Medical Xpress

Stem cell therapies for heart disease -- one step closer

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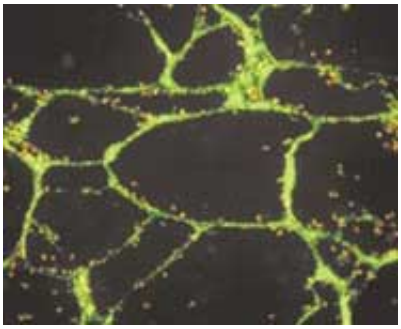

Structures formed in a gel in vitro

New research from the University of Bristol brings stem cell therapies for heart disease one step closer. The findings reveal that our bodies' ability to respond to an internal 'mayday' signal may hold the key to success for long-awaited regenerative medicine.

Dr Nicolle Kränkel and colleagues at the Bristol Heart Institute have discovered how our bodies initiate DIY rescue and repair mechanisms when blood supply is inadequate, for example in diabetic limbs or in the heart muscle during heart attack. Their findings also provide a practical step to advance progress in stem cell therapies.

In healthy people, reduced oxygen supply can occur in certain situations, e.g. after an injury. The affected tissues release chemical messengers that 'call' to a type of circulating stem cells (EPCs) for help to re-

establish blood supply via the growth of new blood vessels. A group of Bristol researchers have found that kinins, for long time considered inflammatory substances, are among the messengers supporting blood vessel growth.

In this study, published in *Circulation Research,* Dr Kränkel and colleagues found that EPCs respond to kinins by travelling to the target tissue and invading it to assist healing. In patients with angina, EPCs cannot respond to the distress call because they lack a kinin sensor (the 'kinin receptor') on their surface. The oxygen-starved tissue is therefore left with reduced blood supply.

In heart attack patients they saw that a proportion of the circulating EPCs were able to sense the kinin signal and respond.

Dr Kränkel, Research Associate at the Bristol Heart Institute, said: "Our findings showed that heart attack patients possess the functional cells needed to repair blood supply to their heart, but they're hidden amongst a muddle of others."

The team purified the kinin-sensitive EPCs from the total stem cell population to create an enriched sample that has huge potential as a powerful regenerative therapy.

Dr Kränkel added: "In previous clinical stem cell trials, a mixture of different types of cells were used. We've used kinin like a magnet to attract and extract the most effective repair cells from the mass of different types. This enriched sample should increase the therapeutic potential, especially in heart attack patients where quick and efficient treatment is crucial for long term outcome."

Professor Jeremy Pearson, Associate Medical Director of the British Heart Foundation – one of the study's funders – said: "The team have

made fascinating discoveries about our DIY repair systems and have translated them into practical use. They've intelligently employed the body's own strategies to develop a method that may take us a step closer to truly effective stem cell therapies for heart patients."

Link: circres.ahajournals.org/cgi/co … CRESAHA.108.179952v1

Source: University of Bristol