

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


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 A man having a blood transfusion.

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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.

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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

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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

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

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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

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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

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Toxic mercury rides rivers into the sea

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

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 The jet structure of Centaurus A

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

 Cannabis landraces in central China

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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

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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

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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

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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

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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

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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

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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'

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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

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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

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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

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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.

Nature (*Nature*) | ISSN 1476-4687 (online) | ISSN 0028-0836 (print)

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