

# **Intra-articular treatment**

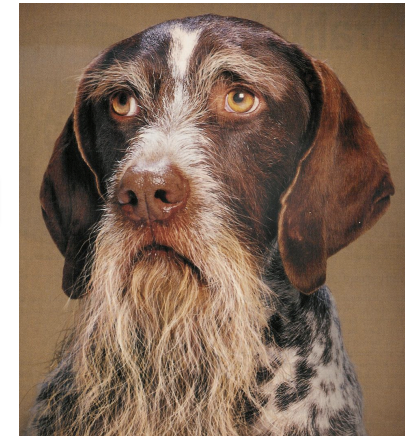
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**Orthogen Veterinary GmbH**

# Osteoarthritis

- excessive use
- wear and tear



**Synovitis  
Osteoarthritis**



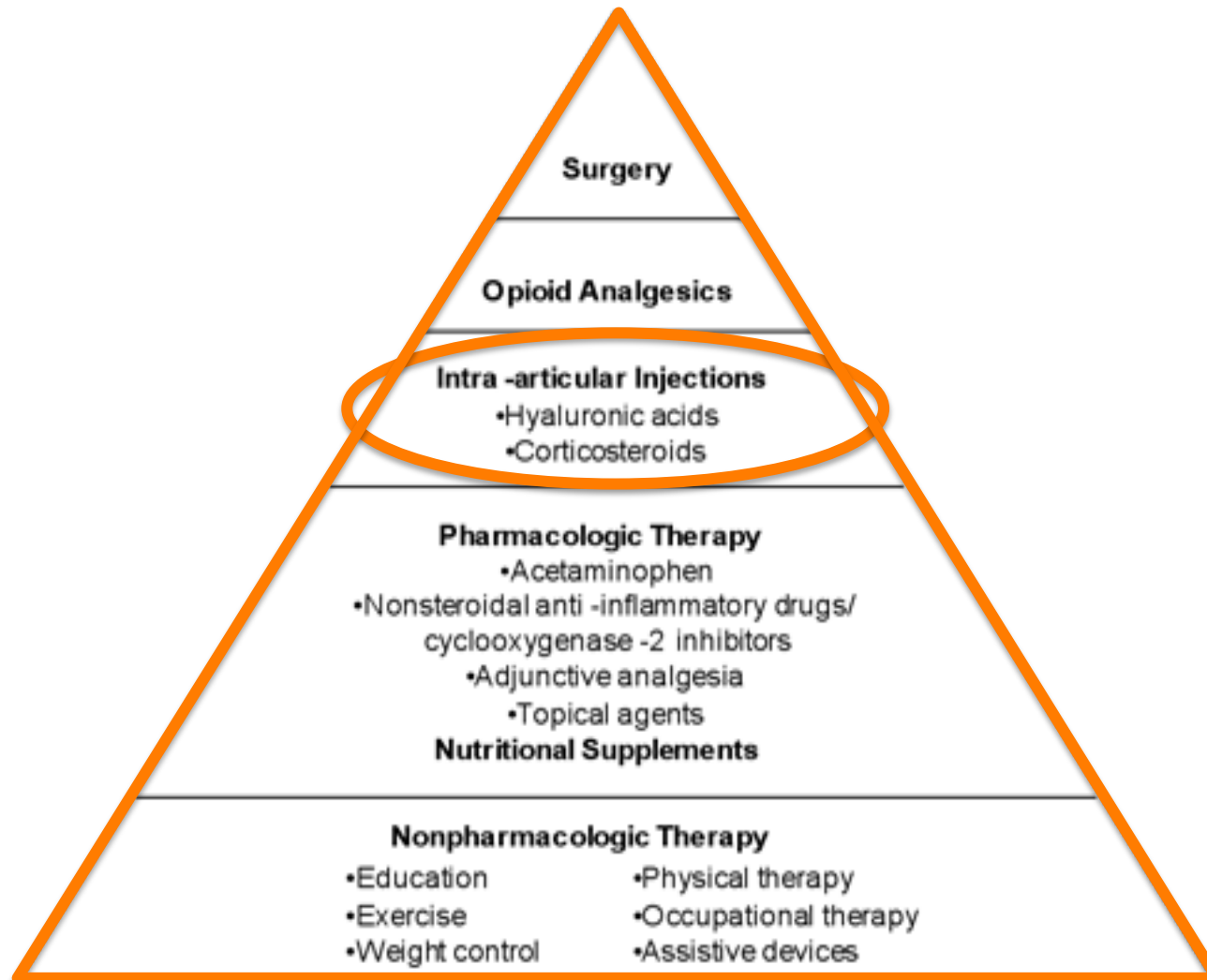
- acute injury



**Anabolic / catabolic equilibrium disturbed**

# Arthrosis

## - Treatment cascade -



# Intra-articular Injections

## - Advantages -

- Peak concentration faster and higher
- Lower doses needed
- Less systemic adverse effects

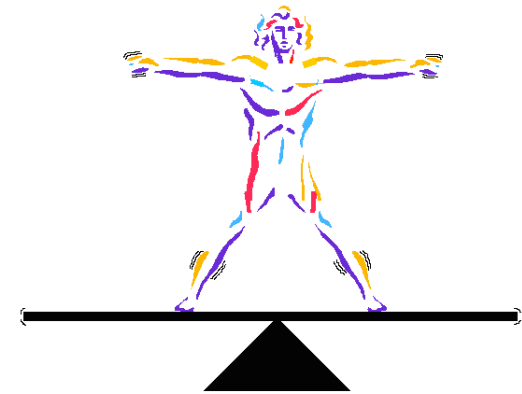
## - Risks -

- Local adverse effects (rare)
  - Infection, flare, crystal induced synovitis

# Intra-articular Injections

## - Therapeutic aim -

- Pain reduction
- Anti-inflammation
- Return to function
  - (not sound but functional?)
- Homeostasis
  
- Chondroprotection



# Intra-articular Injections

## - Acceptance -

- **Human**  
+++
- **Equine**  
+++
- **Canine**  
+/-
- **Feline**  
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Pressure from patient(-owner)  
Ease of technique

# Intra-articular Injections

## - Agents -

- Corticosteroids
- Hyaluronic acid
- PSGAGs
- Local anesthetic
- Blood Products
- Stem Cells
- Polyacrylamide
- Bladder matrix
- Yttrium-90, Rehnium-186
- Botulinum neurotoxin

# Corticosteroids

## - Advantages -

- Potent antiinflammatory agent
- Decrease of MMPs (catabolic reactions)
- Clinical success

## - Risks -

- Increased aggrecanase activity
- Increased early catabolic response
- Short term effects



# Corticosteroids

- Most studies (ca&eq) in vitro or OA model
- Contradictory results
- In dogs mainly used for end stage OA
  - Histologic and macroscopic positive outcomes in ccl-models. Lack of clinical evaluation
- In horses combined with HA (tradition)
  - Efficacy for approximately 8 weeks
- In human for acute rather than chronic
  - Pain reduction up to four weeks

# Hyaluronic Acid

## - Aim -

- Restoring viscoelasticity
- Painreduction related to movement

## - Suggestions -

- Anti-inflammatory, chondroprotective
- Promotion of HA synthesis
- Stimulation of matrix synthesis
- Inhibition of MMPs

# Hyaluronic Acid

- Most studies (ca $\approx$ ) in vitro or OA model
- Contradictory results
- In dogs mainly used for end stage OA
  - Not established
- In horses steroid combination (tradition)
- In human for acute rather than chronic
  - As second line treatment if steroids failed



TREATMENT OF OSTEOARTHRITIS OF THE  
KNEE

EVIDENCE-BASED GUIDELINE  
2<sup>ND</sup> EDITION

Adopted by the American Academy of Orthopaedic Surgeons  
Board of Directors  
May 18, 2013

## RECOMMENDATION 9

We cannot recommend using hyaluronic acid for patients with symptomatic osteoarthritis of the knee.

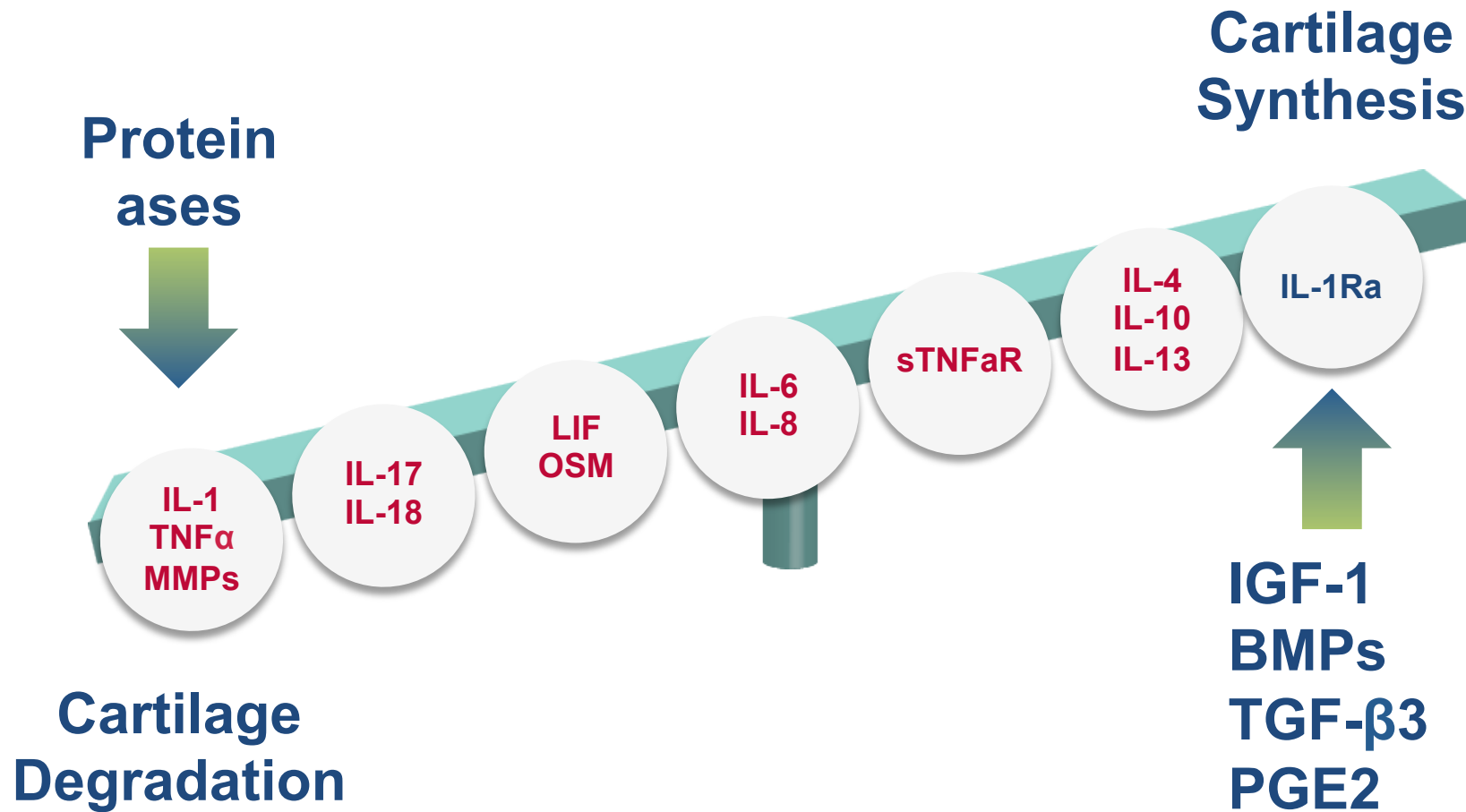
### **Strength of Recommendation: Strong**

Description: Evidence is based on two or more “High” strength studies with consistent findings for recommending for or against the intervention. A **Strong** recommendation means that the quality of the supporting evidence is high. A harms analysis on this recommendation was not performed.

Implications: Practitioners should follow a **Strong** recommendation unless a clear and compelling rationale for an alternative approach is present.

# Biologicals

# Biological factors



# Biological idea

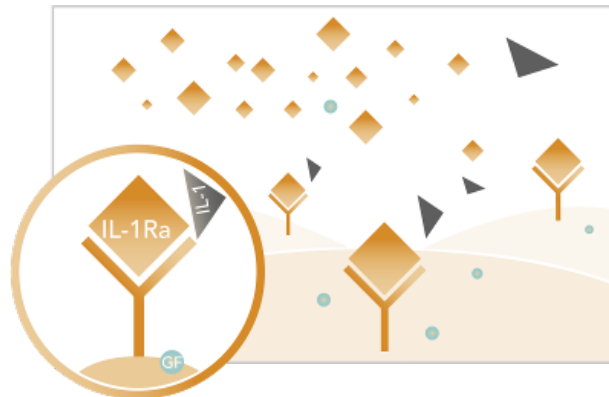
## Situation



## Therapy



## Effect



# Biologicals

- **They are not all the same**
- **Variations from method to method**
- **Variations from patient to patient**
- **Variations from time to time**



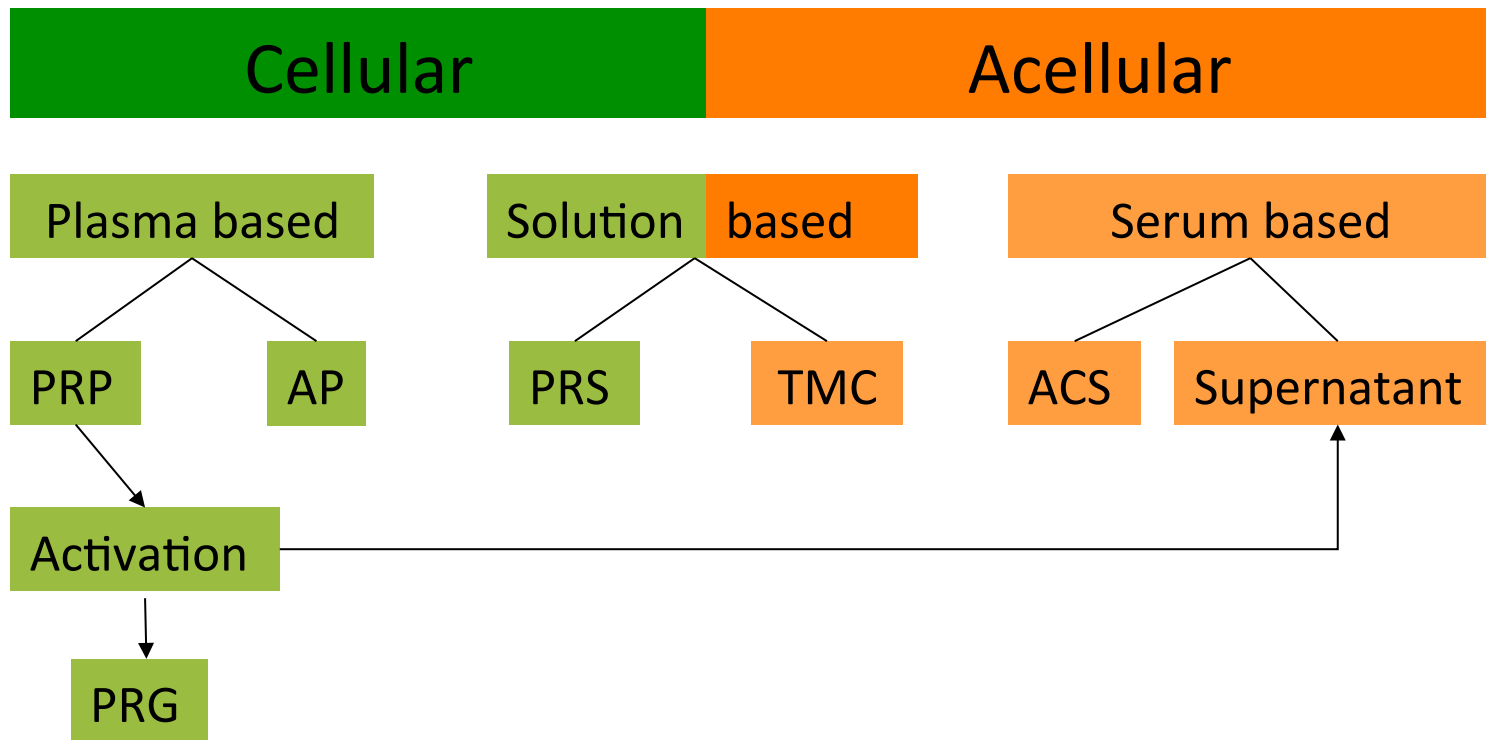
# Autologous Blood Products

- **Biological produced from patient's blood**
  - Autologous, modified
- **Biological produced by the veterinarian**
  - Pharmaceutical Law, EMEA and FDA
- **Medical device or standardised method**
  - They are not all the same

# **ABPs indications**

- **Implantation & Reconstruction**
- **Joint disease**
- **Tendovaginitis, Bursitis**
- **Tendon & ligament injuries**
- **Radiculopathies**

# ABPs Taxonomy



# Platelet Rich Plasma - PRP -

## Content

- Non modified Plasma
  - Fibrinogen, Prothrombine
- Platelets
  - C > 4 x Baseline,  
(Marx 2001)
- Leucocytes
  - Variable concentrations

## Concept

- Growthfactor release
  - At site of damage
- Growthfactors
  - PDGF, TGF, VEGF,  
FGF...
- Anabolic stimulation
  - Stimulation of migration,  
cell devision, synthesis...

# PRP - Clinical use

- **Pathologies with substantial loss/need**
  - Tendon lesions, fractures, implants, wounds
  - Documented for canine equine and human medicine
- **Joint pathologies**
  - Used for OA, cave: coagulation, WBCs, RBCs
  - Lack of clinical documentation

# Autologous (Conditioned) Plasma - A(C)P -

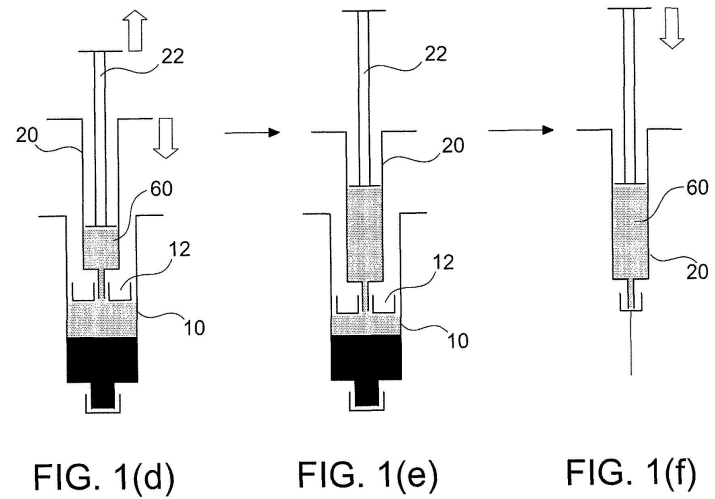
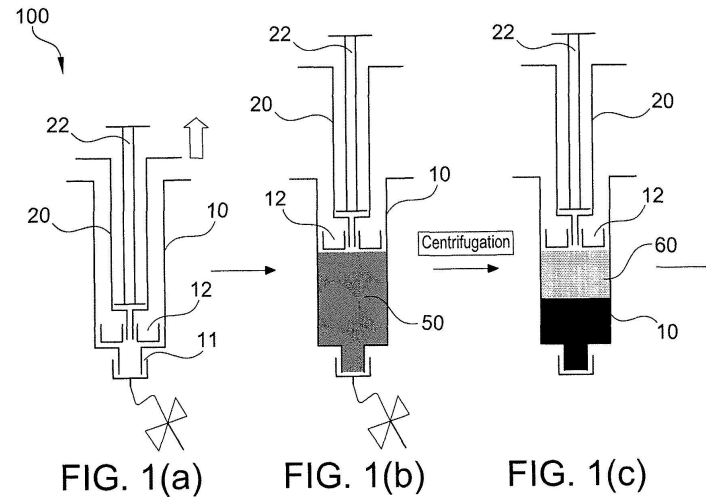
## Ingredients

- Non modified Plasma
  - Fibrinogen, Prothrombine
- Platelets
  - No significant difference to whole blood, (Stief 2011)
- Leucocytes
  - Depletion of WBCs

## Concept

- Growthfactor release
  - At site of damage
- Growthfactors
  - PDGF, TGF, VEGF, FGF...
- Anabolic stimulation
  - Stimulation of migration, cell division, synthesis...

# ACP - Preparation



STRUTPATENT.COM

# ACP - Clinical use

- Same as PRP

Hardly any Platelet elevation → low in GFs

Depletion of WBCs → necessary?



# Autologous Conditioned Serum - ACS -

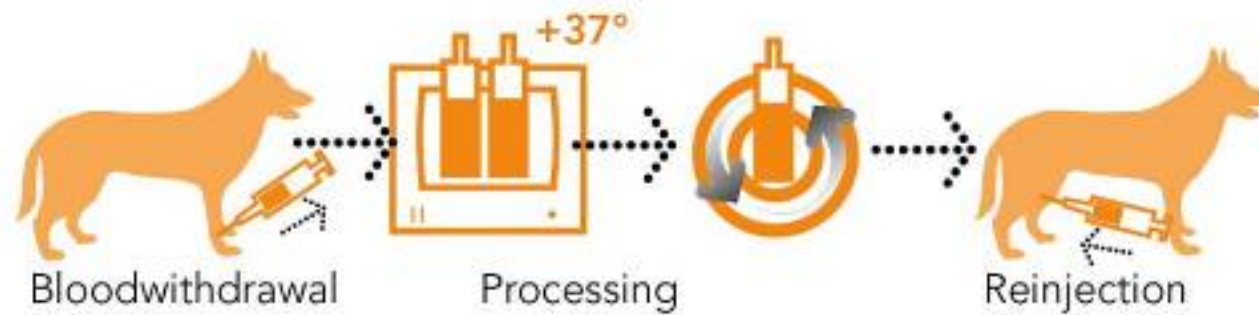
## Ingredients

- Serum
  - No coagulation factors
- Growthfactors
  - Release of GF's during preparation (FGF, IGF...)
- Cytocines
  - De novo synthesis by WBCs (IL-1Ra, IL-10...)

## Concept

- Direct application
  - Concentrated proteins
- Katabolic supression
  - IL-1 inhibition, antiinflammation
- Anabolic stimmung
  - Stimulation of migration, cell devision, synthesis...

# ACS - Preparation



# ACS - Clinical use

- **Pathologies of synovial structures**
  - OA, synovitis of joints, bursae and tendon sheaths
  - Good documentation for equine and human use
  - Caseseries for canine, studies in progress
- **Tendon pathologies**
  - Used for bowed tendon and core lesions
  - Lack of clinical documentation, studies in progress

# What for what and when?

	Joint	Tendon
Biological	ACS	PRP
Reason	Anti-inflammatory Anabolic No cells or clotting factors	Anabolic Clotting factors Cells
Timing	Acute and chronic, PO	Acute and proliferative phase

Everything depends on...

- Stage of disease
- Use of patient
- Owners compliance

# Intra-articular injections for OA

- Safe if correct technique is applied
- Agent directly applied to pathology
- Selection of the right agent
- Selection of the right cases
  
- Multimodal treatment is essential
  - Surgery, weight management, physical exercise, nutritional supplementation

Vielen Dank!

