Performance fibre manufacturer Hologenix believes it made a breakthrough earlier this year when its Celliant product came out positively in a clinical trial in a California hospital. The company feels strongly that this will give it a platform for making quick progress in sports apparel and other market areas.

Wearable oxygen chambers for all

A medical journal in Europe has published details of a clinical study that supports the claims of specialist fibre manufacturer Hologenix that its Celliant product reduces pain. Clothing made from Holofiber has been around for a number of years, but even early adopters said that medical evidence to support its claims would be essential if the invention was to make a big impact on the market. Celliant, which in recent years has gone into products such as specialist socks for sports and healthcare, and also into bedding, can enhance oxygen levels in the body, aiding comfort, healing, performance and overall wellness.

The new clinical study was carried out by research scientists affiliated to the University of California Irvine Healthcare Center. Their findings show that the material also has pain-relief capabilities. In a double blind study using measurement techniques successfully employed in US government-approved clinical trials of pain-relief medications, the magnitude of pain relief reported by participants using products enhanced with Celliant was significantly greater than that reported by participants using placebo products.

The technology behind Celliant is based on years of research regarding the effect of certain wavelengths of light on the body. Past studies have shown that light can be used to reduce pain, speed healing, increase energy and improve wellness. It is a polymer fibre containing optically active micro-particles—a patented mix of silica, titanium dioxide and silicon carbide, which gives off blue, green and red light—which scatter and reflect visible and near-infrared light to produce this effect. The company can supply it in powder or masterbatch form. Apparel products created with these modified fibres scatter and reflect light and energy onto the underlying tissue and skin.





(Left) Celliant fibres as observed in transmitted (visible) light.

(Below) Under broadband ultra violet rays, these fibres exhibit a blue fluorescence.

Hologenix

This is a concept that, although it has been around for a long time, is only now making an impression on the world of sports performance. Hologenix chief executive, Seth Casden, points out that it's specifically red light in certain wavebands that can increase cell growth, speed up muscle regeneration and aid recovery from wounds and injuries. The Irvine trial, he claims, is proof that Celliant's properties mean it can play a part in this.

"This is technology that is already accepted by athletes," he says. "Infrared light penetrates deeper; it gets into where the muscles are. And



Courage Sports is one of the sports apparel companies that have already recognised the benefits of Celliant, incorporating the fibre into products such as its Celliant Polygrid tee-shirts.

Jesse Ramirez



Pittsburgh Steelers wide receiver Hines Ward takes a difficult catch. The player took his own hyperbaric oxygen chamber to the Super Bowl in February. He wanted to spend the night before the game breathing pure oxygen.

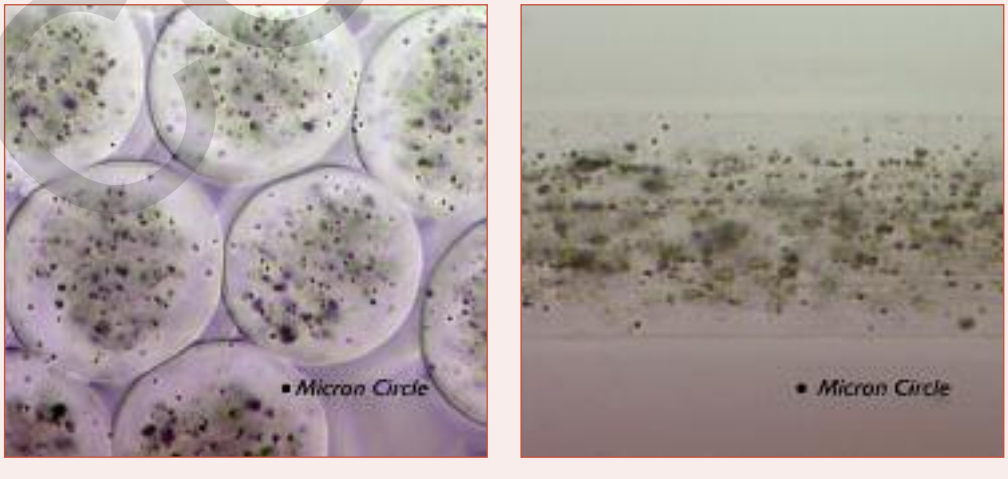
Keith Allison/Wikipedia

we're able to offer all these benefits, without a handheld device, nor in a pill like the ones diabetics take. Here, the delivery system is a textile. Celliant works with the body's chemical processes at a cellular level, increasing blood-flow and oxygenation. And although Celliant has been on the market for some years, I still think the idea is new to many and, for that reason, we have to carry out more clinical trials and work hard to explain how it works."

Fortunately, he likes to talk about it. And he has all the background information he needs because his involvement goes back to the last century. He and his brother, Graham, first became involved as angel investors at the end of the 90s and have both been on the board since October 2003. After engaging at different levels of intensity with a few different senior management teams, he took over, definitively, as chief executive on January 1 this year.

He says: "These first months have been phenomenal. But when I started talking to our customers, I realised there were frustrations. They had been waiting for clinical studies, like the one we carried out in Irvine, to help them convince their customers of the benefits of Celliant. Carpenter, a mattress brand, for example, was waiting for a sleep study. If I don't know something, I'll say, but if I say I'll deliver something, I'll do it and I told them I was going to do everything I could to get the sleep study, and a pilot is now under way."

The team at the University of California Irvine Healthcare Center was keen to take this on. It involves measuring the effect on people with pain-related sleep disorders—for example, after back surgery—of sleeping on a mattress or mattress pads containing Celliant. Participants provide information in the morning about the quality of sleep they enjoyed the night before, and giving details of the level of pain they had endured.



At 2,000x magnification the optically responsive particles in the Celliant fibre are clearly evident. The view on the left shows a horizontal cross section (looks like a cell) and the other shows a longitudinal or length-wise view (the tube).

Gaston College

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Helping blood to flow to any area of the body where there is pain is one direct benefit that Celliant can bring, but Mr Casden insists that athletes, professional and amateur, are driving his business too. The increase in blood-flow the fibre causes also increases the amount of oxygen levels in the blood. This is important in sport. When you see a basketball player go coast to coast and then miss the shot, or see a footballer slalom his way past five defenders with amazing dribbling skills only to hit the ball off target when clean through on goal, a lack of oxygen can often be to blame.

As mentioned, sports teams and physiotherapists already understand that light can help them. Light emitting diodes (LEDs) are making a name for themselves now in the science behind treating sports injuries. Infrared and visible light emitting diodes on flexible neoprene pads can be applied directly to the skin and have shown good results in treating injuries to elbows and knees, tendinitis, ligament injuries, muscle injuries and arthritis. One of the principal effects of these devices is to release nitric oxide, which helps to improve circulation.

Seth Casden continues: "Body-builders and athletes take nitric oxide because it increases the levels of oxygen in the blood. It's a very common supplement. That's why people have paid attention to the new studies that have shown that certain wavelengths of light stimulate the body to produce nitric oxide and many of the new adoptions of Celliant will be in athletic apparel."

One example so far is Courage Sports, a brand based in Las Cruces, New Mexico, which has already incorporated Celliant into a range of products, using construction techniques that put the Celliant next to the wearer's skin, with polyester on the outside for moisture management capability to add to the health-giving properties of the Hologenix fibre. Courage says it had a positive response to garments such as its Celliant NanO2 short-sleeve work-out top and its Celliant Polygrid tee-shirts at an exhibition held in conjunction with the Boston Marathon in April. When talking about these products, the company emphasises that athletes at all levels can wear them to perform, but also to aid recovery (from exertion as well as injury).

The minimum amount of Celliant that Hologenix will allow in a material blend is 40% as it's at that level and above that wearers will notice the benefits. But wearing a shirt with this amount of the fibre in its construction is enough for those benefits to be clear, Mr Casden insists. He says: "If you wrapped someone up in Celliant they wouldn't notice any more improvement in their condition than they would if they were wearing one of these shirts."

The demand to feel an improvement is real. At the last Super Bowl, on February 1, part of the preparation of Pittsburgh Steelers' wide receiver Hines Ward was to take his own hyperbaric oxygen chamber to Tampa Bay, Florida, for the event. He wanted to spend the night before the game sleeping in pure oxygen. "He played a great game and finished on the winning team, so he'll be glad of having taken that step," says Seth Casden. "But we can offer a garment that has the same effect. People are clearly going to great lengths to increase the flow of oxygen in their blood, as this example shows. But not everybody can take a hyperbaric chamber on the road. And not everybody can have a blood transfusion just before they perform. We are saying you can achieve a similar effect, albeit on a much, much smaller scale, with a Celliant shirt."

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