

MONOCYTES

PERIPHERAL BLOOD MONONUCLEAR CELLS



TISS'YOU
BIOLOGICAL COMPANY

ORTHOBIOLOGICS

Osteoarthritis and muscle-tendon pathologies are among the most important causes of pain and disability in humans and have a great impact on quality of life. These conditions are often correlated with ageing, but early onset of pain or disability might be a consequence of traumatic events and incorrect postural attitudes. Tissues affected by these pathologies have limited self-healing ability thus resulting in a tough challenge for orthopaedic surgeons and physiatrists. Regenerative medicine is the cornerstone for solving the causes of tissue degeneration on the biological perspective.

Why do we talk about mononuclear cells in orthobiologics?

Peripheral blood mononuclear cells are the same as in natural conditions that contribute to the self-healing mechanism of tissues. They are the sentinels of our internal homeostasis and have the extraordinary ability to recall and target stem cells residing in repair processes. With a simple blood draw we can make use of these helpful cells.

Mononuclear cells carry out three main actions:

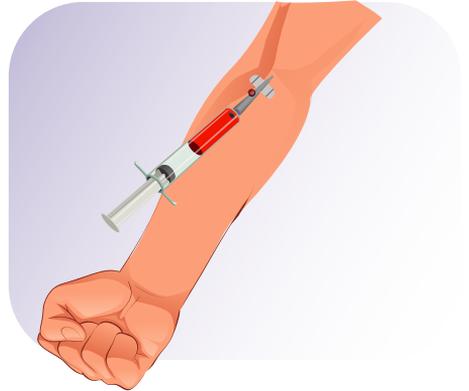
- **Trophic effect through paracrine action:** mononuclear cells can trigger stem cells migration and activation in order to promote tissue regeneration.
- **Immunomodulation:** it is demonstrated that a concentrate of peripheral blood mononuclear cells introduced into a tissue that presents chronic inflammation, polarizes the macrophage from the M1 phase (quiescent phase) to M2, giving the "start" for the restorative phase.
- **Neo-angiogenesis:** through release of grow factor and cytokines, mononuclear cells are able to promote the formation of new blood vessels, helping the dynamic re-assembling of endothelial cells

THE TECHNIQUE: MAIN STAGES

WITHDRAWAL | PROCESSING | RECOVERY | USE

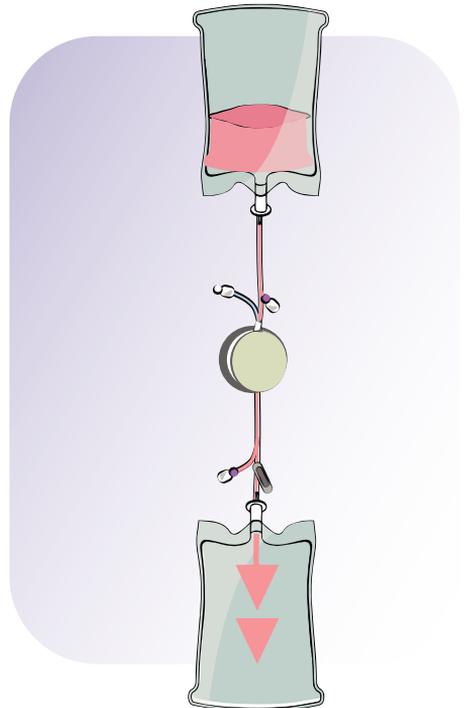
1-Withdrawal (80-120ml)

Put in the 60ml syringe 5ml of ACD-A or 1ml of heparin sodium 5000UI/ml. Clean the draw area and with dedicated cannula needle take 60ml of peripheral blood, then proceed with the withdrawal with the second 60ml syringe.



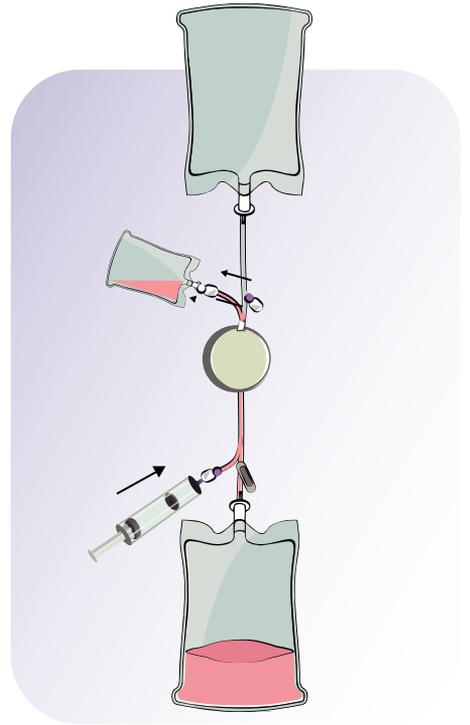
2 - Processing

Put the entire blood sample inside the upper bag of the system and activate the filter circuit by opening the clamps. Wait until all the blood has flowed through the filter. Now the scrap is deposited into the lower bag while the cells are trapped inside the membrane.



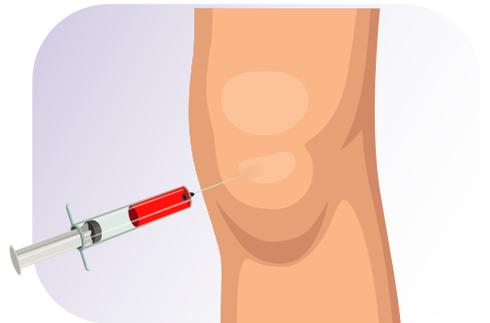
3 - Recovery

Close the two clamps (lower and upper) to exclude the filter circuit. Open the side clamp. Aspirate using the 10ml syringe of the sterile saline solution and connect the syringe to the lower side door. Push 2-3ml of sterile saline solution in a very strong way and the remaining 7-8ml with extreme slowness. Once the filter wash operation is finished, retrieve the contents from the collection bag with a new syringe.



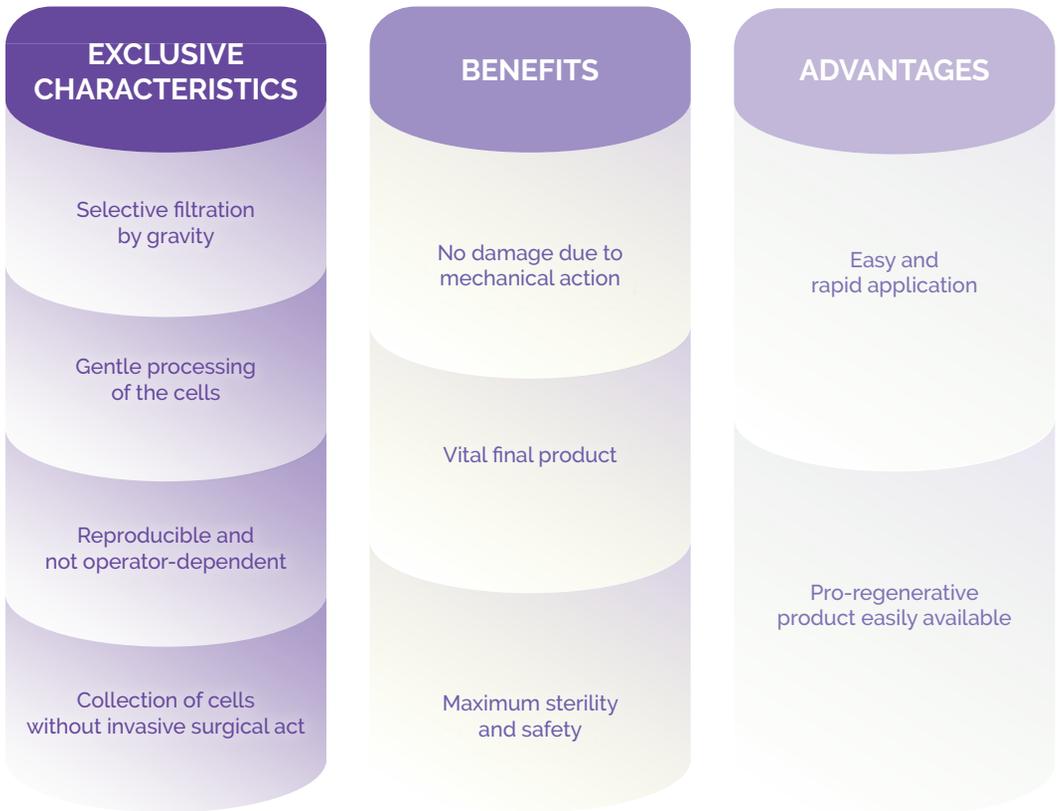
4 - Application

- **Tendon repair:** After suture or scarification, it is necessary to inject the entire intra-tendon portion with wheals from approximately 2ml of cell concentrate.
- **Cartilage Injury:** At the end of arthroscopy surgery and perforations according to Steadman, infiltrate 8ml into the joint.
- **Necrosis-pseudarthrosis:** Remove the necrotic portion of the bone and bring back to bleeding, then load the bone scaffold with the concentrate of mononuclear cells or infiltrate freely inside the bone.



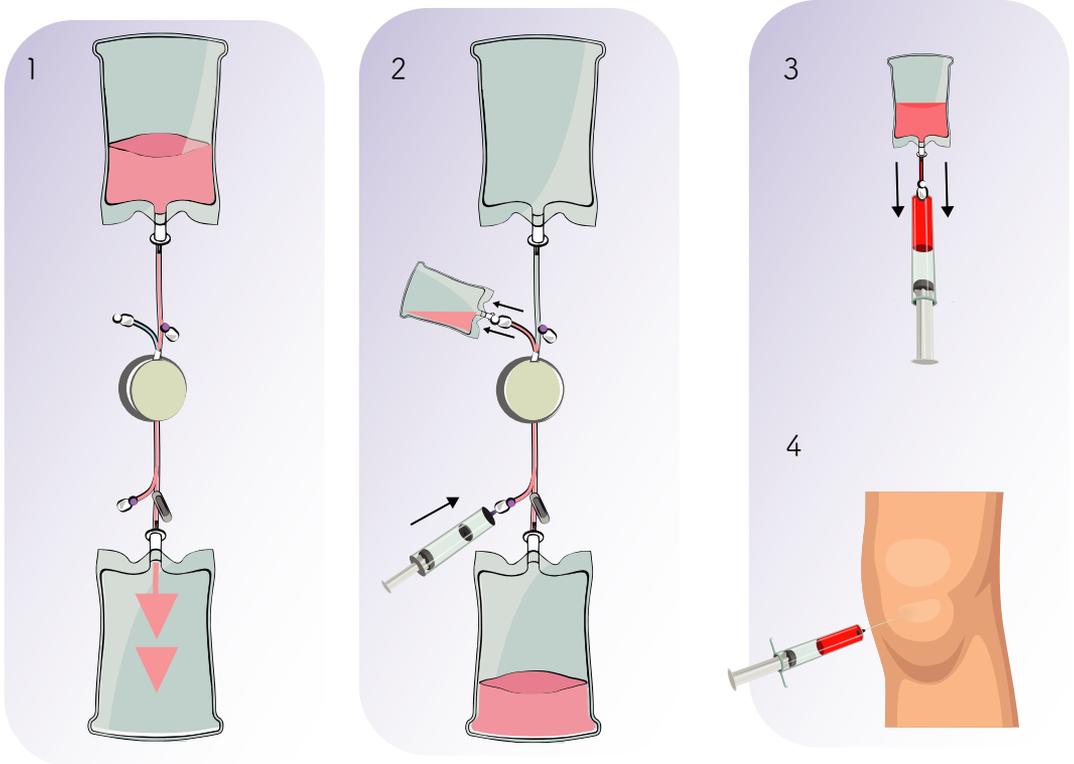
Strengths

The cellular concentrate of peripheral blood mononuclear obtained by **Monocytes Device** does not present contamination by inflammatory pro cells such as neutrophils, basophils, or eosinophils and collects 67% of monocytes and lymphocytes. The final product is extremely vital and biologically active due to the completely atraumatic processing.



Minimal manipulation

The **Monocytes processing system** complies with all European reference standards in the field of tissue manipulation. The use of the sterile device is to be considered exclusively for autologous use and the filtration guarantees the collection of cells without altering the structure and function, for this reason it is considered as minimal manipulation ".



The **M O N O C Y T E S** system

Monocytes is a selective filtration system of peripheral blood from which it is possible to obtain mononuclear cells. Monocytes works for fall filtration, advantage force of gravity, avoiding any act that alters or stresses the cells themselves (centrifugation, cutting, etc.). The heart of the system is a membrane that selectively retains cells for electric charge, recognising for membrane potential, and is able to completely eliminate the inflammatory cell component.



AREAS OF APPLICATION

- BONE VASCULAR PATHOLOGIES
 - CONSOLIDATION DELAYS
 - TENDON INJURIES
- FOCAL CARTILAGE INJURIES

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