

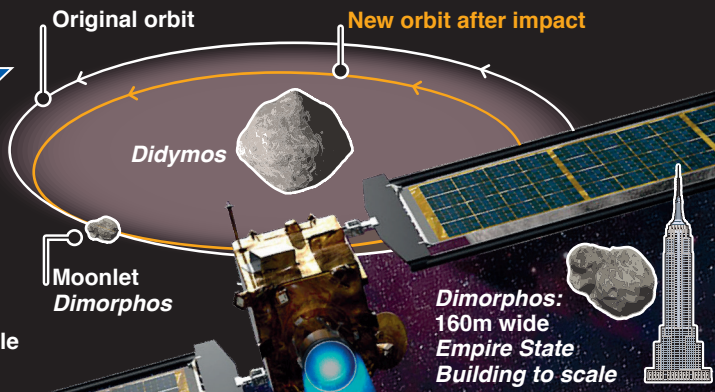
Science year 2021

MISSION TO DEFEND PLANET EARTH

NOVEMBER: NASA launches its *DART* spacecraft, designed to divert potentially hazardous asteroids heading for planet Earth.

The *Double Asteroid Redirection Test* mission will end in September 2022. The 560kg craft will slam into the moonlet, *Dimorphos*, as it orbits the asteroid, *Didymos*, altering the moonlet's course.

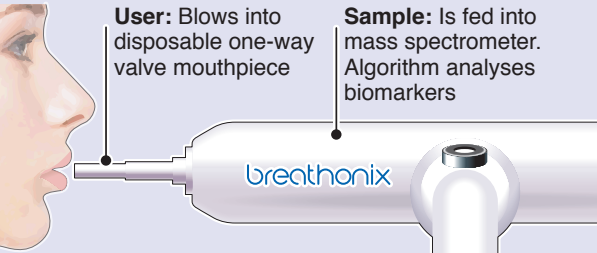
Changing its orbit will demonstrate it is possible to deflect an asteroid heading toward Earth



COVID TEST AS EASY AS BREATHING

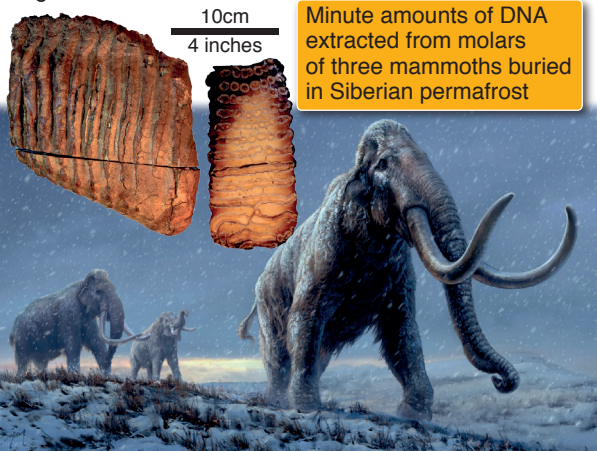
MAY: Singapore-based *Breathonix* develops a breath test system that can accurately detect and identify Covid-19 within sixty seconds.

The system identifies *volatile organic compounds* – biomarkers for respiratory diseases – in an individual's exhaled breath



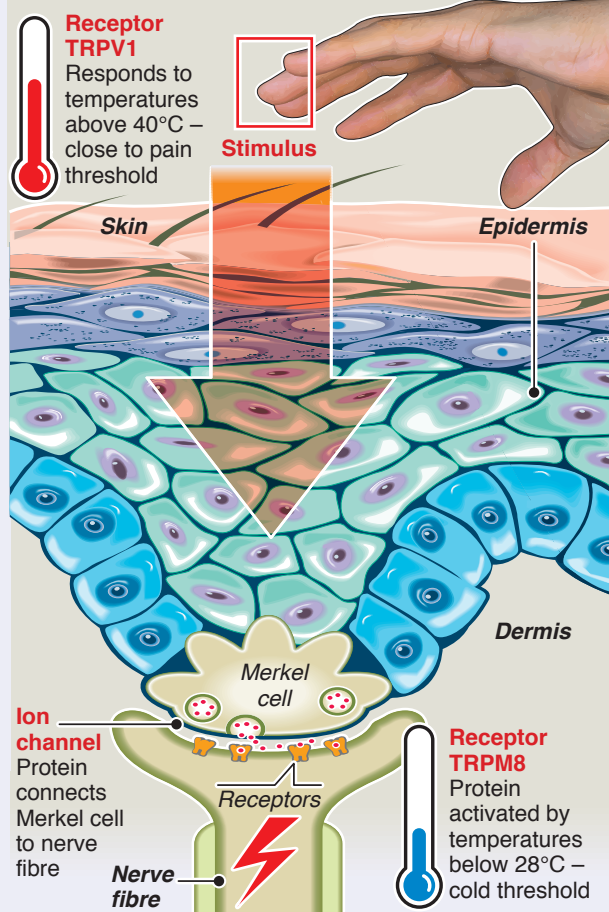
WORLD'S OLDEST GENOME SEQUENCED

FEBRUARY: Scientists at the *Centre for Palaeogenetics* in Stockholm extract DNA from mammoth remains thought to be 1.2 million years old, yielding the oldest full genome known to date



TOUCHY-FEELY PROTEIN SENSORS

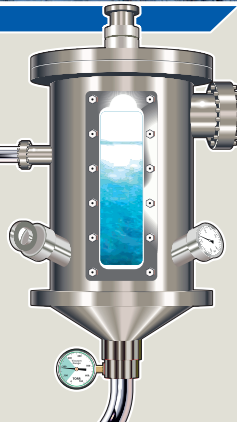
OCTOBER: *David Julius* and *Ardem Patapoutian* are awarded the *Nobel Prize in Physiology or Medicine* for their discoveries of *receptors* that detect temperature and touch at a molecular level



PROTEIN FROM THIN AIR

JANUARY: Finnish food tech *Solar Foods* scales up a concept for producing healthy protein from air.

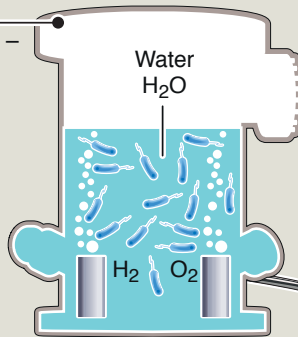
The protein is made by *chemosynthesis*. An edible bacterium uses energy in hydrogen gas to assimilate or "fix" carbon, nitrogen and sulphur. These three elements are incorporated into microbial biomass as carbohydrates, protein and fats



Chemosynthesis: Analogous to photosynthesis, but relies on chemical energy instead of sunlight to power carbon dioxide fixation

Bioreactor

Hydrogen gas – generated by electrolysis of water – CO_2 and trace elements are bubbled through liquid containing hydrogen-oxidizing bacteria



Bacteria
Eat nutrients and multiply, thickening liquid.

Liquid is dried. Powder contains 50% protein, 20-25% carbohydrates and 5-10% fats

