



CYTOKINE THERAPY FOR ORTHOPAEDICS

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THE BASICS

- Chondrocytes
- Tendon, ligament, muscle, bone repair
- All starts at the cellular level
- When chondrocytes are impaired other processes are quickly engaged to further impair these cells and cause more inflammatory responses which damage tissue
- Compensation and excessive loading and inflammation induces enzymes that quickly destroy surrounding tissue



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EXTRACELLULAR MATRIX

- Chondrocytes are the main cellular components
- Injury causes chondrocyte hypertrophy
- Dysrupted chondrocyte function causes progression and breakdown of matrix such as degradation of collagen
- Dysregulated cytokines then cause an imbalance between anabolism and catabolism



HOMEOSTASIS OF MATRIX COMPONENTS

- Disrupted chondrocyte activity disrupts anabolic and catabolic pathways
- This changes the control of the synthesis and degradation of matrix components
- TNF released by apoptotic cells blocks repair by TGF
- AIL-1 can override catabolic action of TNF



GROWTH FACTORS AS REPAIR MOLECULES IN CNT MATRIX

- TGF and FGF are main growth factors in repair of connective tissue matrix
- TRANSFORMING GROWTH FACTOR is considered the main inducer in smooth muscle actin and collagen synthesis and deposition
- It plays a significant role in tissue repair and development of fibrosis.
- TGF is the main repair growth factor
- Fibroblast growth factor organizes connective tissue components



COMPARISON

ALLOPATHIC PRP

- Provides GF through the patient's own blood
- indogenous GF are released from activation of platelets yielding an inconsistent concentrations and types of GF

HOMEOPATHIC INJECTABLES

- Uses mostly homeopathic dilutions of plants for anti-inflammatory effects
- Uses precursors to growth factors in the form of sarcodes; yielding inconsistent concentration of GF



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TOPICAL APPLICATION OF GF

- Is alternative to injection therapy
- Need an appropriate vehicle and method for maximum absorption
- Homeopathic creams such as Natur 4 are most compatible for topical application or for application with medical device
- Compounding in creams makes it more bioavailable
- ***NOT RECOMMENDED TO USE STRAIGHT ALCOHOL -BASED PRODUCT WITH IONTOPHORESIS OR OTHER MEDICAL DEVICE***



NATUR 4... a choice vehicle

NATUR 4's homeopathic formulation provides added benefits for cytokine therapy that generic hydrating body creams do not provide

NATUR 4 contains components that provide CNT matrix components complementary to the cytokines and vascularizing agents that enhance the circulation and carry the cytokines into deep tissues; specifically NATUR 4 contains:

- COLLAGEN
- CONNECTIVE TISSUE EXTRACT
- EMBRYO EXTRACT
- PLACENTAL EXTRACT

these are precursor sources that yield growth extracts like TGF and FGF

- HORSE CHESTNUT EXTRACT is a blood thinner that is desirable in CNT repair to improve vascular permeability bringing active cytokines into the bloodstream

Can be used with medical devices such as microneedling device or electrophoresis/iontophoresis, ultrasound, muscle stimulator.



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TAMANU-ARNICA

This cream formulation provides added benefits of several plant-based anti-inflammatory components and the pain-reducing components of arnica:

- Deeply penetrating
- soothing for muscles and articular membranes
- improves surface permeability of the skin to carry cytokines into vascular regions

Can be used with medical devices such as: a microneedling device, electrophoresis or iontophoresis, ultrasound, muscle stimulator.



NATUR 3

- DRAINAGE
- VASCULARIZING AGENT
- RELEASES MUSCULAR TENSION
- SOFTENS FIBERS OF THE CNT MATRIX TO HELP IMPROVE MANIPULATION AND REMOVE SPASM
- REDUCES INFLAMMATION OF SEROUS MEMBRANES
- PREVENTS FIBROSIS

This can be used as a vehicle for topical application of cytokines with or without medical device.



NATUR 5

NATUR'S LEG FORMULA...

- REDUCES MUSCULAR STRESS
- INCREASES PERIPHERAL CIRCULATION
- INCREASES CIRCULATION OF CYTOKINES
- ENHANCES PAIN RELIEF
- REDUCES SPASM ESP. OR LIMBS AND FEET
- ENERGIZES MUSCLES

**This is a good carrier for the cytokines,
particularly for treatment of the limbs and feet
and muscles; used with or without medical
device.**



COMPOUNDING for TOPICAL APPLICATION OF CYTOKINES

In order to apply available cytokines topically you
need to have an appropriate vehicle; these include:

- Water-based gels (like those used in ultrasound)
- Homeopathic creams like Natur 4
- Herbal hydrating creams like Tamanu Arnica



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ALTERNATIVE TO INJECTION THERAPY KNEE

TOPICAL

15 g NATUR 4
CREAM
+
35 drops TGF
+
30 drops FGF
+
35 drops AIL-1

Or use TAMANU-
ARNICA as the
vehicle cream



Using both oral and
systemic therapy
simultaneously is
recommended here

SYSTEMIC (ORAL)

TGF: 20 DROPS tid
+
FGF: 20 DROPS BID
+
AIL-1: 10 DROPS TID
+
ARTHRO: 20 DROPS QID
For 1 month in acute
phase (pain and healing)
then reduce to 3 x week
for maintenance for 1-2
months



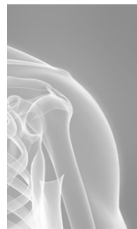
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ALTERNATIVE TO INJECTION THERAPY SHOULDER

TOPICAL

15 g NATUR 4
CREAM
+
60 drops TGF
+
40 drops FGF
+
60 drops AIL-1

Or use TAMANU-
ARNICA as the
vehicle cream



Using both oral and
systemic therapy
simultaneously is
recommended here

SYSTEMIC (ORAL)


TGF: 20 DROPS tid
+
FGF: 20 DROPS BID
+
AIL-1: 20 DROPS TID
+ optional
ARTHRO: 20 DROPS QID
For 1 month in acute
phase (pain and healing)
then reduce to 3 x week
for maintenance for 1-2
months



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ALTERNATIVE TO INJECTION THERAPY NECK

<p style="text-align: center;">TOPICAL</p> <p>15 g NATUR 3 CREAM + 60 drops BDNF + 40 drops FGF + 60 drops AIL-1 + 40 drops IL-10</p> <hr/> <p>Or use TAMANU- ARNICA as the vehicle cream</p>	 <p style="text-align: center;">HERE, TOPICAL THERAPY is sufficient in stress- related cases</p>	<p style="text-align: center;">SYSTEMIC (ORAL)</p> <p>TGF: 20 DROPS BID + FGF: 20 DROPS BID + IL-10: 20 DROPS TID + BDNF: 10 DROPS BID + OPTIONAL: ARTHRO or FLAM: 20 DROPS PRN as analgesic For 1 month in acute phase (pain and healing) then reduce to 3 x week for maintenance for 1-2 months</p>
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ALTERNATIVE TO INJECTION THERAPY HANDS

<p style="text-align: center;">TOPICAL</p> <p>15 g NATUR 3</p> <p>30 drops TGF + 60 drops AIL-1</p> <hr/> <p>— Or use TAMANU- ARNICA as the vehicle cream</p>	 <p style="text-align: center;"><i>Mostly for arthritic joints, including RA</i></p> <p style="text-align: center;">Using both oral and systemic therapy simultaneously is recommended here</p>	<p style="text-align: center;">SYSTEMIC (ORAL)</p> <p>TGF: 20 DROPS tid + FGF: 20 DROPS BID + AIL-1: 20 DROPS BID + IL-10: 20 DROPS BID + (OPTIONAL) ARTHRO: 20 DROPS QID For 1 month in acute phase (pain and healing) then reduce to 3 x week for maintenance for 1-2 months</p>
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ALTERNATIVE TO INJECTION THERAPY FOOT

TOPICAL

15 g NATUR 5
CREAM

30 DROPS IGF
+
30 drops FGF
+
60 drops AIL-1

Or use TAMANU-
ARNICA as the
vehicle cream



Using both oral and
systemic therapy
simultaneously is
recommended here

SYSTEMIC (ORAL)

IGF: 20 drops tid
+
FGF: 20 DROPS BID
+
AIL-1: 10 DROPS TID
+
IL-3: 20 DROPS SID
For 1 month in acute phase
(pain and healing) then reduce
to 3 x week for maintenance
for 1-2 months
OPTIONAL: OSTEOBIOS 20
DROPS BID add to above


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ALTERNATIVE TO INJECTION THERAPY BACK

TOPICAL

15 g TAMANU-ARNICA
Or NATUR 4
+
40 drops TGF
+
35 drops FGF
+
30 drops IGF
+
60 drops AIL-1

*Excellent with
medical device!*



Using both oral and
systemic therapy
simultaneously is
recommended here

SYSTEMIC (ORAL)

TGF: 20 DROPS tid
+
FGF: 20 DROPS BID
+
AIL-1: 20 DROPS TID
+ optional
ARTHRO: 20 DROPS
QID
For 1 month in acute
phase (pain and
healing) then reduce to
3 x week for
maintenance for 1-2
months
Then PRN

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GLOBAL PROTOCOL FOR MUSCULOSKELETAL COMPLAINT

ARTHRO: 20 DROPS QID

+

FLAM: 20 DROPS QID

OR

ARTHRO: 20 DROPS QID

+

AIL-1: 20 DROPS BID

Take combinations together

*oral
administration*



GROWTH FACTORS (main in orthopaedics)

- Growth factors are signaling molecules
- Proteins that stimulate synthesis of structural matrix proteins (such as collagen)
- Growth factors bind to cells that express their receptors and initiate signal transduction, DNA synthesis and mitosis
- Growth factors are secreted at the site of repair by many cell types particularly platelets and fibroblasts



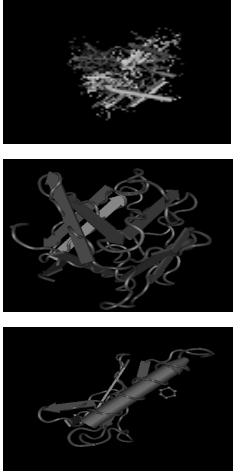
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MAIN GROWTH FACTORS TO USE IN ORTHOPAEDICS

- TGF
- FGF
- IGF

GF structures thanks to:

- Lee, G. et.al. crystal structure of Rabbit acidid FGF1. Acta crystallogr. Sect F (2009)
- Sala, A. et.al. C-terminal Domain of IGF binding protein 1. Isolated from human amniotic fluid. J.Biol.Chem(2005)





TGF

transforming growth factor

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Main areas of application:

- MUSCULOSKELETAL REPAIR: inflammation and pain
- CONNECTIVE TISSUE REPAIR
- NERVE PAIN ASSOCIATED WITH MUSCULOSKELETAL CONDITIONS


IMMUNE FUNCTIONS:

- stimulates macrophages to secrete other growth factors
- Stimulates fibroblast proliferation
- Involved in different stages of healing (depending on mix)
- Chemotactic for macrophages and fibroblasts
- Stimulates angiogenesis esp. in repair of connective tissue

CLINICAL APPLICATIONS:

- Musculoskeletal repair
- Neuropathy of musculoskeletal like radiculitis
- Connective tissue regeneration;
- Tendon
- Ligament
- Muscle

TGF



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FGF FIBROBLAST GROWTH FACTOR

Main areas of application:

- MUSCULOSKELETAL
- BLOOD VESSELS
- MUCOSA

IMMUNE FUNCTIONS:

- Stimulates new growth of blood vessels (wall integrity)
- Stimulates angiogenesis
- Chemotactic for macrophages, fibroblasts, endothelial cells
- Stimulates fibroblasts and endothelial cells

CLINICAL APPLICATIONS:

- Anti-inflammatory (for musculoskeletal, mucosa, intestine)
- Metabolic syndrome/insulin resistance
- Cholesterol/ hyperlipidemia
- joints/cartilage inflammation and repair
- Arthroses: osteoarthritis
- Hyperlipidemia
- cardiovascular diseases

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IGF INSULIN-LIKE GROWTH FACTOR

Main areas of application:

- LIVER/SPLEEN AXIS
- FAT
- MUSCLE
- NEUROPATHY ESP. DIABETIC

IMMUNE FUNCTIONS:

- Synthesized by fibroblasts, muscles and liver
- Stimulates DNA with serum factors

Contraindicated in prostate cancer

CLINICAL APPLICATIONS:

- Diabetic neuropathy (numbness)
- Obesity; fat mass, hypercholesterolemia
- - liver steatosis (fatty liver)
- Steatitis
- Enlarged spleen
- Anti-age
- Aesthetics (UV protection)

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