Tissue Regeneration Factor (TRF) is an ideal first line defense for any stage of osteoporosis, broken or fractured bones, and for any condition in need of joint or cartilage repair. It is effective in helping to maintain joint homeostasis, the stable equilibrium of well-functioning components in a joint (such as the synovial membrane and cartilage matrix) without the presence of inflammation. When joint homeostasis is disturbed, this equilibrium is affected and issues such as inflammation and various degenerative joint diseases can develop.

TRF works by addressing the pathways that cause cartilage to degrade, as well as the ensuing pain and inflammation caused by arthritis and other degenerative joint conditions. It is involved in the maintenance and repair of articular cartilage, which covers the surface of a joint where the ends of bones meet. When this cartilage becomes damaged, the bones will grind against each other instead of having a smooth, fluid movement. Since there is no direct blood supply to cartilage, damage to these areas from injuries, misuse, or overuse leads to pain and inflammation with potentially extended recovery time.

What is Tissue Regeneration Factor?

TRF features Cyplexinol® PRO, a bone-derived protein/collagen complex containing biologically active proteins known as Body/Bone Morphogenetic Proteins (BMPs) as well as key growth factors naturally contained in bone, such as Transforming Growth Factor Beta (TGF-β), Insulin-like Growth Factor (IGF), Platelet Derived Growth Factor (PDGF), and Basic Fibroblast Growth Factor (BFGF). TRF’s Cyplexinol® PRO is derived from certified organic, bovine cortical bone.

The proteins contained in TRF (BMPs) are the components that activate the bone and cartilage-forming process, which is necessary for bone health and joint integrity/regeneration (Bobacz K, et al, Arthritis Rheum, 2003). Research shows that BMPs are more effective when used in combination with growth factors such as insulin-like growth factor, which is present in TRF (Chubinskaya S, Osteoarthritis Cartilage, 2007).

BMPs found in TRF are important morphogenic agents, as they play a role in the differentiation and growth of tissues during the body’s development with multiple functions in regulating the development, homeostasis and repair of various tissues. TRF is well-absorbed, as receptors for BMPs are able to permeate the GI tract.
TRF works in two ways:

1. Stimulates new bone formation (Osteoinductive)
2. Anti-inflammatory effect

1. Stimulating new bone formation – The Osteoinductive Effect
TRF is a bone anabolic agent (tissue regenerating), exerting its effect on bone by increasing bone formation and reducing bone resorption (Simic P, et al, J Biol Chem, 2006). It is actually the bone morphogenetic proteins that are osteoinductive, as they stimulate mesenchymal stem cells and differentiate them into osteoblasts (produce bone tissue) and chondrocytes (produce cartilage). Oral supplementation of TRF has been shown to have a direct effect on bone metabolism, affecting the protein collagen complex found in TRF and biomarkers such as bone collagen, bone hydroxyproline (amino acid that occurs in collagen and other connective tissue proteins), and bone protein synthesis (Martínez JA, et al, J. Rev Esp Fisiol. 1993).

2. Anti-inflammatory Effect (Immunoprotective)
Body/Bone morphogenetic proteins have an immunoprotective effect by exhibiting antagonist activity towards key pro-inflammatory cytokines (such as IL-1 and IL-6) and transcription factors, all of which are responsible for inflammation (Chubinskaia S, Osteoarthritis Cartilage, 2007). IL-1 activates NF-kB transcription factor and matrix metalloproteinases (group of zinc-dependent enzymes which can break down proteins such as extracellular matrix proteins). Thus, BMPs work to suppress major inflammatory cytokines, leading to the restoration of joint and cartilage homeostasis. In a clinical trial on Cyplexinol® PRO, its osteoinductive proteins have been reported to yield significant improvement in the reduction of joint pain and frequency of pain with an increase in activity level and joint strength in those with osteoarthritis (Garian, R, DC, CALDOP Trial, data on file).

TRF and Osteoporosis
Bone loss during aging and in post-menopausal women results from an imbalance between bone formation and resorption, which leads to an alteration in bone architecture and various degrees of bone fragility. Loss of bone strength and an increased number of bone fractures in patients with osteoporosis may be associated with a decreased capacity for bone regeneration, which is related to the lower content of BMPs and growth factors in the bone’s matrix. Since TRF is considered a bone anabolic agent, it can play an integral role in helping to decrease the progression and symptoms of osteoporosis.

Research shows that BMPs improve bone mineral density even in ovariectomized rats, where ovaries have been surgically removed and bones lack BMPs. Improvements were seen in trabecular (spongy) bone architecture, trabecular thickness, and trabecular connectivity (Simic P, et al, J Biol Chem, 2006).

How to Use TRF
• TRF is available in 150 mg and 350 mg doses. Use TRF 350™ when higher dosages are desired for more serious bone and cartilage support.
• Can be taken with or without meals
• Consider pairing TRF with OsteoForce™ (for additional bone support), or ArthroSoothe™ (for additional joint support)