# EUREKA EUROSTARS PROJECT
# 5999 Ar-Tex

## A BETTER BACK REPAIR KIT

**Herniated discs are not only painful, they are a major burden to health systems worldwide. A new textile-based device developed by the AR-TEX project could be a game-changer, improving back-surgery outcomes and relieving the suffering felt by millions every year. Reports of patents and successful product trials look promising for the Spanish and German partners behind the new solution.**

Every year, over a million patients undergo surgery to repair herniated discs in the lower lumbar. This is a painful, costly and sometimes risky process which is made worse for the 10 % of patients who need a second operation when the first fails, costing European health systems an additional €450 million a year.

The search for a better way to prevent re-herniation drew the attention of AR-TEX partners NEOS Surgery and CALVO Izquierdo in Spain and the German Institutes of Textile and Fiber Research Denkendorf.

Herniation is usually the result of a rupture between the vertebrae causing soft material inside the disc to leak out and press on surrounding nerves (i.e. a 'pinched nerve') in the spine. This irritation is typically felt as severe 'nerve-root' pain, and can radiate down the leg (sciatica) and through the neck and arms.

Surgeons face a tough decision with every herniation repair. Do they remove more of the damaged disc to reduce re-herniation risk but increase the potential for long-term complications and back pain, or proceed less aggressively first-time round and hope for success. Something in between is needed to remove herniation but maintain the spine's structural integrity.

### Disruptive technology, literally

The AR-TEX project created a disruptive implant, called Annulus Repair (AR), which acts as a soft buffer between the injured area and the sensitive nerves nearby.

"AR taps into an unmet clinical need in hernia management," says Ana Rodriguez of NEOS Surgery, lead partner in AR-TEX. The device they developed with Eurostars support not only helps with the painful symptoms but gradually works to repair inter-vertebral disc after surgery. And it has a 100 % success rate in pre-clinical testing.

The challenge was to design a barrier strong enough to stop disc re-herniation but also flexible enough to stretch and compress with the natural movements of the spine. The collaboration between the three partners was critical here.

"Together, we were able to combine shape-memory materials and novel textile designs to create a device that can be inserted in the same opening required for current surgical intervention, so it's minimally invasive," explains Rodriguez.

The new polymer fabric being used was developed by AR-TEX's German partner with technical and commercial support from the Spanish partners.

AR-TEX's primary goal is to stop re-herniation, reduce surgeries and restore patients' quality-of-life, but the team is also conscious of the cost-savings and relieving the burden on surgeons and health-care systems.

> ***"AR-TEX created a disruptive implant … which acts as a soft buffer between the injured area and the sensitive nerves***

Experts predict annual growth of 4.6 % in the global medical devices market over the coming five years, reaching around $343 billion (€325 billion) by 2021. There is only one comparable product on the market currently being sold by a US start-up. The patent-protected AR is a first in Europe and is scheduled for launch in 2019.

"A big project like AR-TEX would have been too risky for an SME like NEOS Surgery to develop alone. Eurostars funding offered some security and helped us find the best partners to deliver it," concludes Rodriguez.

AR-TEX is the winner of the 2017 EUREKA Innovation Award for projects making significant headway developing an innovative product, service or process.

This project has received funding from the Eurostars-2 joint programme with co-funding from the European Union Horizon 2020 research and innovation programme

### MAIN PARTNER

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### OTHER PARTNERS

*CALVO Izquierdo S.L., Spain*
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### TOTAL R&D INVESTMENT

*€ 1 M*

### DURATION

*January 2011 to August 2014*

### COUNTRIES AND NATIONAL FUNDING BODIES INVOLVED

*Centre for the Development of Industrial Technology CDTI*

*Bundesministerium für Bildung und Forschung BMBF*

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