



**DON'T PANIC: A HITCHHIKER'S GUIDE TO THE METAVERSE**

Everything you need to know about the next technological frontier

# Science Focus

*The truth about*  
**YOUR COVID RISK**

*What's next for*  
**SHACKLETON'S SUNKEN SHIP?**

*Meet the*  
**DNA DETECTIVE**

## THE GREAT MOON RUSH

Why the world's superpowers and billionaires are in a hurry to get back to the Moon

REAL-LIFE BALLOON ANIMALS + MIGRAINE CURES + MICHAEL MOSLEY'S EXERCISE REGIME  
PARTICLE SMASHERS EXPLAINED + STARFISH SKELETONS + DR STRANGE AND THE MULTIVERSE

04 >  
9 772632 284028  
#376 APRIL 2022  
UK 25.50

## SPACE

## Astronauts could grow super lettuce to keep bones strong in space

**The genetically engineered salad leaf produces a hormone that stimulates bone growth and could be cultivated aboard a space station**

A team from the University of California, Davis, has developed a genetically modified strain of lettuce that could help prevent astronauts losing bone density during long space journeys.

Regular lettuce has already been grown successfully aboard the International Space Station (ISS), so the team decided to see if they could create a strain of the plant that produces

a bone-stimulating chemical called human parathyroid hormone (PTH), which would help counter the bone-depleting effects of spending extended periods in the microgravity of space.

Recent NASA studies carried out on Scott Kelly and Christina Koch (the first two astronauts to spend a year on the ISS) found that they lost more than 1 per cent of their bone

density during each month of their stay. With a mission to Mars likely to last around three years, scientists are searching for ways to counter these effects. Medicine is one possibility and food is another, which may be more practical.

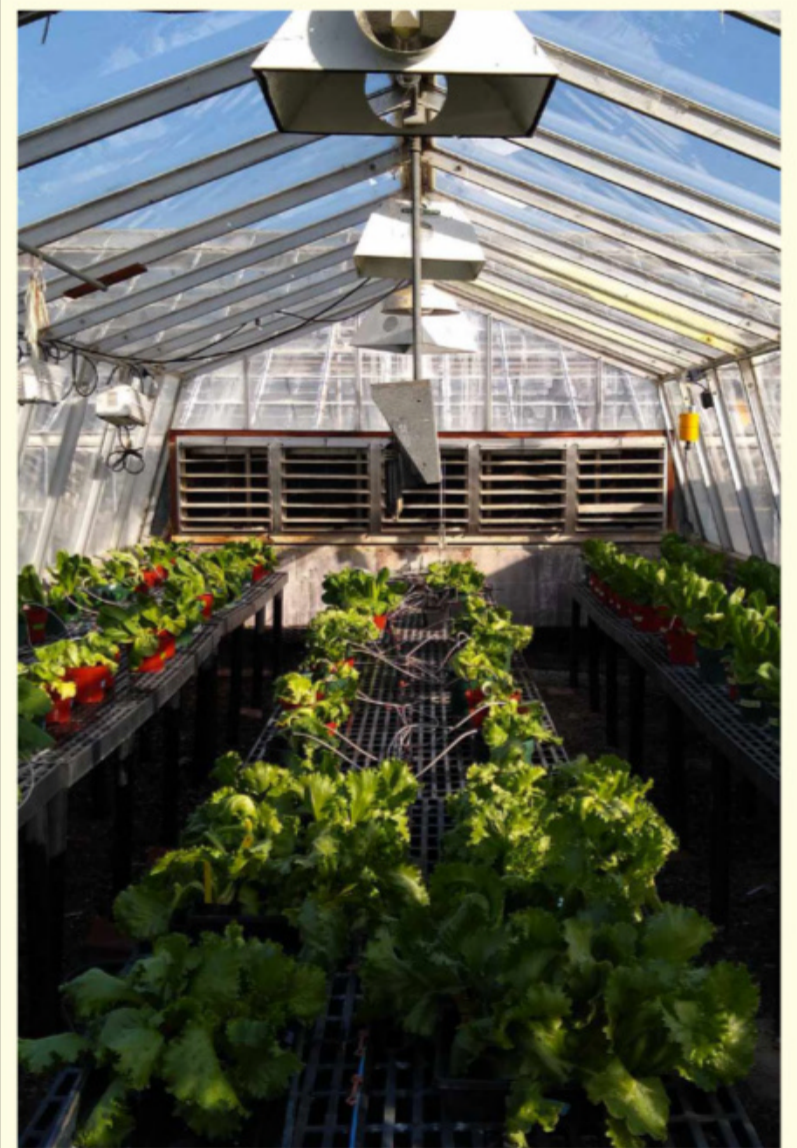
Growing lettuce that contains PTH on a space vessel would take up far less room than storing large quantities of medicines to counter the bone-depleting effects of microgravity.

“Astronauts can carry [genetically modified] seeds, which are tiny – you can have a few thousand seeds in a vial about the size of your thumb – and grow them just like regular lettuce,” said Dr Somen Nandi, one of the scientists behind the genetically modified lettuce. “They could use the plants to synthesise pharmaceuticals, such as PTH, and then eat the plants.”

Initial tests show that 1kg of the GM lettuces contains around 10mg of PTH, making the daily portion of the salad leaves required to counter the effects of microgravity about 380g.

“We’ve looked at a few [lettuces] so far and the average [PTH content] was 10-12mg per kg, but we think we might be able to increase that,” said Prof Karen McDonald, another member of the team. “The higher we can boost the expression [of PTH], the smaller the amount of lettuce that needs to be consumed.”

The team hasn’t taste tested the GM lettuce, as it hasn’t been confirmed as safe for human consumption yet, though they say it’s likely to taste much the same as regular lettuce. They now want to test the lettuce’s effectiveness in animal models and see how well it grows on the ISS before moving on to human trials.



**ABOVE** It’s not rocket science... it’s lettuce science. GM lettuce could help astronauts avoid bone-mass depletion

**“The higher we can boost the expression [of PTH], the smaller the amount of lettuce that needs to be consumed”**