Hormone injection lets ageing muscles run harder and longer

15/06/2016

Wind back the clock. We've found a hormone that can make ageing muscles more youthful and active – in mice at least.

Once overlooked as the passive scaffolding of the body, we are beginning to understand that our bones can communicate with and influence other organs.

Now Gerard Karsenty of Columbia University and his colleagues have shown that a hormone secreted by bone – called osteocalcin – boosts the ability of muscles to burn fuel and generate energy.

When they injected the hormone into old mice, the animals were able to run as far as their younger counterparts, despite being up to a year older – a long time in mouse years. Old mice that did not receive the hormone ran about half as far. "It was extremely surprising," says Karsenty...

Fountain of youth?

The team found that in both mice and humans, physical exercise significantly increases the level of osteocalcin in the blood. The release of this hormone increases the availability of two primary fuels, glucose and fatty acids, to the muscles.

Osteocalcin gives the muscles an extra kick by promoting fuel uptake as well as boosting the muscles' ability to break down that fuel to use as energy, making it easier to run longer and harder, says Karsenty.

They found that osteocalcin levels gradually decrease in men and women as they age, flatlining at ages 50 and 30, respectively. "If you look backwards during evolution, men were much more active than women – for example, in hunting and fishing. That may be an explanation for why the decrease in circulating osteocalcin occurs later in men than in women," Karsenty suggests.

The team now plans to test whether the hormone improves muscle function in people as well as mice.

The results are exciting, but there are many “big ifs”, says Graham Kemp at the University of Liverpool. “Notably, if osteocalcin has the same effect in humans, and if there are any side effects.”

There is also the risk that osteocalcin could be used as a doping agent in sport, Kemp says. “Anything, especially a natural endocrine factor, with these potential effects in humans, couldn’t fail to attract interest from would-be dopers.”