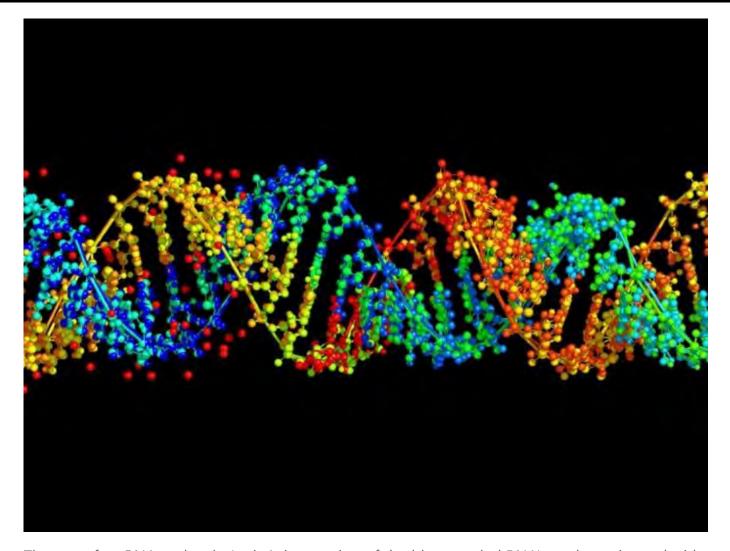
nature



The age of an RNA molecule (artist's impression of double-stranded RNA) can be estimated with a protocol that involves an RNA-editing protein. Credit: Laguna Design/SPL

BIOTECHNOLOGY · 19 OCTOBER 2020

The timestamp that can tell an RNA molecule's age — to the hour

Technique allows scientists to complete a timeline for gene activity in a single cell.

An RNA-editing tool that 'timestamps' RNA molecules reveals not only which genes in a cell are turned on at any one time, but also when they were turned on.

When a gene is switched on, it triggers the production of RNA molecules that carry the information needed to make a specific protein. Scientists hoping to understand a cellular process often sequence the RNA molecules present at a given moment in a single cell. But researchers have lacked a reliable way to determine when a particular gene became active.

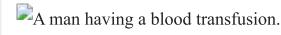
A team led by Edward Boyden at the Massachusetts Institute of Technology in Cambridge and Fei Chen at the Broad Institute of Harvard and MIT, also in Cambridge, tagged genes with a genetic sequence that is recognized by an RNA-editing protein. After these genes had synthesized RNA, the protein made chemical changes to the molecule, adding progressively more edits over time.

When the researchers then sequenced the RNA molecules, they could assume that those with more chemical edits were older than those with fewer edits. The system can narrow down an RNA molecule's age to within roughly one hour.

Nature Biotechnol. (2020)

Biotechnology

MORE RESEARCH HIGHLIGHTS...



VIROLOGY · 29 JULY 2021

Your blood teems with a unique set of stealthy 'anelloviruses'

A single individual harbours tens to hundreds of variants of this DNA-based virus, which can move from one person to another in donated blood.

Light micrograph of a section through a kidney.

MEDICAL RESEARCH · 28 JULY 2021

A grim future awaits many children with type 2 diabetes

Long-term follow up finds that more than half of children and adolescents with the disease develop complications within 15 years of diagnosis.

Bird's eye view of a marked bumble bee on a green robotic flower

ANIMAL BEHAVIOUR · 28 JULY 2021

A caffeine buzz gives bees flower power

Bumblebees dosed with caffeine can more easily remember the scent of sugar-heavy blossoms.

A grey circular path is shown where a metavehicle has travelled

MATERIALS SCIENCE · 28 JULY 2021

Mini 'metavehicles' zip and swerve on light power

Light can be used to both propel and steer tiny vehicles made with materials that have distinctive optical properties.

A visual representation of saccadic eye movement - left side is a clear image, right side blurry

NEUROSCIENCE · 27 JULY 2021

The unnoticed eye motions that help us see the world

Eye movements lasting only a few hundredths of a second create an information-laden 'smear' on the retina.

The PDS 70 system, located nearly 400 light-years away

PLANETARY SCIENCE · 27 JULY 2021

Far-off planet has a nursery for baby moons

Researchers spy a dusty, moon-forming disk surrounding a planet beyond the Solar System.

Satellite image of Ganges Delta plain, Bangladesh

GEOCHEMISTRY · 23 JULY 2021

Toxic mercury rides rivers into the sea

Research suggests that rivers are a bigger source of mercury in coastal waters than is the atmosphere — a finding that contradicts some global models.

A GIF of a sulphur-crested cockatoo opening the lid of a household bin

ANIMAL BEHAVIOUR · 22 JULY 2021

Rubbish-raiding parrots take lessons from coconspirators

Sulphur-crested cockatoos are the first parrots known to have complex culture centred on food-gathering.

The jet structure of Centaurus A

ASTRONOMY AND ASTROPHYSICS · 22 JULY 2021

A telescope watches as a black hole spews stuff into space

The trailblazing collaboration that first imaged a black hole turns its sights on a nearby black-hole jet.

Cannabis landraces in central China

GENOMICS · 21 JULY 2021

The surprising place where pot farming first blossomed

Humans first began cultivating cannabis, a source of both fibres and drugs, some 12,000 years ago.

Smoke and vapor rising from the cooling towers and chimneys of the power plant Niederaussem

CLIMATE CHANGE · 21 JULY 2021

How to win big for the climate: rein in the 'super polluters'

Just 5% of the world's power plants account for almost three-quarters of carbon emissions from electricity generation.

Selected materials found in the gut contents of Tollund Man

ARCHAEOLOGY · 20 JULY 2021

The guts of a 'bog body' reveal sacrificed man's final meal

Tollund Man, who lived more than 2,000 years ago, ate well before he was hanged.

Two plateau pikas 'kissing' on grass

ZOOLOGY · 19 JULY 2021

Pikas in high places have a winter-time treat: yak poo

Snacks of faeces help the pocket-sized mammals survive the cold and wind atop a vast plateau that abuts the Himalayas.

A computer illustration of pink Zika virus particles

MOLECULAR BIOLOGY · 16 JULY 2021

Tied in knots: Zika virus tangles are the most stable RNA known

A dangerous virus uses a ring-shaped structure to make its RNA resistant to attack.

Birds-eye view of vegan bowls with various vegetables and seeds on a blue table

METABOLISM · 15 JULY 2021

Why a meat-free diet boosts health: protein levels might hit the spot

An analysis shows that the amino-acid profiles of vegan, vegetarian and omnivorous diets are similar.

A worker sweeps up broken watermelons on the floor

SUSTAINABILITY · 15 JULY 2021

China wastes almost 30% of its food

Out-of-home dining accounts for some of the nation's wasted food, but much more is lost during food storage and processing.

Close up of a finger tip being held against a vitamin C sensor with an electrochromic display reading '4'

ENERGY · 15 JULY 2021

While you sleep, a device harvests energy from your sweaty fingertips

An energy collector in contact with the skin is efficient enough to power some electronic devices.

Aerial view of the Salamon tower, part of the 13th century Visegrád castle ruins, on the banks of the river Danube, Hungary

SOLID EARTH SCIENCES · 14 JULY 2021

Damage to a royal town on the Danube warns of seismic danger

Documents and physical evidence hint that a major earthquake struck Visegrád in Hungary, once home to kings.

An indigenous mother breastfeeds her son under a mosquito net in a dark room

PUBLIC HEALTH · 14 JULY 2021

Why breastfeeding is becoming less reliable for birth control

As countries become more prosperous, people nursing their babies become fertile sooner after birth.

Lizard, Psammodromus algirus, resting on a rock

ECOLOGY · 13 JULY 2021

Destructive fires serve as pest control for lizards

Mediterranean lizards in burnt areas are less likely to be afflicted by mites than their neighbours in unburnt woodlands.

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