

2020: The year in science

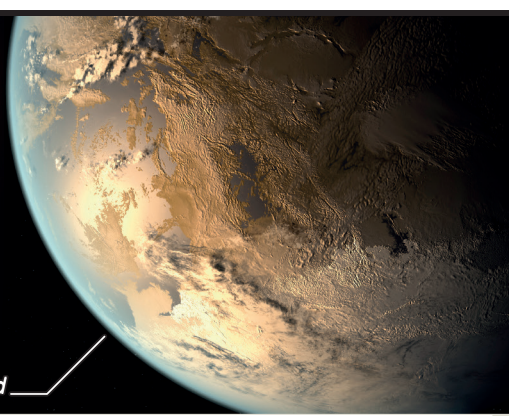
SEARCHING FOR ANOTHER EARTH

OCTOBER: Using data from NASA's retired *Kepler space telescope*, astronomers calculate that there could be as many as 300 million potentially habitable planets orbiting stars similar to our Sun.

These Earth-like planets are in the "goldilocks" or habitable zone, where they can support liquid water

The nearest so-called **exoplanet** is **GJ 357d** which orbits a star around 31 light years away, in the constellation **Hydra**

Kepler-186f: Artist's concept of first Earth-sized planet to be discovered



RACE FOR A CORONAVIRUS VACCINE



JANUARY: Since Chinese health authorities shared the full sequence of the novel coronavirus genome, pharmaceutical companies have smashed the record for the time between identifying a virus and creating a vaccine.

Pfizer/BioNTech's vaccine is the fastest to go from concept to regulatory approval, taking just 11 months to follow the steps that generally span ten years

BIRD SONGS BECOME SEXIER

OCTOBER: With noise of traffic and construction reduced during the lockdown, birds in cities adapt to the new soundscape by increasing their song complexity and doubling their communication distance.

Research published in the journal **Science** finds that male sparrows changed their song to have a broader vocal range and softer notes. **Higher-performance songs are more attractive to female birds**

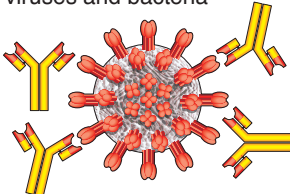


AI SOLVES THE PROTEIN-FOLDING PROBLEM

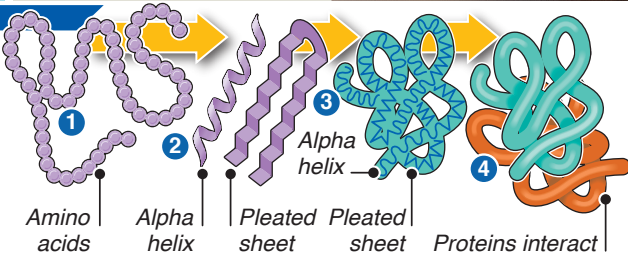
NOVEMBER: Google's **DeepMind** has created an artificial intelligence (AI) programme called **AlphaFold** that can solve a 50-year-old grand challenge in biology – the **protein-folding problem** – in a matter of days.

The ability to accurately predict the unique 3D shapes of proteins from their amino acid sequences would be a huge boon to life sciences

For example, **antibody proteins** are **Y-shaped** with unique hooks to latch onto viruses and bacteria



Haemoglobin blood protein is made up of four protein subunits folded in such a way it can carry oxygen



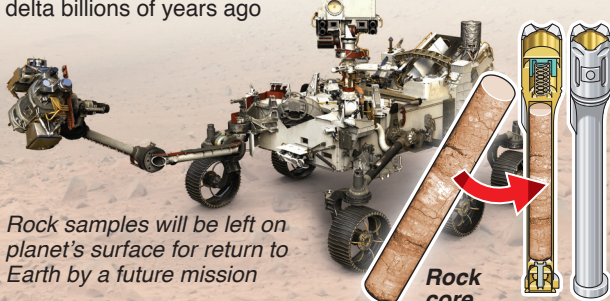
- 1. Proteins are made from chains of amino acids strung together by peptide bonds
- 2. Amino acid shapes – helices and sheets – join to form polypeptide chains

- 3. Polypeptide chains fold in on themselves
- 4. Proteins are polypeptides of 300-1,000 amino acids, folded in such a way that they have biological activity

THREE MISSIONS AIM FOR MARS

JULY: NASA's life-hunting Mars **Perseverance** rover is due to land on the Red Planet on February 18, 2021.

Perseverance – the centrepiece of NASA's \$2.7 billion Mars 2020 mission – will hunt for signs of ancient life in the **Jezero Crater**, which harboured a lake and river delta billions of years ago



Rock samples will be left on planet's surface for return to Earth by a future mission

Two other missions will arrive at the Red Planet in February – the United Arab Emirates' **Hope** orbiter and China's **Tianwen-1** mission. They will join the six orbiters and two landers already on the surface

BRAIN-MACHINE INTERFACES

AUGUST: Elon Musk's **Neuralink** reveals that a monkey has been able to control a computer with its brain.

Neuralink intends to implant sensors inside the motor and sensory areas of a human brain

The implant will sit flush inside the skull. Electrical threads about 1/20th the thickness of hair extend into the brain to pick up electrical signals

The device will connect wirelessly to a behind-the-ear receiver allowing people to communicate with machines

Human trials could start in 2021

