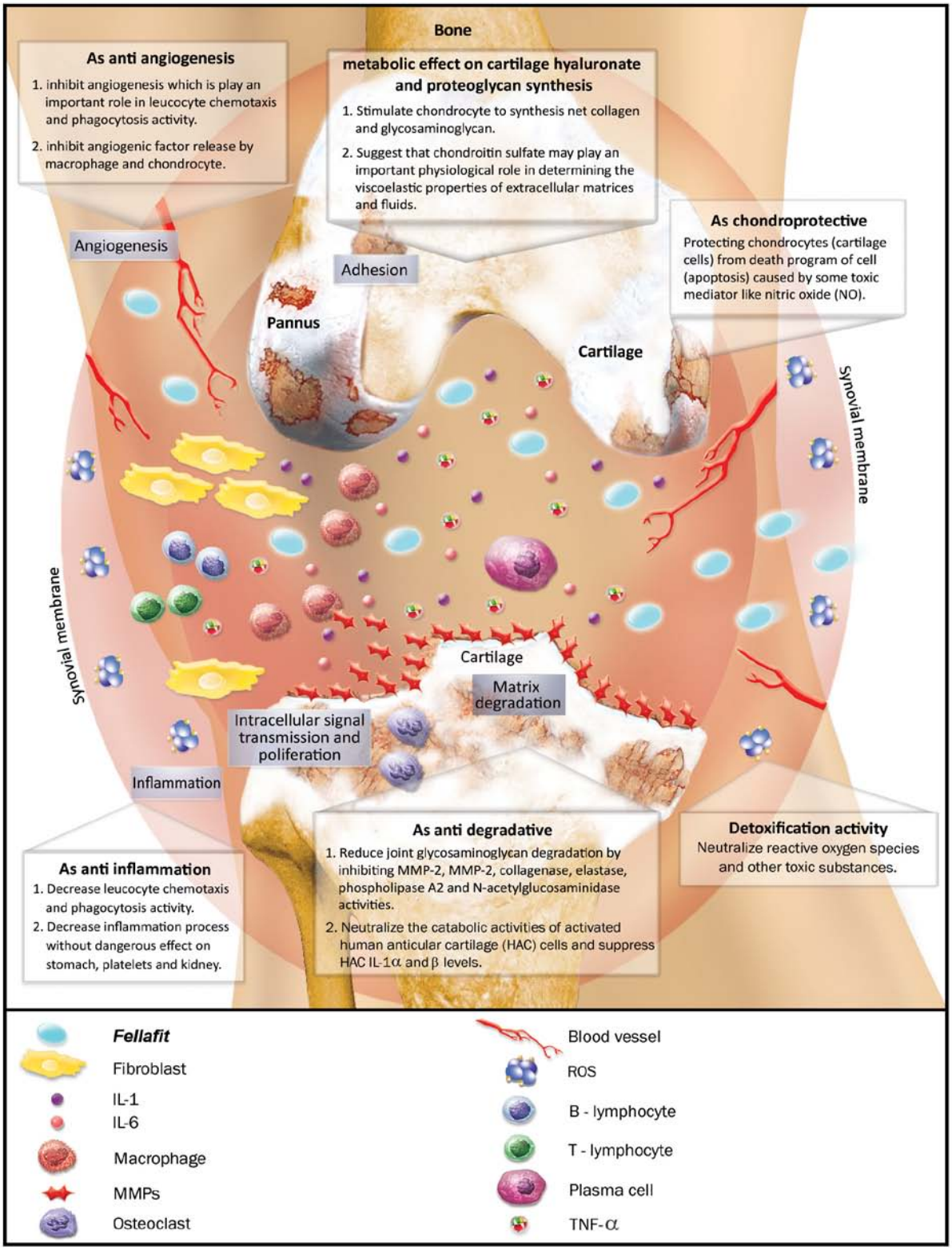

Fig.14. Mechanism of Action of Glycosaminoglycan and Proteoglycan in OA