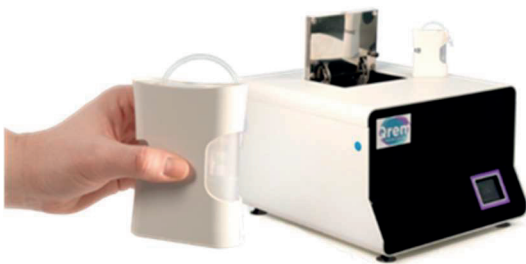




PIONEERING TECHNOLOGY FOR AUTOLOGOUS TREATMENT WITH CYTOKINES

The Qrem® Cytokine product is a closed, automatic Lab-in-a-Box system which is comprised of a tabletop device (Q-Device) and a disposable, sterile kit (Q-Kit) which work biunivocally.

They can be installed in any office, no matter how small, without the need for special infrastructure or someone with specific training.



Qrem® Cytokine Kit and Qrem® Device

PATENTED METHOD TO EXTRACT CYTOKINES FROM BLOOD

With Qrem® Cytokine technology it is possible to obtain the cytokines that are involved in tissue regeneration.

Cytokines are proteins released by blood cells and platelets.

CYTOKINES: THE LANGUAGE OF THE CELLS

Cytokines are the messages used by cells to manage injuries' healing process and keep our bodies in good working order.

There are several families of cytokines, including pro-inflammatory cytokines, which promote inflammation; anti-inflammatory cytokines, which have the opposite effect, and growth factors, which stimulate the cell proliferation of tissues.

In order for the regeneration process to end correctly, a balanced amount of these cytokines is needed. When this balance is off, tissues begin to deteriorate.

Autologous Cytokine-rich serum (ACRS) provides the cytokines needed to help restore this balance.

QREM CYTOKINE EXTRACTS CYTOKINES FROM PLASMA, WHITE BLOOD CELLS AND PLATELETS

Anti-inflammatory cytokines are primarily found in plasma and white blood cells¹.

Qrem® Cytokine does not discard IGF-1, a plasma growth factor that has been proven to be vitally important in collagen synthesis in tendons^{2,3} and to play a very active role in chondrogenesis⁴.

By activating white blood cells, various cytokines are obtained, such as IL-10 and IL-4, which help polarise macrophages to M2 that play a crucial role in the anti-inflammatory process^{5,6}.

Studies show that keeping a balance between M1 macrophages (inflammatory) and M2 macrophages (anti-inflammatory)



Qrem® Cytokine Autologous Cytokine Rich Serum

MUSCULOSKELETAL SYSTEM

is important in halting degenerative processes of the musculoskeletal system, such as osteoarthritis ^{7,8}.

In fact, there are many studies proving the relevance played by the growth factors contained in platelets (PDGF, VEGF, TGF- β 1, EGF) in the healing process.

ACTIVATION WITHOUT INCUBATION OR ADDITION OF EXOGENOUS CALCIUM

Qrem® Cytokine technology uses cell activation mediated by calcium and autologous thrombin, in addition to mechanical forces.

Qrem® Cytokine does not require the manipulation, incubation, culture or addition of substances to activate blood cells.

OUT-PATIENT TREATMENT

Treatment with ACRS does not require a surgery room. It can be provided in the physician's office and consists in 3 very simple steps:

1. 38 ml of blood is drawn from the patient and put into the Q-kit.
2. The patient has to wait 36 minutes while the blood is being processed and ACRS is obtained thanks to the Qrem® Cytokine system.
3. The physician then injects the ACRS in the area to be treated, and the patient can immediately go home.

USE OF SYNERGISTIC PROPERTIES OF CYTOKINES

Qrem® Cytokine produces more than 10 ml of ACRS serum with a balanced concentration of cytokines.

The ACRS uses the synergistic properties of cytokines to stimulate multiple signalling pathways, which decreases inflammation (mediated by anti-inflammatory cytokines) and activates tissue regeneration.

The balanced use of several cytokines and growth factors helps stimulate the different endogenous repair pathways ^{9,10}.



APPLICATION IN MUSCULOSKELETAL SYSTEMS

Treatment with cytokines and growth factors is aimed at acting on the healing process through cell proliferation, resolving inflammation and remodelling the tissues damaged in:

- Bones ^{11,12,13,14}
- Cartilage ¹⁵
- Muscles ¹⁶
- Spine ¹⁷
- Tendons ^{18,19,20,21}
- Ligaments ²²



Qrem® Cytokine Autologous Cytokine Rich Serum MUSCULOSKELETAL SYSTEM

SAFETY AND REGULATORY COMPLIANCE

The application of Qrem® Cytokine technology yields a cytokine rich serum which is an Autologous Medicine for Human Use that meets all the regulatory requirements of the Spanish Agency of Medicines and Medical Devices and CE marking.



ABOUT QREM REGENERATIVE TECHNOLOGY

Qrem is a Spanish company founded in 2016 which develops, manufactures and sells medical devices for regenerative medicine.

Our mission is to drive the standardisation and scalability of autologous regenerative therapies, making Lab-in-a-Box bioengineering systems available to physicians so they can deliver therapies in their own offices easily and safely to reach as many patients as possible thanks to their cost-effectiveness.



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