Casual Friday Presents

The Science Behind Nexugen

FM Strategies: Physiology, Pathology, Interventions.

A BIOGENETIX CLINICAL PRESENTATION
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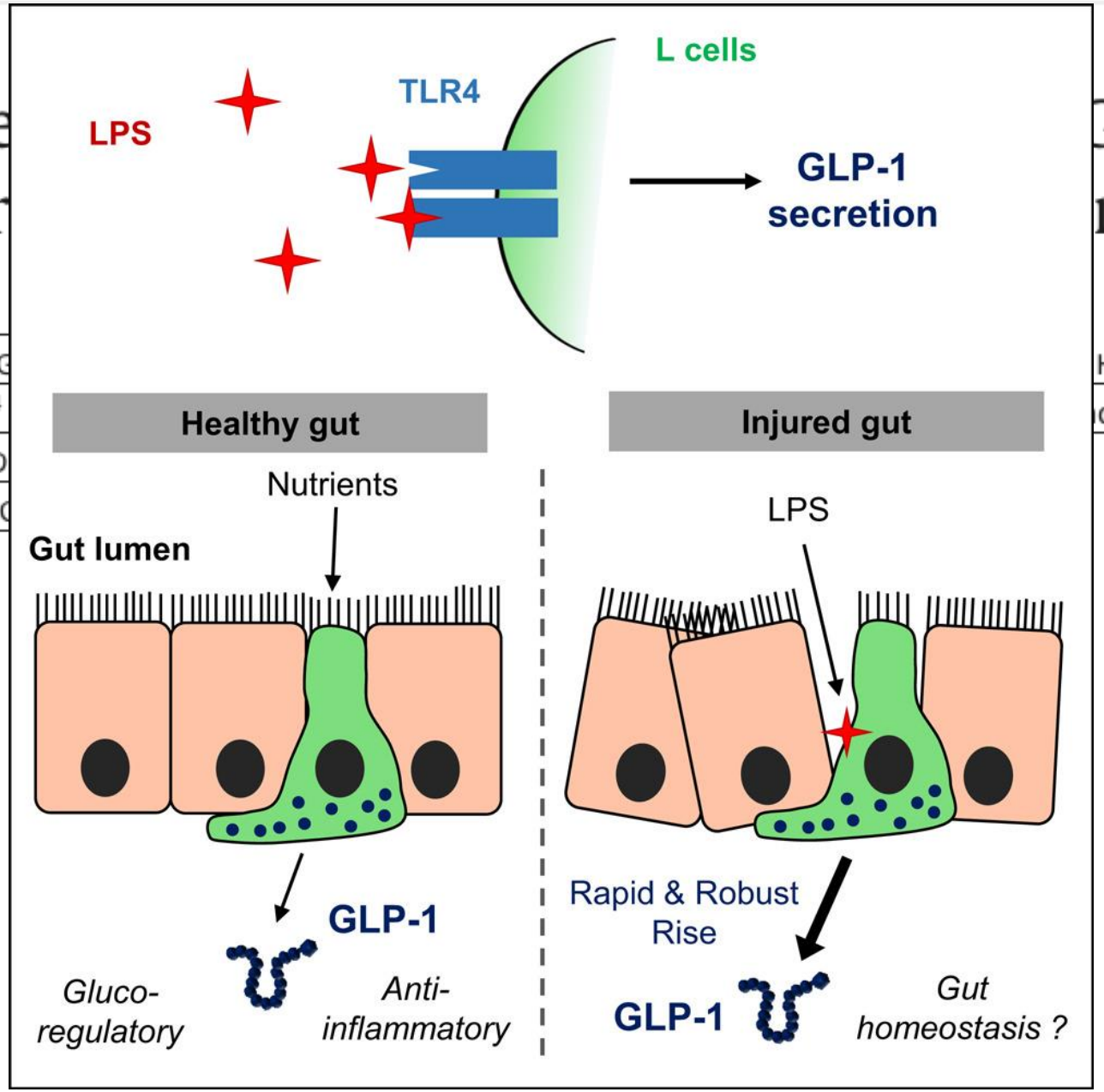
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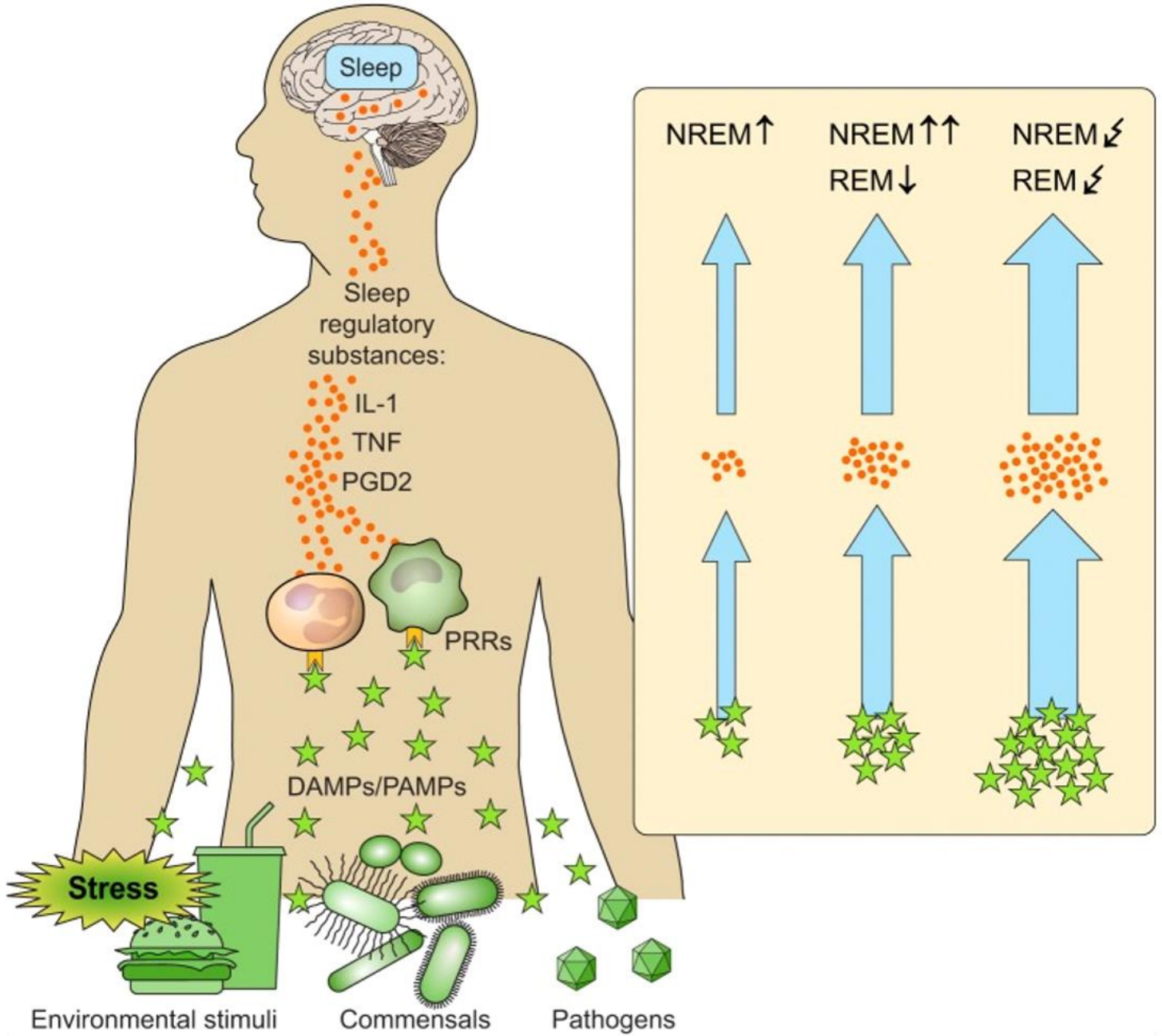
Report

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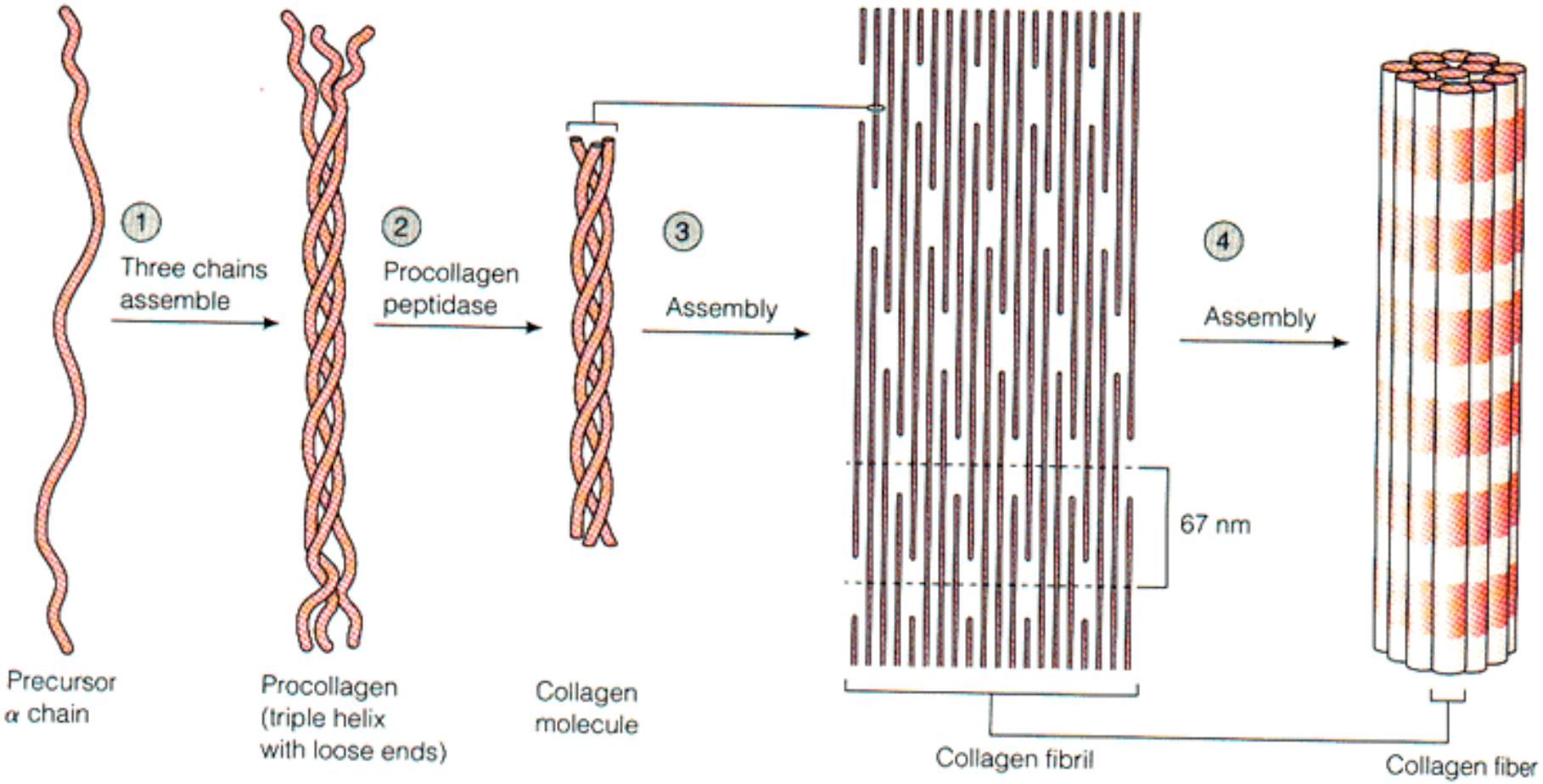


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https://pmc.ncbi.nlm.nih.gov/articles/PMC6689741/

Collagen Fiber Structure



https://www.orthobullets.com/basic-science/9013/collagen

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Clin Orthop Relat Res. 2020 Apr 14;478(8):1839–1847. doi: 10.1097/CORR.0000000000001261

Obesity Increases the Risk of Tendinopathy, Tendon Tear and Rupture, and Postoperative Complications: A Systematic Review of Clinical Studies

Marina Macchi [1,2,3,4], Matteo Spezia [1,2,3,4], Silvia Elli [1,2,3,4], Gabriele Schiaffini [1,2,3,4], Emanuele Chisari [1,2,3,4]✉

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PMCID: PMC7371074 PMID: 32732565

Obesity has been investigated as a possible risk factor for impaired healing in patients with tendinopathy because it could increase mechanical stress and support an inflammatory environment [58]. Low-grade, chronic inflammation [2], which affects this population, seems to be caused by adipocytes [57]. Because of hypertrophy, adipose cells suffer from hypoxic, mechanical, and oxidative stress, ultimately leading to cellular apoptosis [38] with the release of intracellular pro-inflammatory molecules [30]. Additionally, continuous macrophage recall increases the production of pro-inflammatory cytokines [35]. Strong evidence confirmed that this inflammatory condition predisposes patients with obesity to have chronic diseases such as Type II diabetes mellitus, cardiovascular diseases, degenerative diseases, and autoimmune conditions, which are well-known risk factors for musculoskeletal diseases [7, 27, 42, 43].

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In the 22 included studies, we analyzed the data of 49,914 participants (5984 with obesity), 31,100 (1884 with obesity) who had upper extremity tendinopathy while 18,814 (4010 with obesity) had lower extremity tendinopathy. We only examined patients with obesity (BMI ≥ 30 kg/m^2), defined according to the WHO's criteria [41]. The total number of patients with obesity was 5912. The weighted mean age was 50.5 ± 4.6 years, and the male-to-female ratio was 8:10.

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Our findings suggest that obesity is associated with a higher risk of tendinopathy. Higher BMI was associated with macroscopic tendon changes such as greater thickness and lower stiffness [2, 6, 10, 22, 53, 59]. However, although mechanical changes and systematic comorbidities could explain the higher risk of tendinopathy in individuals with obesity than in individuals without, the findings we showed in upper extremity tendons weaken this conclusion. The molecular aspects of the disease, particularly adipokines, should be studied further for these reasons. Only one study [46] considered this aspect and found that higher levels of leptin were associated with a lower incidence of recovery from upper extremity soft-tissue disorders. In contrast, higher levels of resistin and visfatin were associated with a higher recovery rate. Thus, the role of leptin resistance, which is commonly found in people with obesity, may elucidate this further [20, 39]. Mechanical changes cannot be considered the cause of the increased risk of tendinopathy and should be considered a contributing factor only. We should aim to evaluate the metabolic state of patients with obesity.

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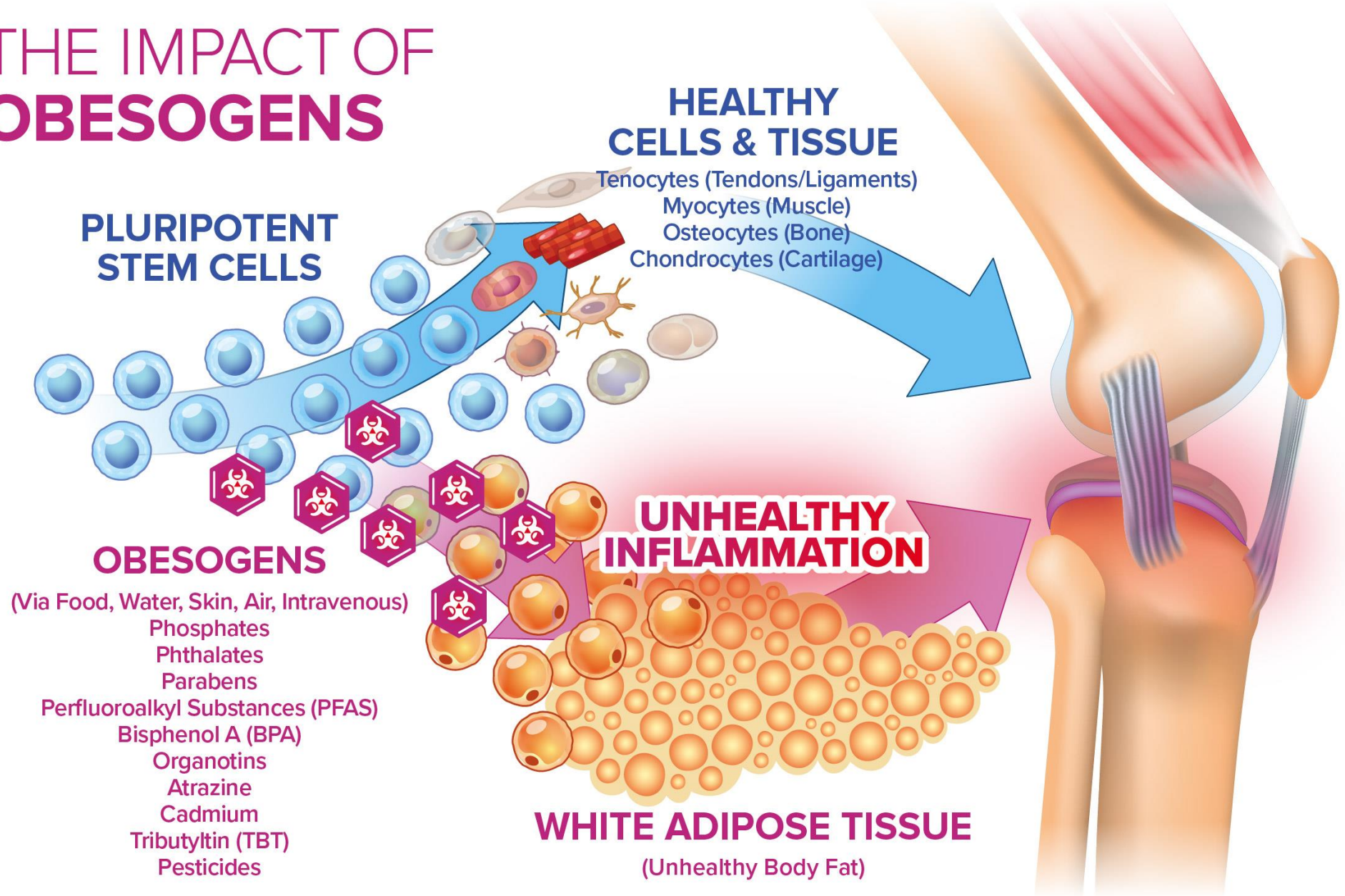
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Obesity is associated with tendinopathy and its main features. The risk that this condition will develop, together with the risk of complications after surgery, was higher when either upper and lower extremity tendons were investigated. When we evaluated tendon tear and rupture, only upper extremity tendons seemed to be affected. This review is the first, to our knowledge, to systematically investigate this association, and it is based only on observational evidence that did not show causation but only association. Thus, the results should be interpreted with caution. However, our findings highlight that obesity has a clear role in tendinopathy, and patients should be guided in weight loss and proper progressive physical activity. In addition, surgery might not be the best option to treat tendon tear and rupture because of the higher risk of complications and impaired healing response in clinical and preclinical studies, respectively. Future preclinical studies are needed to confirm our results and investigate the inflammatory and molecular pathways of this relationship, while prospective, multicenter, matched-cohort studies may elucidate its role clinically. In particular, they will need to identify whether obesity is just an associated factor or whether it has a central role in the pathogenesis of tendinopathy.

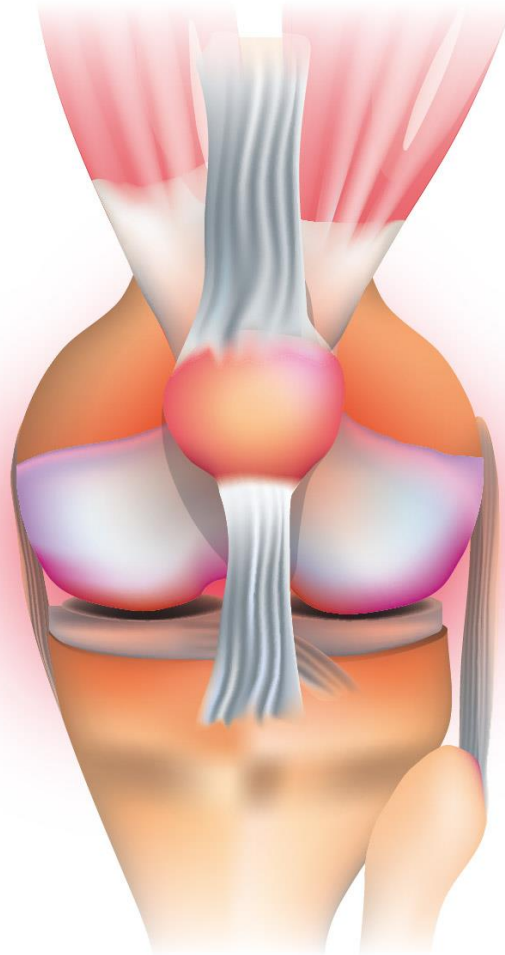
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THE IMPACT OF **OBESOGENS**



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THE **ADIPOKINE** SPIRAL



1 Obesogens Drive Stem Cells into Adipocytes

2 Adiposity Increases

3 Increased Adipokine Activity

4 Triggering Increased Unhealthy Inflammation

5 Ongoing Tissue Damage

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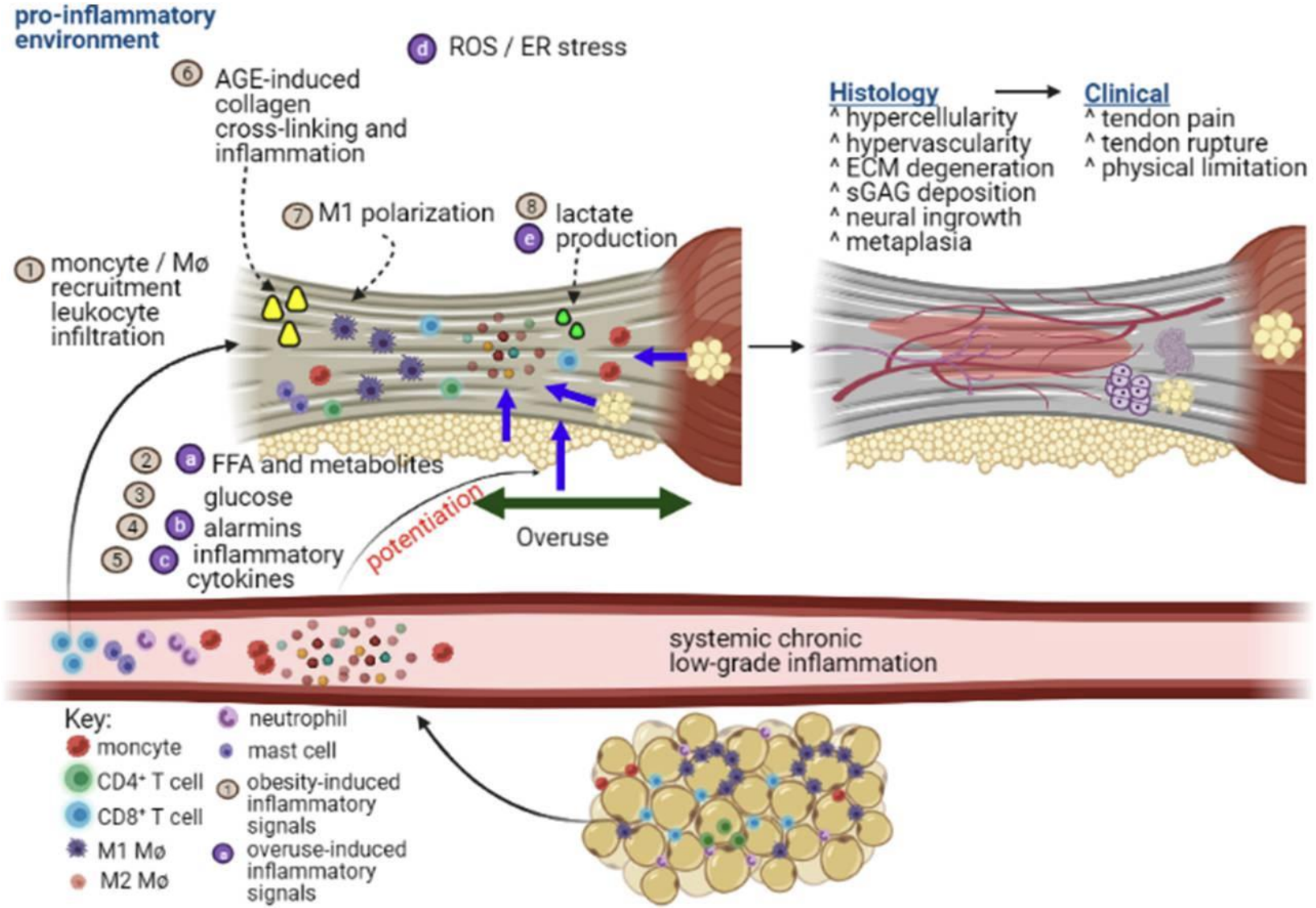
Notes:

- **Obesity can affect tendons through both loading and systemic factors.** Greater body mass increases mechanical demand, while adipose tissue can contribute inflammatory signals and metabolic changes that may affect tendon tissue.
- Tendon changes in obesity models, including **altered collagen fibrils, impaired remodeling, lipid deposits, and disorganized tendon structure are possible**.
- Animal studies suggest that reduced GAGs could contribute to less well-organized collagen fibrils.

GAGs and mucopolysaccharides

- **Glycosaminoglycan is current term; mucopolysaccharide is older term** used for this family of molecules.
- GAGs are part of the tendon's extracellular matrix. They help organize the matrix around collagen and influence its structure and hydration.
- O**besity-related tendon changes can include altered GAG levels; GAGs are involved in tendon matrix organization.**

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https://www.ncbi.nlm.nih.gov/core/lw/2.0/html/tileshop_pmc/tileshop_pmc_inline.html?title=Click%20on%20image%20to%20zoom&p=PMC3&id=8666605_gr2.jpg

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4 Mechanisms

1. Metabolic related inflammatory imbalance.
2. Metabolic related structural integrity.
3. Body weight related mechanical stress.
4. Job/Athletic related overuse stress.

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Curr Ther Res Clin Exp. 2016 Nov 18;78:1–7. doi: 10.1016/j.curtheres.2016.11.001

A 3-Arm Randomized Trial for Achilles Tendinopathy: Eccentric Training, Eccentric Training Plus a Dietary Supplement Containing Mucopolysaccharides, or Passive Stretching Plus a Dietary Supplement Containing Mucopolysaccharides

Ramon Balius [1,2], Guillermo Álvarez [3], Fernando Baró [4], Fernando Jiménez [5,6], Carles Pedret [2], Ester Costa [7,*], Daniel Martínez-Puig [7]

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PMCID: PMC5198794 PMID: 28053674

In this study, 3 different interventions have been evaluated: EC alone, the combination of EC with a dietary supplement containing MCVC, and an alternative physical therapy such as PS combined with the dietary supplement in patients with Achilles tendinopathy. The main goal was to determine the additional benefit of MCVC to a physical therapy program.

EC: eccentric load training (muscle gets long under load)
MCVC: mucopolysaccharides, type 1 collagen, and vitamin C (tendoactive)
PS: passive stretching

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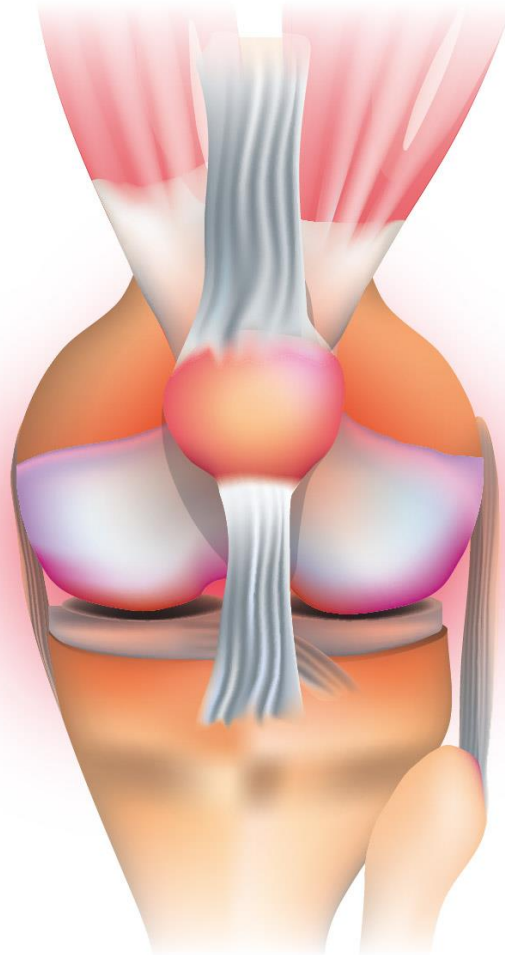
A 3-Arm Randomized Trial for Achilles Tendinopathy: Eccentric Training, Eccentric Training Plus a Dietary Supplement Containing Mucopolysaccharides, or Passive Stretching Plus a Dietary Supplement Containing Mucopolysaccharides

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The data obtained from this study confirm the therapeutic potential of EC for the management of tendinopathy, both at reactive and degenerative stages. The novelty of this study is that it shows the effects of a new therapeutic approach consisting of personalized stretching routines and dietary supplementation with MCVC. In patients with reactive tendinopathy, supplementation with MCVC further decreased pain levels compared to EC alone, so it could be included in the therapeutic arsenal for tendinopathy. In patients with degenerative tendinopathy, supplementation with MCVC could not improve the outcome of EC. Despite the lack of blinding and placebo treatment, the obtained results suggested that for patients with difficulties in performing EC due to advanced age, illness, or extreme tendon injury, a PS program supplemented with MCVC could be an alternative treatment to be taken into account.

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1 Obesogens Drive Stem Cells into Adipocytes

2 Adiposity Increases

3 Increased Adipokine Activity

4 Triggering Increased Unhealthy Inflammation

5 Ongoing Tissue Damage

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A clinical rundown:

1. What situations are involved (lifestyle)?
2. Do I have data that highlights the mechanism (testing)?
3. What approach is the patient looking for?
    - Symptom relief or roots?

Phase 1: What are my expectations for progress?

Phase 2: How long is the road ahead?

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Metabolic Clearing Protocol



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Regen Support Kit PLUS



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SUPPLEMENT FACTS

Serving size: 2 Capsules Servings per container: 30	Amount Per Serving	% Daily Value
Vitamin C (ascorbic acid)	60 mg	67%
TENDOACTIVE® Proprietary Blend: Mucopolysaccharides and Type I Collagen	520 mg	**

** Daily Value Not Established

Other Ingredients: HPMC (capsule), microcrystalline cellulose, ascorbyl palmitate, silica, and medium-chain triglyceride oil.
Does Not Contain: Wheat, gluten, yeast, soy, dairy products, fish, shellfish, peanuts, tree nuts, egg, ingredients derived from genetically modified organisms (GMOs), artificial colors, artificial sweeteners, or artificial preservatives.

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We Want to Hear from You!

Give us your Casual Friday feedback
with this short 5-question survey.

biogenetix.com/survey

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