# The rejuvenation factor

**Professor Adrian Wilson and his team help give people back the joints that they used to have**

The ability to rejuvenate tissue is much debated. To turn back the clock and repair damage, to effectively help a joint or cartilage to revive and even re-grow. But this is exactly the science that Professor Adrian Wilson and his team at The Regenerative Clinic are working with right now.

Already a leading global expert in orthopaedic surgery, Adrian Wilson was inspired by the work of Carlo Tremolada in Italy. Working closely with him he began to understand the benefits of a new technology called Lipogems for healing, pain relief and the rejuvenation of joints to restore mobility.

Travelling back and forth to Italy, Wilson became determined to bring the treatment to the UK. He could clearly envisage the benefits as an alternative to costly and more intensive orthopaedic surgeries. Where surgery was required early in a person's life for knee problems, for instance, Lipogems could give people additional time without surgery. In the UK alone there were more than 100,000 knee replacements last year, along with about 40,000 ligament reconstructions.

Wilson knew from his experience that some people, especially older people, may be less tolerant or suitable for traditional surgeries and the rigours of general anaesthetic and recovery time. One early patient with an advanced hip issue presented with severe kidney problems. A general anaesthetic (administered for a hip replacement) would have resulted in a near certainty of daily kidney dialysis forever thereafter. Results show improvement in this 75-year-old patient whose mobility is restored, and his shoulder also received Lipogems for a less serious complaint. He continues to both work and act as a carer for his wife. He notes a significant

decrease in pain for both hip and shoulder. Six months following treatment results of increased mobility are present.

As well as the practical implications of Lipogems in rejuvenating tissue, surgeons found that there was an additional benefit – and that was the decrease in pain. The Regenerative Clinic is currently creating its own data to measure outcomes of treatment, however it is reported widely and anecdotally that the treatment has an efficient and impressive impact on the reduction of pain.

Although The Regenerative Clinic has focused intensively on the orthopaedic benefits of Lipogems there are many parallel uses in aesthetic and additional conditions where there is the potential for cell rejuvenation.

Professor Wilson says: “I have seen the remarkable potential of this treatment first hand. This is a new-to-the-UK procedure with potentially incredible results for patients. It is very exciting to be at the forefront of applying this new therapy, but the real satisfaction comes in giving people back the joints that they used to have.”

## How it works

The Lipogems® technology works by harnessing the inherent rejuvenating properties of a person’s own fat cells. Fat contains lots of juicy blood vessels and natural repair cells (adipose pre-cursor stem cells). The adipose pre-cursor stem cells are extracted from fat, prepared using the Lipogems technology and injected directly into the affected area (for example, hip, knee or elbow).
These prepared cells trigger a natural healing response within the body where they detect injury and attach themselves to damage. At this point they react and begin to regrow tissue.

The day case procedure takes around one hour and is much less invasive compared to traditional methods of joint replacement. Patients can return to normal activity after a day or so compared to the months of recovery associated with traditional joint replacement.

These pre-cursor stem cells release compounds that have been shown to act against bacteria and infections, reduce pain and encourage damaged tissues to repair. More than 25,000 procedures have been conducted worldwide, with no post-procedural infections recorded and a striking early success rate.

Lipogems is a quick, one-day procedure involving a multidisciplinary team including orthopaedic and plastic surgeons, an anaesthetist, a radiologist and specialist nurses.

With the patient sedated, the plastic surgeon injects a mixture of saline and local anaesthetic into tummy fat and it is left there for 15 to 20 minutes.

The fat is extracted with a syringe from either side of the patient’s stomach in a process called lipoaspiration. Unlike with liposuction, where more than three litres is removed, we take approximately 150ml and if many joints are to be treated then more is taken.

It takes about 15 minutes to extract and is transferred to a Lipogems device consisting of a clear, airtight chamber with five marble-sized ball bearings and saline. This is shaken for 30 seconds to break down the fat globules. We add more saline and after six or more shakes, the solution becomes clear and the fat collects on the surface.

This process ‘washes’ blood and oil residue from the fat and exposes the pericytes. The fat solution containing them is then passed through a fine mesh to make the globules even smaller.

The radiologist injects about 10ml into the damaged area using a fine needle under ultrasound guidance. This takes about 10 to 15 minutes per knee.

The pericytes start gradually releasing compounds called cytokines, which inhibit and block pain and inflammation and promote healing. They block the same pain receptors as morphine and also recruit other cells involved in tissue healing, leading to the formation of new cells capable of forming new cartilage. The patient can usually go home on the same day. There is often some minor discomfort for a couple of days. Most patients feel a slow release over the following weeks and gradually their pain eases.

## The team

Wilson has assembled a team of specialist consultants, each one an expert in their own field (orthopaedic, radiology and cosmetic). The clinic has now treated a range of orthopaedic conditions, specifically knee, foot, toe, ankle, hip, back, spinal, hand, finger, wrist and elbow.

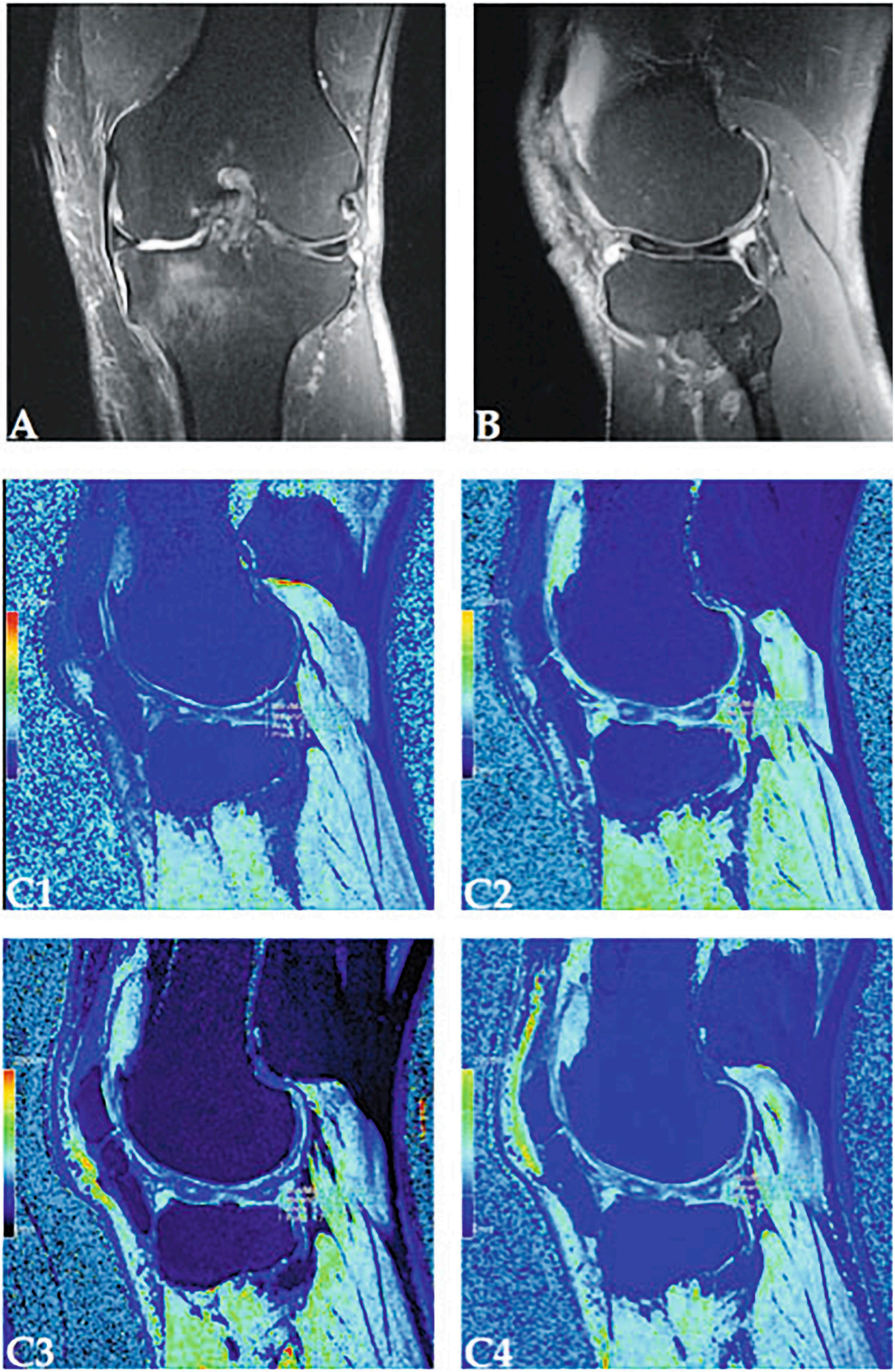
Alongside Adrian is Ali Noorani, a consultant upper limb surgeon at St Bartholomew's and Royal London Hospital (Barts Health NHS), specialising in trauma and upper limb surgery; Nima Heidari, a consultant foot, ankle and limb reconstruction surgeon at the Royal London Hospital, the largest trauma centre in Europe. He also set up the Foot and Ankle Unit as well as the Bone Infection Service; Sarah Davies is a sports physician who worked at both the London 2012 Olympics and Paralympics and at the Rio Games in 2016 with British Athletics; Miles Banwell, consultant plastic surgeon; and Chris Seifert, an expert in musculoskeletal pain management, who is now offering lipogems among other treatments for degenerative disease of the neck and back.

## Measurement outcomes and regulation

Lipogems technology is FDA approved in the US, and CE marked in the UK. The Regenerative Clinic patients are asked to help collect, record and analyse the results of Lipogems therapy to measure how well the treatment works and the quality of service.

## Platelet-rich plasma (PRP)

Where appropriate the clinic also offers PRP as a therapy. PRP is a concentrate of platelet-rich plasma protein derived from whole blood, centrifuged to remove red blood cells. It has a greater concentration of growth factors than whole blood, and has been used to encourage a brisk healing response.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## New study confirms cartilage regrowth through intra-articular injection of fat

Some recent peer-reviewed studies reveal striking evidence of human tissue regrowth through the new non-surgical method of intra-articular fat injection (Lipogems). In two studies the efficacy of both cartilage regrowth and pain reduction has been documented.

The first study [1] by Damian Hudetz, published October 2017, was carried out on 17 patients (and 32 knees) with an average age of 69 with osteoarthritis classified as grade 3-4 (arthritis is graded 1–4 with 4 representing the most advanced cases with little remaining cartilage and often bone-on-bone symptoms).

Following the treatment, patients were tested at three, six and 12 months using a number of indicators including MRI scans and measurement of synovial fluid. In almost all cases there was an improvement seen, with more than half, 53.57 per cent of joints recorded seeing an increase in cartilage regrowth of +15 per cent or more.

The images of the following patient recorded an increase of 83 per cent in cartilage after 12 months.

The treatment induces host chondrocytes to make rejuvenating structural and biochemical changes in the cartilage. It was also noted that it was not just the thickness, but rather the quality of the regrown cartilage which was remarkable. Significant pain reduction was also noted across all patients after three, six and 12 months.

A separate study [2] conducted by Arcangelo Russo at the Sacre Cuore hospital in Calabria, Italy, proves the effectiveness of reducing pain. The study is peer reviewed and has been published in the Journal of Experimental Orthopaedics.

Here, 87 per cent of patients recorded a significant reduction in pain after 12 months (based on the VAS pain scale and Tegner Lysholm Knee). In a sample of 30 patients with a median age of 43, there were no major complications recorded. Russo found the treatment to be “sustainable, quick, one-step, minimally invasive, and with low percentage of complications”.

## Patient approval

A new study by YouGov [3] revealed that more than a third of Britons (38 per cent) would prefer to have innovative stem cell treatments over a traditional joint replacement. The figure rose to 42 per cent in the over-55 age group.

Nearly half (45 per cent) of Britons believe that stem cell procedures are the future of medicine, with 48 per cent demanding to learn more about these new emerging techniques. More men (49 per cent) cite stem cell treatments as the future of medicine compared with 42 per cent of women. This rises to 50 per cent in 18 to 24-year-olds.

While the efficacy and professionalism of traditional replacement procedures within the NHS and private sector is excellent, not all individuals are able to tolerate such operations. Eighty-six per cent of people had concerns about having joint replacement surgery with only 15 per cent saying that they would not have any specific worries at all. Only 3 per cent of those surveyed said that stem cell treatments such as Lipogems were not for them.

## Risks

Matt Dawson, a consultant specialist knee surgeon at North Cumbria University Hospitals NHS Trust, said: “This treatment is interesting. There are no really obvious drawbacks as far as I can see. Infection is reported in very

few cases. There seems to be a natural healing effect, which protects from infection. This has to be investigated further."

For a week or so there may be some mild bruising, with a risk of extensive bruising in one case in 80.

There is a small risk to the deeper structures of the abdominal cavity from the needle used when the fat is being extracted. There are no research studies to determine the long-term benefits.

## A success story – John Wakefield

John Wakefield, 57, from Shiptonthorpe, North Yorkshire, underwent the procedure. Eight weeks after the procedure he could walk for 20 minutes without pain. For most of his life he had been active and played five-a-side football a few times a week for 16 years. But in August 2016, he suffered a sudden shooting pain inside the right knee while at work. This was followed by a feeling of heat deep inside the knee that did not go away.

He wrapped an ice pack round it, rested, then saw his GP a week later. He was referred for an MRI scan, which showed a tear in the cartilage lining the knee joint. An NHS knee specialist told him that it probably happened during football. He said the flap of torn cartilage was catching on the joint whenever he moved his knee, causing the pain, and advised he could have microfracture treatment — tiny fractures are made on the surface of the bone in the knee, causing it to bleed. Once it scabs over, new cartilage forms.

Another consultant he saw privately for a second opinion said this might not work, as the new cartilage could break down in the future. Instead, he said it might heal on its own as it was quite a small tear. John stopped playing football but the pain affected other parts of his life. He limped and took painkillers.

The other knee started hurting. By October 2016, he was experiencing grinding pain whenever he walked, but an MRI scan couldn't find any obvious cause.

John saw Adrian Wilson, who diagnosed arthritis (cartilage damage in both knees) and recommended Lipogems. Done under local anaesthetic, John reports “not feeling a thing”. After 45 minutes he stood up and walked out of the theatre. He said: “The next day my knee joint felt inflamed. This sensation ebbed away after a week — though I was told it would keep happening for about three months. Gradually my knees felt better and soon there was no pain at all. I was astonished. I no longer limped and only felt occasional pain at night after a long day”.

## References


1. The Effect of Intra-articular injection of Autologous Micro-fragmented Fat Tissue on Proteoglycan Synthesis in Patients with Knee Osteoarthritis by Damian Hudetz Published October 2017 http://www.mdpi.com/2073-4425/8/10/270
2. Autologous and micro-fragmented adipose tissue for the treatment of diffuse degenerative knee osteoarthritis by A. Russo, V. Condello, V. Madonna, M. Guerriero and C. Zorzi Published: October 2017 https://jeo-esska.springeropen.com/articles/10.1186/s40634-017-0108-2
3. YouGov – All figures, unless otherwise stated, are from YouGov Plc. Total sample size was 2086 adults. Fieldwork was undertaken between 30 November – 1 December 2017. The survey was carried out online. The figures have been weighted and are representative of all UK adults (aged 18+).