



For the latest research published by Nature visit: [www.nature.com/latestresearch](http://www.nature.com/latestresearch)

## TWEAK SPIRULINA FOR A SOUPED-UP SMOOTHIE



Dried spirulina could be used as a carrier for protein-based therapies.

The blue-green alga spirulina could help bioengineers to produce therapeutic proteins such as antibodies.

Often taken as an antioxidant, spirulina (*Arthrospira platensis*) is already mass-produced at farms and sold as a powder that can be mixed into drinks such as smoothies. James Roberts at Lumen Bioscience in Seattle, Washington, and his colleagues wondered whether spirulina could replace the yeast and bacteria often used to make therapeutic proteins.

The team altered spirulina's DNA by inserting a gene for an antibody against a component of the bacterium *Campylobacter jejuni*, a common cause of food

poisoning and infant death in low-income countries. Mice that were infected with *C. jejuni* and fed the engineered spirulina were protected from disease. The team also fed the spirulina to healthy human volunteers, who showed no negative reactions.

Spirulina could be useful for delivering therapeutics in low-income countries because it can be dried into an edible powder, does not need to be refrigerated and can be consumed in large amounts. The authors are developing 'cocktails' of ten or more therapeutic proteins made by the microorganisms.

*Nature Biotechnol.* <https://doi.org/hmv8> (2022)

## BUBBLE BUBBLE: HOW TO MAKE AIRY YEAST-FREE PIZZA

A physics-driven baking technique can produce a yeast-free pizza with the classic well-risen, porous base.

Many consumers are intolerant of or allergic to yeast. But it is difficult to make yeast-free breads that have the same taste and texture as yeasted versions. Rossana Pasquino, Ernesto Di Maio and their colleagues at the University of Naples Federico II in Italy – including a professional pizza maker – developed a baking method that could overcome this problem.

In conventional bread making, the dough rises because it contains yeast that produces gas bubbles through a biochemical process. In the team's technique, similar bubbles are created by dissolving gas in a yeast-free dough in a pressurized environment and then slowly reducing the pressure during baking. The researchers fine-tuned the pressure reduction by studying the flow and deformation of the dough as the pressure dropped.

The authors applied their procedure to the baking of pizza and found that they could make yeast-free pizzas that are similar to standard ones. They say that their approach could be adapted to other baked products.

*Phys. Fluids* **34**, 033109 (2022)



## BOA CONSTRICTORS SPLIT SQUEEZING AND BREATHING

Boa constrictors breathe by expanding and collapsing their ribcages, a technique that seems at odds with the snakes' habit of constricting and swallowing huge meals – both actions that constrain rib movement. Now scientists have explained this conundrum: boas can breathe with one part of their bodies while prey occupies another part.

John Capano at Brown University in Providence, Rhode Island, and his colleagues used a blood-pressure cuff to constrict portions of the bodies of boas (*Boa constrictor*, pictured), then watched the snakes' bones move. When the cuff immobilized a certain region of a snake's body, the animal shifted its breathing to other spots along its length.

The results help to explain a long-standing mystery: why are there so many kinds of snake? Snake species outnumber species of other long, slender vertebrates roughly tenfold. The researchers think that evolving the ability to breathe with isolated parts of their lungs – and therefore squeeze prey with their bodies, and then swallow it whole – increased the variety of animals snakes could eat. This let them live in a wide range of habitats, where they diversified.

*J. Exp. Biol.* **225**, jeb243119 (2022)