

# Blood cells rejuvenated after a heart attack with new method

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People who survive a heart attack live with a weakened heart muscle for the rest of their lives because the part of the heart affected by the heart attack dies and can no longer contribute to the heart's pump function. Injecting stem cells into the heart is a promising technique for repairing it. These stem cells are isolated from the blood. Unfortunately, those who experience a heart attack are often elderly people with a suboptimal health. Their stem cells may therefore be too weak to fix the heart.

Dutch researcher Reinier Boon discovered the Achilles' heel of cells that repair these [blood vessels](#). He found that it was a protein naturally occurring in blood vessels called KLF2. By increasing the amount of KLF2 in repair cells, so-called circulating pro-angiogenic cells (PACs), he was able to rejuvenate these cells. They could then be used to efficiently repair the heart.

Boon not only gave the PACs a boost, he was also able to increase the number of PACs in the blood. Elderly people and those in poor health often have far fewer PACs in the blood. Experiments in elderly mice revealed that the number of PACs in the blood normalized when the amount of KLF2 they contained was artificially returned to the level young healthy PACs contain. In these experiments, PACs containing more KLF2 [protein](#) were also better at repairing blood vessels. Now the next step is to find a method that allows us to safely increase the amount of KLF2 in the PACs of heart patients. Although rejuvenation with KLF2 improves the repair capacity of PACs, it remains uncertain whether this improvement is enough to guarantee full restoration of the

heart. Boon's method may make stem cell therapy more efficient.

Boon's results were published in the *European Heart Journal* of 1 February 2011. The research was carried out at the Institute of Cardiovascular Regeneration at Frankfurt University. So far, this method has only been demonstrated to work in mice, but the discovery will provide leads for further research into human treatments. Boon also discovered a microRNA important for the immediate repair process after a heart attack and a microRNA that plays a role in the development of aneurysms. These two discoveries also provide direction for further research into the recovery process following a [heart attack](#).

Boon's research was funded by NWO's Rubicon program. Rubicon allows scientists who have recently obtained a PhD to gain research experience in world-class institutes abroad.

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