

Removing zombie cells may help MS

Senolytic drugs can remove damaged cells, allowing degraded tissue around nerves to recover

Grace Wade

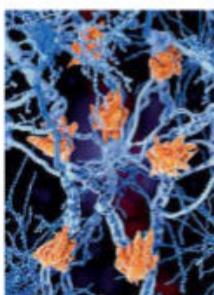
DRUGS that remove worn and damaged immune cells may help treat multiple sclerosis (MS), a study in mice suggests.

MS is a neurodegenerative disease in which the immune system mistakenly attacks the protective coating around nerves, called myelin. It often manifests in people's 20s and 30s. Most people with the condition have relapses – where myelin is damaged and their symptoms worsen – followed by periods of recovery, in which myelin regenerates.

As people with MS age, they usually advance to the progressive phase. This is when symptoms worsen without recovery periods, meaning less myelin regenerates, says Phillip Gross at Georgetown University in Washington DC.

To see why remyelination typically occurs only earlier in the disease, Gross and his colleagues looked at the effects of senescent

JUAN GAERTNER/SHUTTERSTOCK



In multiple sclerosis, microglia cells (orange) damage the protective sheath around nerve cells

cells, which accumulate with age. These are cells that have become so worn or damaged they cease to work. Instead of dying, they linger in tissues, like cellular zombies. "We wanted to see if there was an increase in senescent cells with age following demyelination," says Gross.

First, the researchers damaged myelin in five 3-month-old mice and four 18-month-old mice by injecting a toxin into their spinal cords. They then genetically analysed cells at the site of injury and found, on average, a sixfold increase in a marker of senescence

in cells of the older mice than in those of the younger mice. The increase was greatest in microglia, which are immune cells of the nervous system.

This finding suggests a myelin injury leads to a greater build-up of senescent immune cells in older animals than in younger ones. Further experiments revealed that this increase seemed to impair the ability to regenerate myelin.

To see if targeting senescent immune cells could help repair myelin in old age, the researchers injected a toxin into the spinal cords of 11 mice aged 12 months. They treated five of them with a drug belonging to a class of medications known as senolytics, which remove senescent cells. The medication is in clinical trials and isn't yet used in humans. The other animals had a sham treatment.

They found, on average, a 65 per cent greater increase in a protein

used to rebuild myelin in treated mice than in those in the control group. This suggests that clearing senescent immune cells may enhance myelin regeneration, says Gross, who presented these findings at a November meeting of the Society for Neuroscience in Washington DC.

"If we can improve the remyelination phase, maybe that's another way to treat multiple sclerosis"

This could provide a different way to treat MS. "If we can improve that remyelination phase, maybe that's another way to attack the problem," says Gross.

Further research will be needed to find out whether senescent-clearing drugs could be effective at treating the disease in people, says Darren Baker at the Mayo Clinic in Minnesota. ■

Conservation

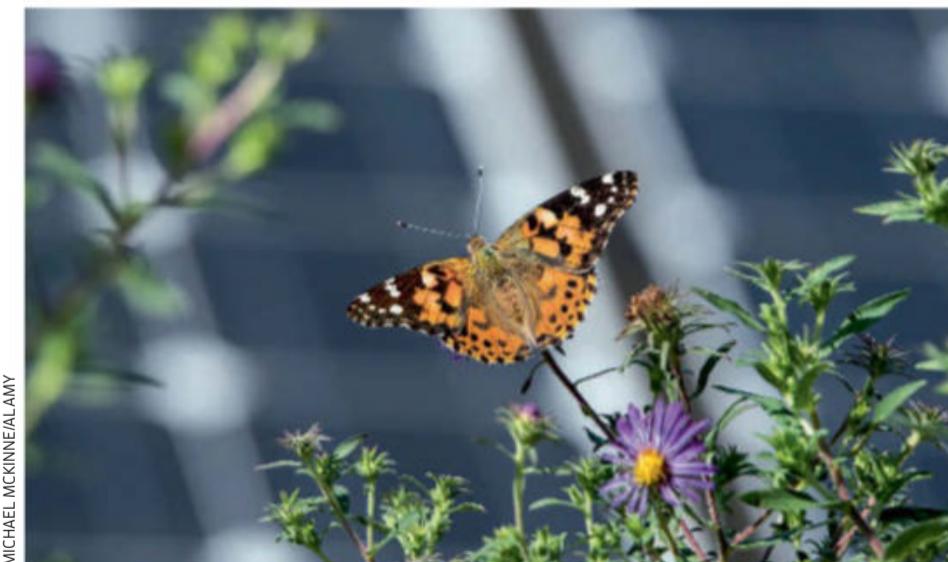
Insects thrive on solar farms planted with native flowers

SOWING grasses and wildflowers among solar panels can bring big increases in bees and aid crop pollination in nearby fields.

Leroy Walston at Argonne National Laboratory in Illinois and his colleagues have monitored the impact on insects after two solar farms in Minnesota were planted with native vegetation.

The solar farms were built in 2017 on land that was previously used to grow rows of crops. The entirety of both sites were sown with specially designed seed mixes, and smaller, experimental plots were sown again in 2018.

From annual summer surveys of



MICHAEL MCKINNEY/ALAMY

the experimental plots, Walston's team found that the number of beneficial insects tripled and their diversity increased by 13 per cent from 2018 to 2022. There was a particularly big impact on native bees, with their numbers rising

20-fold over the study period.

The researchers also counted insects visiting flowers in adjacent soya bean fields, finding a comparable level of visits as there were in fields next to grasslands in a restoration programme. This

Flowers planted among solar panels can attract butterflies and other insects

suggests attracting pollinators to the solar sites has a spillover effect on nearby farmland (*Environmental Research Letters*, doi.org/k7ww).

"While we prefer solar energy projects avoid ecologically sensitive areas altogether, solar-pollinator habitat can be a means to mitigate some ecological impacts associated with the conversion of lands to solar energy," says Walston.

This study gets us closer to working out how best to establish and maintain native vegetation around solar arrays in ways that end up benefiting wildlife, says Zara Dowling at the University of Massachusetts Amherst. ■
Gary Hartley