Energy storage synovial membrane control

How does energy metabolism affect synovial osteogenic transformation?
In contrast,metabolomic analysis revealed that high energy metabolism (TCA cycle) expression provides the energy required for synovial osteogenic transformation. Alterations in energy metabolism,cartilage repair,and osteogenic mechanisms are critical.

What is the role of synovial ECM in tissue homeostasis?
In conclusion,the role of synovial ECM in tissue homeostasis is to mediate appropriate cellular responses and phenotypesand to guide physiologically and pathologically related cellular behavior to maintain the mechanical integrity and function of synovial membranes.

What reflects a high-energy metabolic state in the synovium and synovial fluid?
Elevated TCA cycle activityin the synovium and synovial fluid reflects a high-energy metabolic state. Arginine is a semiessential amino acid that serves as a precursor for various molecules,including urea,nitric oxide,proline,glutamate,creatine,and agmatine.

Why are synovial ECMs important?
Synovial ECMs are highly plastic, providing biochemical and necessary structural support to cells while regulating organ development and maintaining body balance. Arthritis occurs when the balance of the ECM components in the synovium is disrupted.

Do synovial fluid mesenchymal stem cells attract MSCs?
Morphological aspects of synovial fluid mesenchymal stem cells isolated from (A) healthy persons and (B) patients with osteoarthritis. Cell cluster (arrowhead) is observed in synovial fluid mesenchymal stem cells from patients with osteoarthritis. SF seems to have a role in attracting MSCswhether from BM or other sources on the synovial joint.

Are synovium and synovial fluid involved in koa pathology?
GO enrichment analysis revealed that the differentially expressed proteins in both the synovium and synovial fluid were involved in cell adhesion,extracellular matrix organization,and collagen fibril organization,suggesting a shared biological functionbetween these tissues in KOA pathology.

Background: Knee osteoarthritis is a common degenerative joint disease involving multiple pathological processes, including energy metabolism, cartilage repair, and osteogenesis. To investigate the alterations in critical metabolic pathways and differential proteins in osteoarthritis patients through metabolomic and proteomic analyses and to explore the ...

The synovial membrane lining layer is the principle site of inflammation in RA. Here the resident cells are the fibroblast-like synoviocytes (FLS) and the synovial tissue macrophages (STM), ...

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Understand the role of the lactate system in energy production for exercise and sports performance; Anaerobic, Process of anaerobic glycolysis (glucose converted to lactic acid), Recovery time, Contribution to energy - duration and intensity Understand the role of the aerobic energy system in energy production for

The present invention relates to the power distribution control technology fields of the fuel cell-super capacitor composite power source of electric car, more particularly to a kind of vehicle-mounted composite power source power distribution synovial membrane variable structure control method, fuel cell is connected to DC bus as main power source, by irreversible ...

RA T cells upregulate the locomotion program. A key pathogenic property of RA T cells is their ability to rapidly invade the synovial membrane, maneuver through extravascular space and polarize into pro-inflammatory effector cells 11,32.Tissue infrastructure and chemokine milieu contribute to the attraction and retention of T cells 32,33.We explored whether RA T cells have ...

Synovial fluid MSCs have been studied in healthy persons and osteoarthritic patients in order to explore its potential for treatment of some orthopedic disorders. Here, we briefly review the ...

The present invention relates to the power distribution control technology field of the fuel cell ultracapacitor composite power source of electric automobile, specifically related to a kind of vehicle-mounted composite power source power distribution synovial membrane variable structure control method, fuel cell is connected to dc bus as main power source by irreversible ...

Dynamics of a Self-Excited Vibrating Thermal Energy Harvester with Shape Memory Alloys and PVDF Cantilevers ... Zhu, H. Sliding Mode Backstepping Control of Excavator Bucket Trajectory Synovial in Particle Swarm Optimization Algorithm and Neural Network Disturbance Observer. ... 2025. "Sliding Mode Backstepping Control of Excavator Bucket ...

(1) Background: Synovial tissue plays a fundamental role in inflammatory processes. Therefore, understanding the mechanisms regulating healthy and diseased synovium functions, as in rheumatic diseases, is crucial ...

At 2000 s, the energy storage is 191.34 Ah with energy flow control and 146.00 Ah without energy flow control, and the difference between the two is 45.34 Ah. The results show that the energy storage system with energy flow management has better energy storage effect.

Rheumatoid arthritis (RA) is a progressive autoimmune disease accompanied by joint swelling, cartilage erosion and bone damage. Drug therapy for RA has been restricted due to poor therapeutic effect, recurrence and adverse effects. Macrophages and synovial fibroblasts both play important roles in the pathology of RA. Macrophages secrete large amount of pro ...

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In this work, we aim to systematically investigate the lipid compositions derived from EVs existing in the synovial fluids. The most applied EV isolation methods including ...

Temporomandibular joint osteoarthritis (TMJOA) is a multifaceted degenerative disease characterized by progressive cartilage degradation, chronic pain, and functional ...

Synovium-derived mesenchymal stromal cell (Sy-MSC) is a newer member of the mesenchymal stromal cell families. The first successful demonstration of the mesenchymal stromal cell from ...

Osteoarthritis (OA) is a multifactorial disease depending on molecular, genetic, and environmental factors like mechanical strain. Next to the cartilage and the subchondral bone, OA also affects the synovium, which is ...

Relationships between differential proteins and osteogenesis: FN1 and TGFBI are closely associated with synovial osteogenesis, while the upregulation of energy metabolism ...

The synovial membrane, made of macrophages and synovial fibroblasts in a collagen-rich matrix, regulates exchanges with nearby blood capillaries. Articular cartilage, composed of chondrocytes within a collagen-proteoglycan matrix, is critical for joint function. SF, a hyaluronic acid-rich fluid secreted by the synovial membrane, lubricates ...

Finally, the membrane, or more precisely, the chemical gradients across the membrane, is an important energy source for the cell. 7.3.1: Membrane Structure and Composition Since most cells live in an aqueous environment and the contents of the cell are also mostly aqueous, it stands to reason that a membrane that separates one side from the ...

Designed Nanoarchitectures by Electrostatic Spray Deposition for Energy Storage C. Zhu*, Y. Fu and Y. Yu*, Advanced Materials, 2019, 31, 1803408. 169. 2D Material as Anode for Sodium Ion Batteries: Recent ...

To obtain high-resolution and high-precision images, the aviation remote sensing stabilization platform (ARSSP) is used, which enables the isolation of unpredictable aerial camera movements during aerial ...

Classically, lipids have been described as the main components of cell membranes, and also used as fuel and energy storage. In the recent years, studies have shown that lipids are bioactive molecules and function as ...

ECM in synovium not only supports the structural integrity of synovium, but also plays a crucial role in regulating homeostasis and damage repair response in synovium.

Membranes cover and line all parts of the body, both inside and out. There are four basic types of membranes in the body: mucous membranes line openings to the outside world and contain sticky mucus; serous ...

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Osteoarthritis (OA) is a degenerative joint disease that mainly occurs due to the cellular inflammatory response and the destruction of joint cartilage. Natural eggshell membrane (NEM), a byproduct of egg processing, ...

Osteoarthritis (OA) is a chronic progressive disease of the joint. Although representing the most frequent cause of disability in the elderly, OA remains partly obscure in its pathogenic mechanisms and is still the orphan of resolutive therapies. The concept of what was once considered a "wear and tear" of articular cartilage is now that of an inflammation-related ...

Calcium pyrophosphate dehydrate (CPPD) crystals are found in the synovial fluid of patients with articular chondrocalcinosis or sometimes with osteoarthritis. In inflammatory conditions, the synovial membrane (SM) is ...

Wear tests of joint prostheses are usually performed using bovine calf serum. The results from different laboratories are hardly ever comparable as, for example, the protein concentration and the protein composition of the ...

Osteoarthritis (OA) is a chronic degenerative joint disease that causes chronic pain, swelling, stiffness, disability, and significantly reduces the quality of life. Typically, OA is treated using painkillers and non-steroidal anti ...

Synovial variable structure control is a nonlinear control based on the control switching rule. Through the mutual switching between different control states, the current state quantity of the system moves according to the set ...

There is a lack of in vitro models able to plausibly represent the inflammation microenvironment of knee osteoarthritis (OA). We analyzed the molecules released from OA tissues (synovial membrane, cartilage, ...

Synovium samples were collected during total knee arthroplasty and assigned to histopathology or cyclic 10% tensile strain loading, including (1) static (control); (2) low ...

Synovial fluid is produced by synovial membranes in joint cavities and acts as a lubricant and shock absorber. It contains hyaluronic acid and filters interstitial fluid. ... Quality control, quality assurance, and quality assessment ...

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