

Can actual 'young blood' rejuvenate tissue and reverse aging?

Two mice perch side by side, nibbling a food pellet. As one turns to the left, it becomes clear that food is not all that they share — their front and back legs have been cinched together, and a neat row of sutures runs the length of their bodies, connecting their skin. Under the skin, however, the animals are joined in another, more profound way: they are pumping each other's blood.

Parabiosis is a 150-year-old surgical technique that unites the vasculature of two living animals. (The word comes from the Greek *para*, meaning 'alongside', and *bios*, meaning 'life'.) It mimics natural instances of shared blood supply, such as in conjoined twins or animals that share a placenta in the womb.

In the lab, parabiosis presents a rare opportunity to test what circulating factors in the blood of one animal do when they enter another animal. Experiments with parabiotic rodent pairs have led to breakthroughs in endocrinology, tumour biology and immunology, but most of those discoveries occurred more than 35 years ago. For reasons that are not entirely clear, the technique fell out of favour after the 1970s.

In the past few years, however, a small number of labs have revived parabiosis, especially in the field of ageing research. By joining the circulatory system of an old mouse to that of a young mouse, scientists have produced some remarkable results. In the heart, brain, muscles and almost every other tissue examined, the blood of young mice seems to bring new life to ageing organs, making old mice stronger, smarter and healthier. It even makes their fur shinier. Now these labs have begun to identify the components of young blood that are responsible for these changes. And last September, a clinical trial in California became the first to start testing the benefits of young blood in older people with Alzheimer's disease.

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