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GENR Knee, Joint Solutions

Using cell genetic engineering nano-scale regeneration technology to promote technological innovation in natural meniscus regeneration and repair

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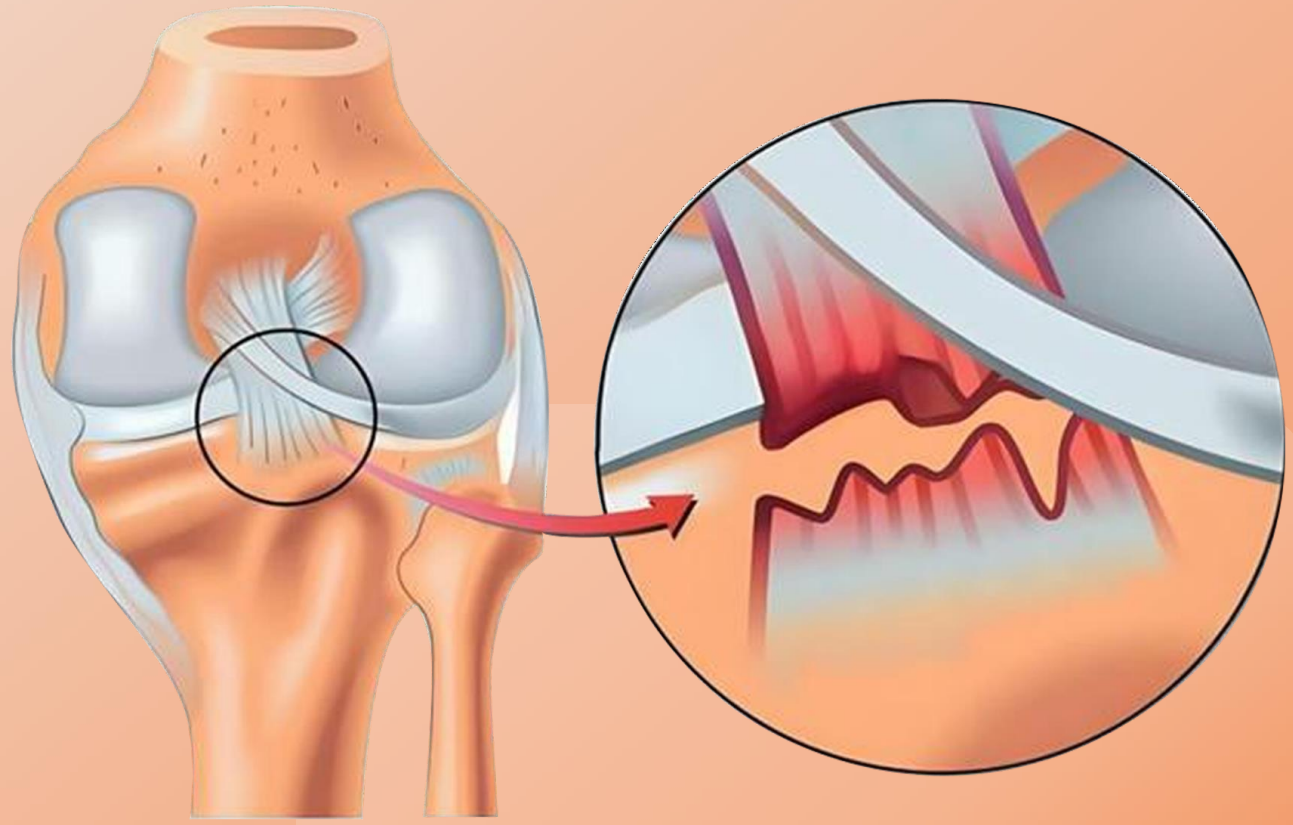
Project Knee GENR

Focusing on the natural regeneration and repair of meniscus cartilage, it goes beyond traditional stem cell therapy.



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Project Background

According to statistics, there are more than **140 million osteoarthritis patients in China** , **120 million** knee osteoarthritis patients **,** and the prevalence of **knee osteoarthritis in China is 8.1 %, with more than 100 million patients.**

The prevalence of osteoporosis in people over 50 years old is close to 20%, and the rate of low bone mass is

Nearly 50% of people over 40 years old have knee osteoarthritis. The rate was **17.0%** , **including 12.3% for males and 22.2% for females.** There was a significant difference between

Forecast of global osteoarthritis patient population growth: By **2050 ,** the number of osteoarthritis patients worldwide is expected to continue to grow, among which the number of patients with knee osteoarthritis is estimated to be **642 million** .

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Number of cases

Number of arthritis patients	Number of knee replacements
worldwide **355 million people**	**Globally every year** **1 million people**
China **150 million people**	**China every year** **300,000 people**

- The life span of the knee joint is only 60-70 years
- The incidence of osteoarthritis in people over 50 years old is 50 %, and the incidence in people over 70 years old is as high as 80%.

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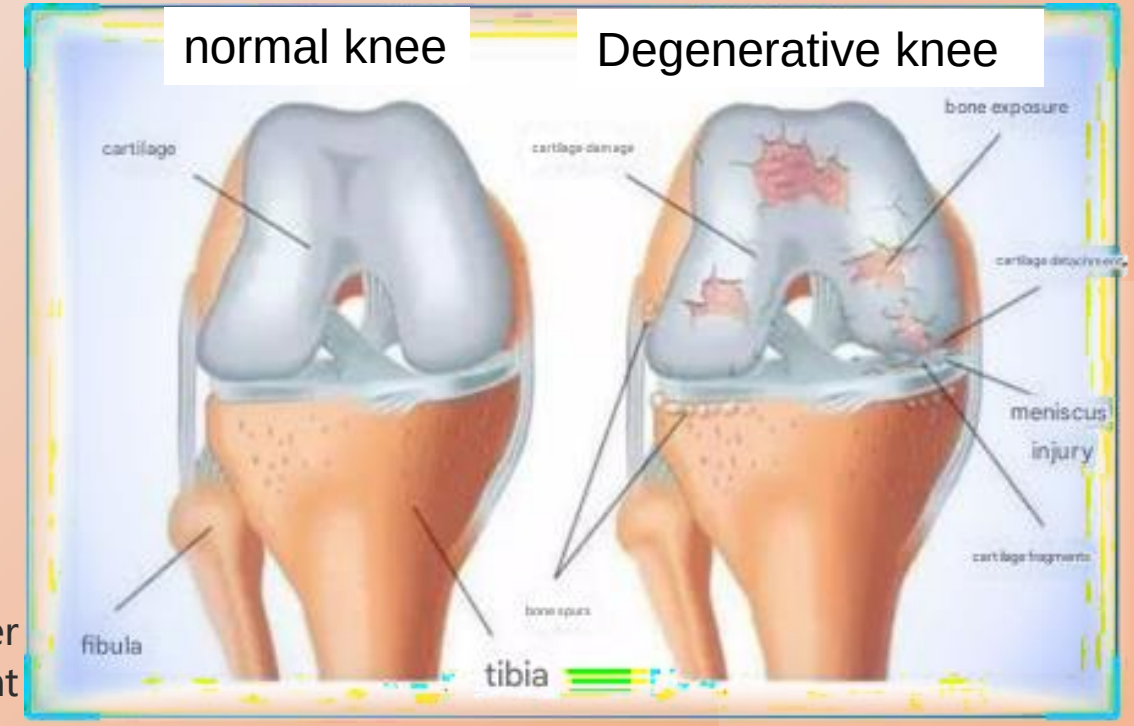
Impact of living environment

age

As we age, chondrocytes hypertrophy and thicken, and the synovial fluid is not supplied with enough nutrients, which causes hyaline cartilage to transform into fibrocartilage and the joint surface to wear out.

Profession

Workers, athletes and other occupations are prone to joint injuries or overuse, which changes the transmission of joint loads and increases local loads and wear on the cartilage surface.



weight

Obesity increases the burden on joints, and weight gain is directly proportional to the incidence rate.

deformity

Knee varus and valgus deformities, foot, hip, and spine deformities , etc. In addition, osteoarthritis tends to run in families.

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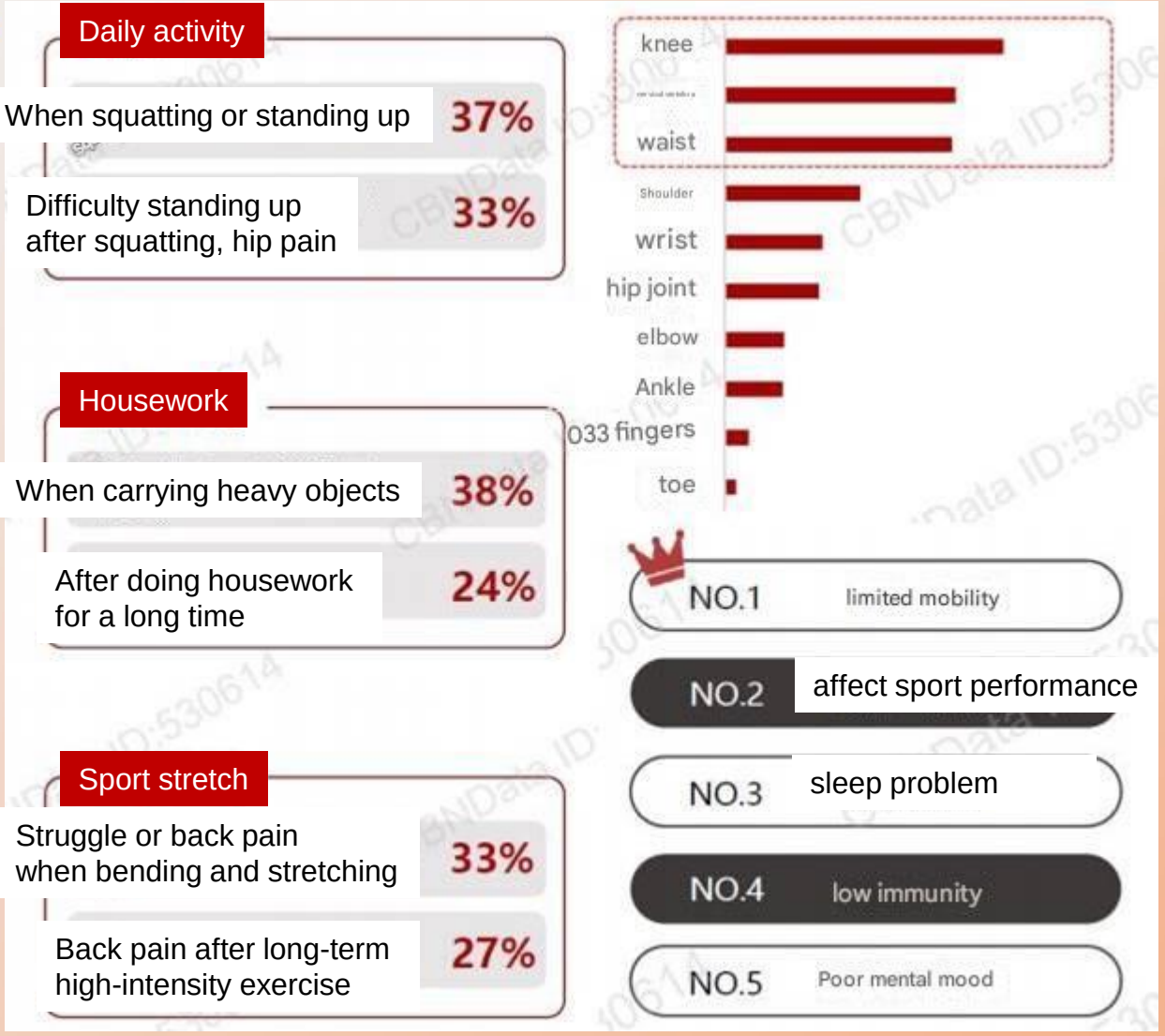

* Data source: 2023 Bone and Joint Health Trend Insight White Paper

In various life scenarios

Knees are the most common site of discomfort

Knee joint discomfort occurs in various daily activities, household chores, and exercise stretching. Sub-health of the knee joint not only affects mobility and athletic performance, but long-term discomfort can also have a certain negative impact on sleep, immunity, and mental mood.

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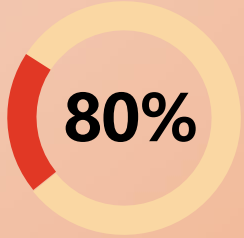
Project Background

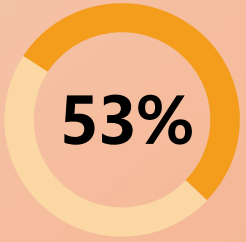
WHO statistics, 10 % of the medical problems of the global population are caused by osteoarthritis, which is the most common joint disease among the middle-aged and elderly. More than half of the elderly people over 60 years old in China suffer from osteoarthritis.

Inflammation is becoming more and more common, and osteoarthritis has shown a trend of occurring at a younger age.

>60 years old
The prevalence rate is as high as 50%



>75 years
The prevalence rate is as high as 80%



Bone joints
The disability rate is as high as 53%

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Knee joint structure

Soft tissue

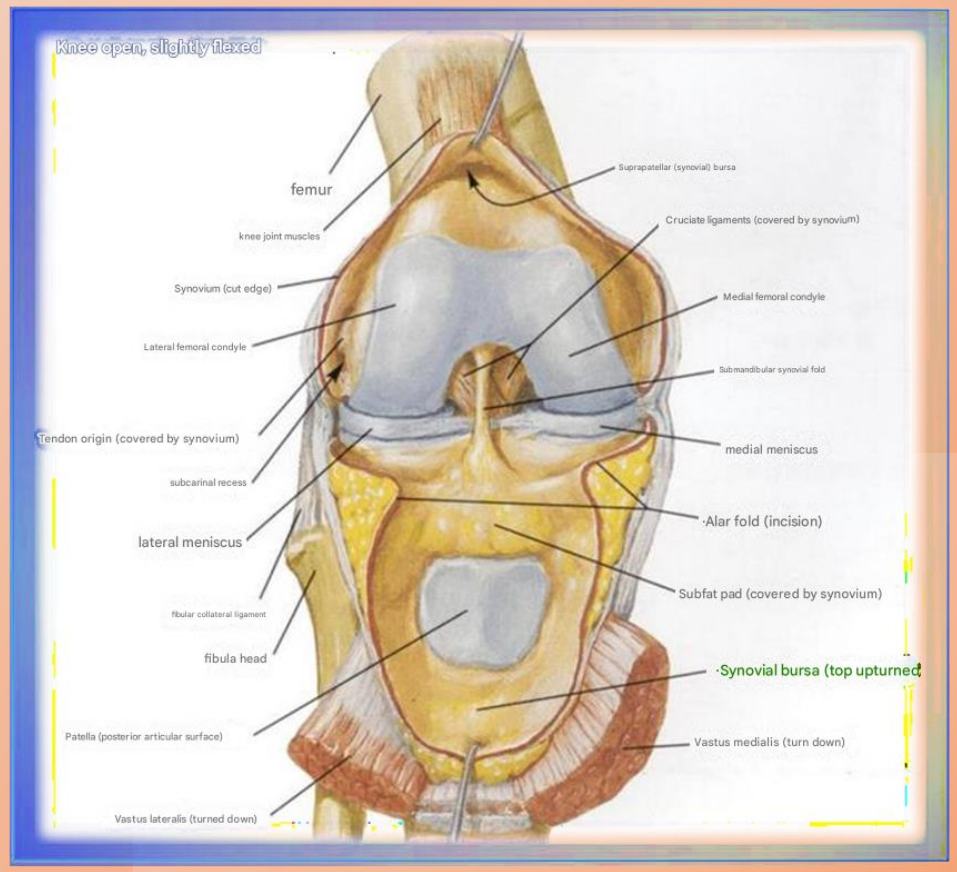
- ligament
- Synovial bursa
- Muscles and tendons
- Infrapatellar fat pad
- Synovium
- Meniscus

skeleton

Lower end of

Upper end of

- patella



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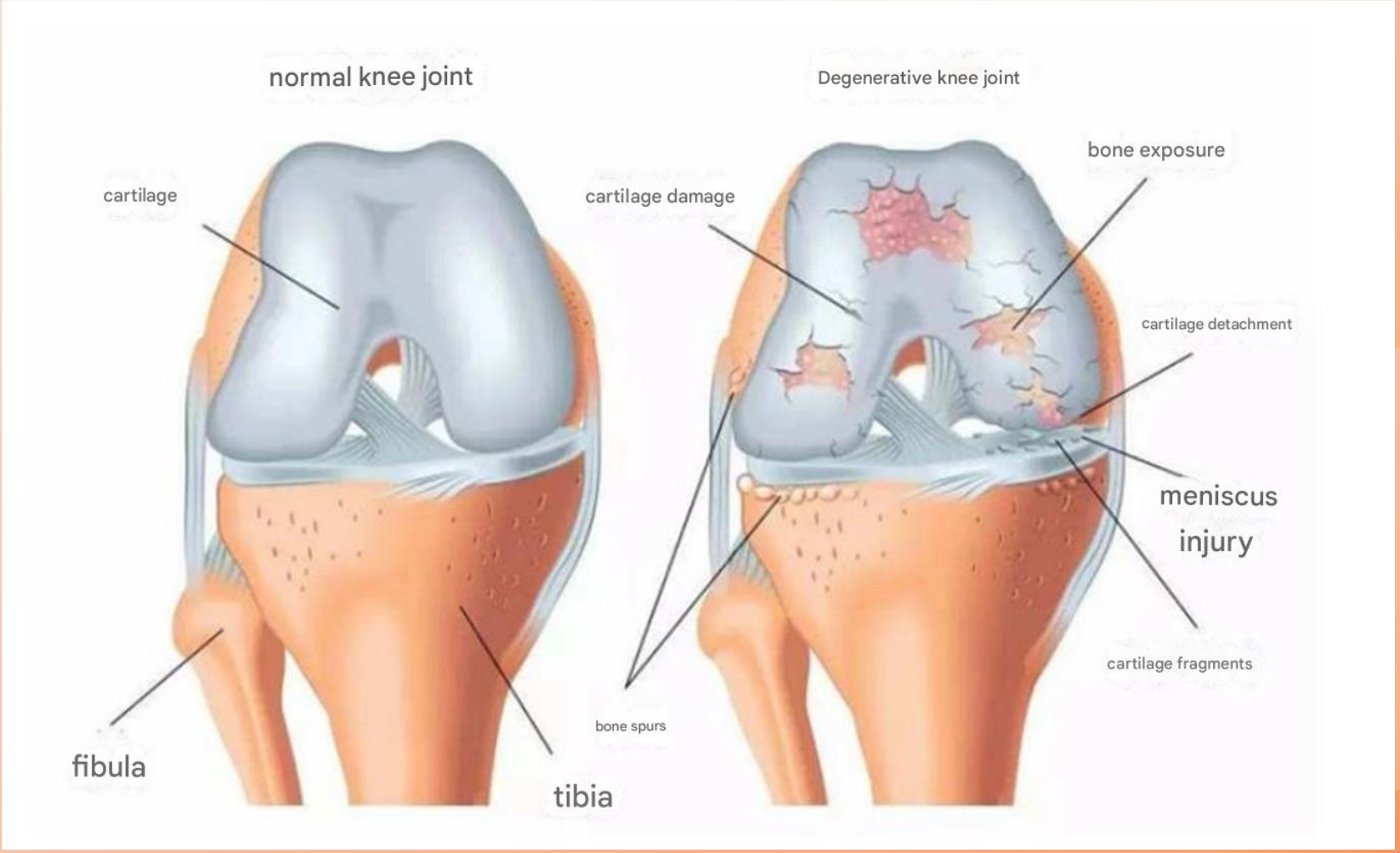
Knee osteoarthritis



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Knee GENR and conventional treatment

therapy	effect	Treat the symptoms/ root cause	Post-treatment reaction	Validity period
GENR Regeneration and Repair	Pain disappears, cartilage regeneration is repaired, safe , effective and stable	Root cause treatment	After treatment, you can walk around freely and the pain disappears.	permanent
Stem Cells	Relieve pain, reduce inflammation, and promote growth	Treating the symptoms	After treatment, pain is relieved and you can walk around in real time.	Half a year
Total joint replacement	Relieve pain, correct deformity and maintain knee Stability of joint movement	Root cause treatment?	It usually takes 1-3 weeks after surgery to be discharged from the hospital. Going to physical therapy and learning to walk with a support device	10 years
(Hyaluronic Acid)	Provides lubrication and pain relief to joints	Treating the symptoms	After the injection, the patient can move around immediately	6 months
Traditional Chinese Medicine/Acupuncture/Tuina	Promote blood circulation, dredge meridians, Helps improve pain	Treating the symptoms	The treated area may feel sore, swollen, or painful. The situation	5 years
Joint Health Food	Relieve joint discomfort and strengthen joint function	Treating the symptoms	It is recommended to make changes in daily life, such as avoiding strenuous exercise. Exercise and control weight to delay further deterioration of the condition	2-3 months for the effect to be seen after taking it , but once you stop taking it, the effect will quickly disappear. Take it for health care

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SOLUTIONS

GENR Solutions

The era of "regenerative medicine"

GENR Genetic Engineering

Customized, revolutionary, safe, effective

Core Values

Targeted injection, regeneration of cartilage, repair of mild and severe soft tissue injuries of the knee joint.

Joint pain was significantly reduced or disappeared, and functional improvement was significant.

Three years of clinical validation, 24 months of clinical follow-up, single injection efficacy is 96 %.

Indications

Severe degenerative lesions/ cartilage damage/ meniscus tear/ meniscus injury ligament injury/ effusion/ synovitis/ bursitis/ fat pad inflammation, etc.

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Technical principle

GENR technology implementation

Autologous stem cell matching

Using the patient's own stem cells to reduce rejection

1

Extraction of growth factors

Stimulate cell activity, Speed up the regeneration process

2

Genetic programming technology

Genetic engineering technology can be used to edit the differentiation ability of cells

3

Nanomaterial support

Provide an ideal growth environment, solve the mobility of cells, and allow them to attach in a directional manner

4

Injection of protease

Regulates sugar and protein in the joint cavity of cells

5

Low temperature fusion technology

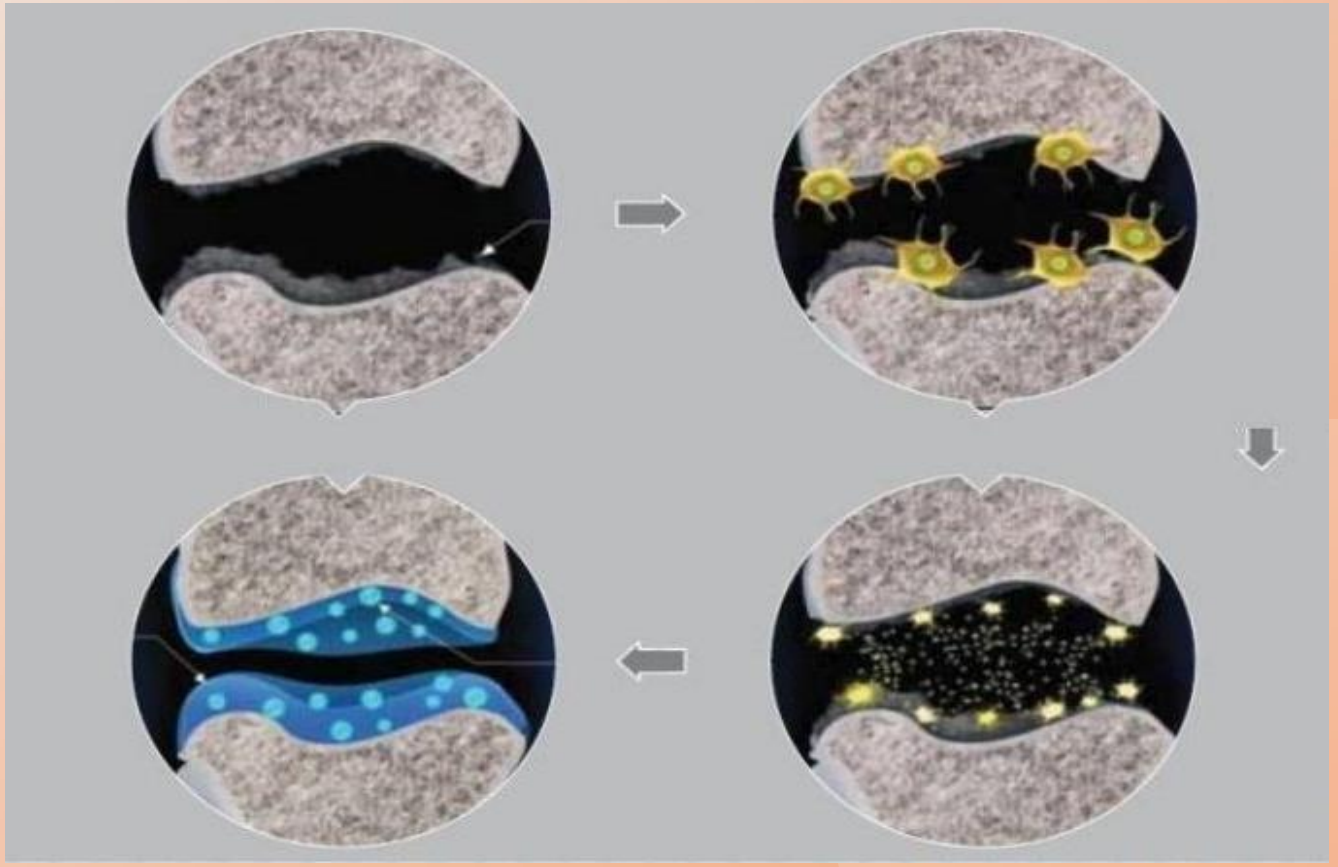
the repair, fusion and regeneration of

6

Treatment Principle

Severe cartilage damage

GENR targeted injection



GENR continues to replicate to form healthy cartilage tissue

GENR secretes growth and cytokines

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Before/After Treatment Comparison

GENR can promote **the repair of** damaged cells; **replace** necrotic cells; **and induce** chondrocyte regeneration

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Technical Summary

Technology Type	Arthroscopic surgery	Knee replacement	PRP	Stem Cells	Collagen Scaffold	GENR genetically engineered nanomaterials
illustrate	Targeted treatment of joint problems Problems and injuries	Late stage osteoarthritis A helpless choice	Facing minor joint problems/ Inflammation has a certain effect	For osteoarthritis Cartilage damage and repair	Knee cartilage damage (Animal cartilage extraction)	Comprehensive targeted repair
Advantages	Minimally invasive surgery technology is mature	Providing an alternative	No surgery required, safer	Regenerative Medicine Key Research Directions	To some extent Improve cartilage function	1. No surgery required, targeted injection into the joint cavity 2. Clinical single injection efficacy is 96% 3. No recovery period, safe and burden-free 4. Autologous cell extraction, no risk of rejection 5. Comprehensive repair of moderate to severe knee joint problems
Disadvantages	Facing recovery, infection, pain Pain and other issues	Many surgical restrictions Poor postoperative feeling And face problems such as secondary surgery	Single growth factor Limited effect	In clinical trial stage Not fully mature application	Need for surgery Only for cartilage	Advanced medical technology is not yet included in medical insurance

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Project Positioning

the Cell 3.0 era, **genetic engineering targeted editing, nanomaterial support** , and low-temperature fusion activate the repair, fusion, and regeneration of cartilage + meniscus.

Core Business

Knee repair, targeted injection.

Technical Features

Personalized customization, autologous cell matching, directed editing, and targeted repair.

Operational advantages

A large number of clinical results have been verified, safe and effective.

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Treatment Process

Treatment steps and How to operate

1

Extraction of growth factors

Stem cell collection and matching

2

Genetic programming technology

Differentiation capacity of targeted edited cells

3

Nanomaterial support

Provide an ideal growth environment and solve the problem of cell mobility

4

Protease regulation

Sugars and proteins that regulate the growth of cells in joint spaces

5

Low temperature fusion technology

Activate cartilage + meniscus repair and fusion to achieve regeneration

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GENR knee repair

	Knee Replacement Surgery	GENR Knee Repair
Creation noodle	**Surgery is very invasive**	**injection**
Recovery period	The recovery period is long and requires bed rest.	There is no bed rest recovery period and normal life is not affected.
Reversibility	Irreversible	It is reversible and there is still a chance to choose treatment again.
wind risk	Risks of immune response, postoperative complications, etc.	No side effects, targeted injection therapy into the joint cavity.
Treatment duration	Duration of surgery	The targeted injection repair of the knee joint takes about 5 minutes.
Scope of application	For patients who need knee replacement; **It is not generally suitable for the elderly and people who are allergic to anesthetics.**	**Universally indicated for patients diagnosed with a need for knee replacement** Also **suitable for elderly patients**

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GENR knee repair

	Sodium hyaluronate injection	PRP Injections	GENR Knee Repair
Ingredients and principles	Sodium hyaluronate Hyaluronate (Sodium hyaluronate, hyaluronic acid) , lubricating use.	Growth factors (More than 30 kinds) 6 major categories (More than 700 kinds of growth factors It has targeted repair effect.	Activate stem cells for targeted repair.
do use	Replaces synovial fluid and provides short-term relief.	Improves mildly damaged joint tissue to a certain extent	Repair damaged cartilage Repair damaged knee soft tissue
Conventional treatment	1 time/15 days 4-10 times/treatment course	3- 6 times/year	1 course / 3-5 years or more
Enhanced treatment	none	1 time/month	1 course of treatment/half year
Injection reactions and indications	**There is a feeling of distension and pain after the injection, but no repair effect.**	After the injection, there is a slight swelling feeling and a slight repair effect. **Suitable for minor knee injuries.**	The bloating disappeared **Knee pain is significantly improved and it is suitable for patients with severe knee joint diseases.**

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GENR knee repair

	Stem cell knee repair	GENR Knee Repair
week Expect	**Requires extraction and cultivation cycle, cannot be stored at room temperature**	**Personalized customization, storage at**
Rejection	There is a certain risk of rejection. It triggers the recognition and clearance process of immune cells.	**No immune cell recognition and elimination, no rejection**
Treatment Procedure	3- 6 times as a course of treatment	3 times for one course of treatment
effect use	It works by secreting cytokines, and the effects vary from person to person due to different cytokine environments in the body .	Genetic engineering directed editing, personalized customized products, start knee joint stem cell Cell targeted repair, accurate and **effective**
Competitive product analysis	**Severe homogeneous competition**	five **none**
Market Application	**Stem cells are currently in clinical trials**	Widely used in high-end markets, hundreds of cases

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Project creator – Dr. Jia Huidong

- Interdisciplinary complex regenerative medicine and clinical treatment in the context of clinical medicine practice

  Technical expert.

- Professional member of the International Society for Stem Cell

  Research; member of the British Society for Extracellular Matrix

  Research; member of the Royal Society of Physiology and Medicine

- Patent published: Method for purifying multipotent vascular progenitor cells from perinatal tissues
- Method for obtaining multipotent vascular progenitor cells from umbilical cord blood using autologous serum
- PhD in Cellular and Molecular Medicine, University of Bristol, UK

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Case - 01

Osteoarthritis of the knee

Before surgery: The pain worsened during knee joint movement.

The point is that the pain is paroxysmal at first, then continuous, and

The condition is worse at night, and there is obvious pain when going up and down stairs.

After the operation, the patient's pain

was significantly reduced during knee

joint movement and the joint could move

freely.

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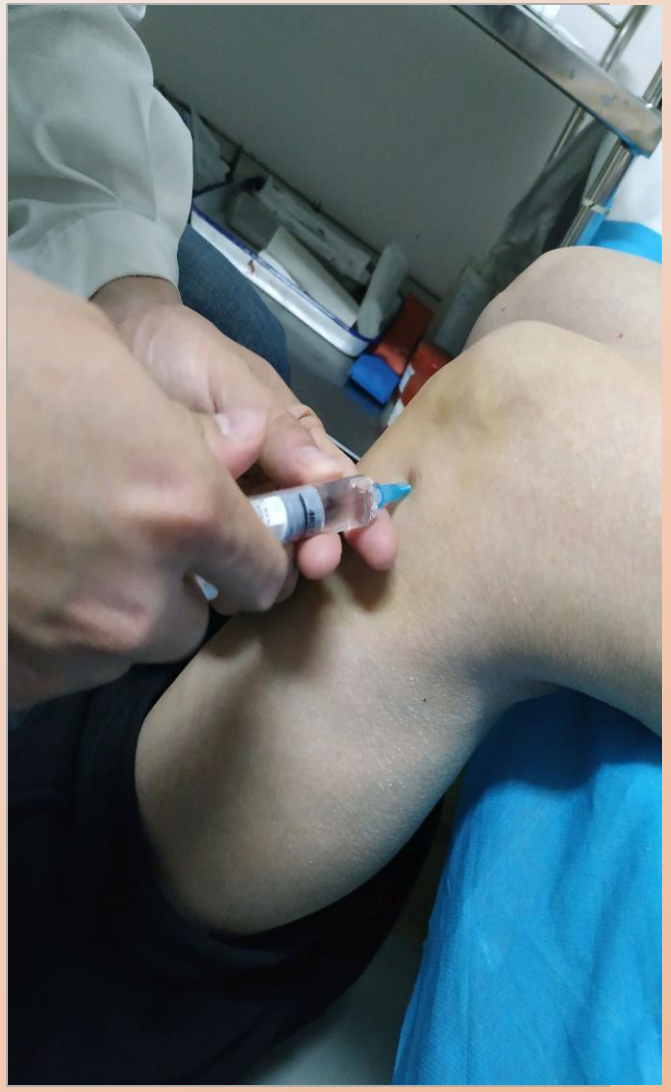

Case - 02

Articular cartilage defects

Mr. Zhang , 65 years old, likes mountain climbing. However, due to long-term neglect of maintenance and wear and tear on his knee joints caused by mountain climbing, he

Since 2012 , I have felt extreme pain in my knee joints when walking and have basically relied on a wheelchair to get around.

I received GENR knee joint service

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Case- 03

Sports Injuries

Mr. X , a badminton enthusiast , is over 40 years old and has played for half of his life.

Professional level, but playing badminton does cause great damage to the knees and even affects normal life and walking.

He received GERN knee joint services in April 2023. He can now walk normally and has returned to the badminton court.

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Case- 04

Clinical application in orthopedics

Shoulder

2 cm below the front of the shoulder joint until the puncture needle enters the shoulder joint cavity. If there is no effusion and no blood after aspiration, inject directly into the joint cavity .

Knee

After routine disinfection of the surrounding skin, insert the needle from the lateral approach of the knee joint, and adjust the direction and depth of the needle tip in real time until it reaches the suprapatellar bursa . If there is no effusion and no blood after aspiration, inject into the joint cavity.

Ankle

After routine disinfection of the surrounding skin, 2 cm position, and insert the needle backward until the puncture needle enters the ankle joint cavity. If there is no effusion and no blood after aspiration , inject it into the joint cavity. Push the needle slowly during injection and observe the widening of the joint cavity space. After each joint injection, remove the needle and perform routine disinfection. Let the patient move the joint slightly within the tolerable range and observe the patient for 10 min , you can leave.

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Focusing on meniscus regeneration and repair, we have solved hundreds of knee joint problems

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Daily care of knee joints

01. Don't walk for too long. It is recommended not to walk more than 6,000 steps a day.

02. Maintain an ideal body weight to reduce stress on your knees.

03. Do not do high-intensity exercise such as running, high jumping, or long jumping.

04. Pay attention to keeping your knees warm. You can wear knee pads to protect your knees.

05. Avoid half squatting, full squatting or kneeling postures, such as horse squatting.

06. Lift less heavy objects and wear less high heels.

07. Do not perform semi-flexed rotation movements of the knee joint to prevent half-plate injury.

08. Avoid trauma and excessive labor.