

Ode to Happiness for Sunday August 22 2021

Ring Galaxy AM 0644-741



Image Credit: NASA, ESA, Hubble, HLA; Processing: Jonathan Lodge

The rim of the large blue galaxy at the right is an immense ring-like structure 150,000 light years in diameter composed of newly formed, extremely bright, massive stars.

AM 0644-741 is known as a ring galaxy and was caused by an immense galaxy collision. When galaxies collide, they pass through each other and their individual stars rarely come into contact.

The large galaxy's ring-like shape is the result of the gravitational disruption caused by a small intruder galaxy passing through it. When this happens, interstellar gas and dust

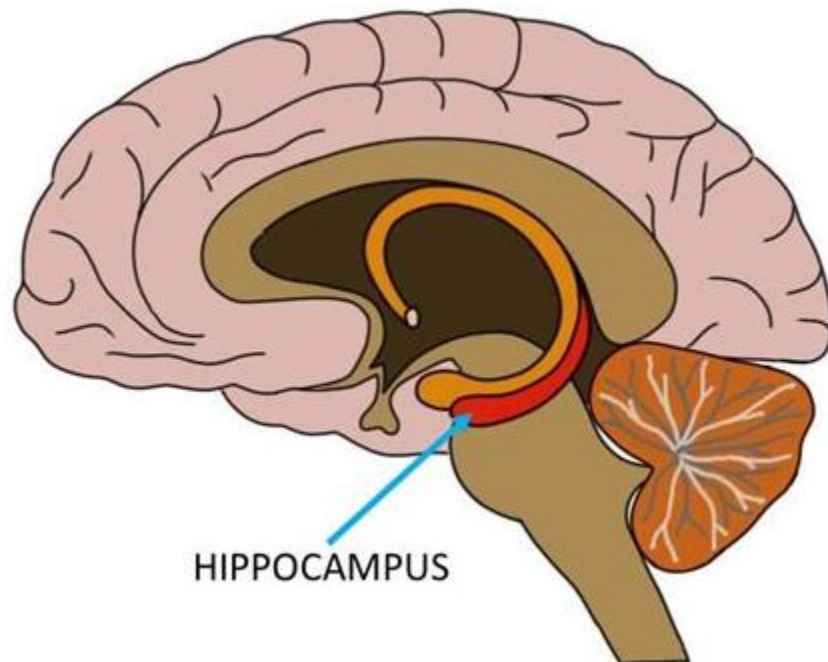
become compressed, causing a wave of star formation to move out from the impact point like a ripple across the surface of a pond.

Other galaxies in the field of view are background galaxies, not interacting with AM 0644-741. Foreground spiky stars are within our own Milky Way. But the smaller intruder galaxy is caught above and right, near the top of the frame taken by the Hubble Space Telescope.

Ring galaxy AM 0644-741 lies about 300 million light years away toward the southern constellation Volans.

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Brain's 'Memory Center' Needed to Recognize Image Sequences but not Single Sights



neuroscientificchallenged.com

The visual cortex stores and remembers individual images, but when they are grouped into a sequence, mice can't recognize that without guidance from the hippocampus

A new MIT study of how a mammalian brain remembers what it sees shows that while individual images are stored in the visual cortex, the ability to recognize a sequence of sights critically depends on guidance from the hippocampus, a deeper structure strongly associated with memory but shrouded in mystery about exactly how.

By suggesting that the hippocampus isn't needed for basic storage of images so much as identifying the chronological relationship they may have, the new research published in *Current Biology* can bring neuroscientists closer to understanding how the brain coordinates long-term visual memory across key regions.

"This offers the opportunity to actually understand, in a very concrete way, how the hippocampus contributes to memory storage in the cortex," said senior author Mark Bear, Picower Professor of Neuroscience in The Picower Institute for Learning and Memory and MIT's Department of Brain and Cognitive Sciences.

Essentially, the hippocampus acts to influence how images are stored in the cortex if they have a sequential relationship, said lead author Peter Finnie, a former postdoc in Bear's lab.

"The exciting part of this is that the visual cortex seems to be involved in encoding both very simple visual stimuli and also temporal sequences of them, and yet the hippocampus is selectively involved in how that sequence is stored," Finnie said.

Above: A pair of mouse brain cross-sections shows an unaltered one on the left and one with significant removal of the hippocampus on the right. Image credit: Peter Finnie.

To have hippocampus and have not

To make their findings, the researchers including former postdoc Rob Komorowski trained mice with two forms of visual recognition memory discovered in Bear's lab. The first form of memory, called stimulus selective response plasticity (SRP) involves learning to recognize a non-rewarding, non-threatening single visual stimulus after it has been presented over and over. As learning occurs, visual cortex neurons produce an increasingly strong electrical response and the mouse ceases paying attention to the once novel, but now decidedly uninteresting, image. The second form of memory, visual sequence plasticity, involves learning to recognize and predict a sequence of images. Here, too, the once novel but now familiar and innocuous sequence comes to evoke an elevated electrical response, and it is much greater than what is observed if the same stimuli are presented in reverse order or at a different speed.

In prior studies Bear's lab has shown that the images in each form of memory are stored in the visual cortex, and are even specific to which eye beheld them if only one did.

But the researchers were curious about whether and how the hippocampus might contribute to these forms of memory and cortical plasticity. After all, like some other forms of memory that depend on the hippocampus, SRP only takes hold after a period of "consolidation," for instance overnight during sleep. To test whether there is a role for hippocampus, they chemically removed large portions of the structure in a group of mice and looked for differences between groups in the tell-tale electrical response each kind of recognition memory should evoke.

Mice with or without a hippocampus performed equally well in learning SRP (not only measured electrophysiologically but also behaviorally), suggesting that the hippocampus was not needed for that form of memory. It appears to arise, and even consolidate, entirely within the visual cortex.

Visual sequence plasticity, however, did not occur without an intact hippocampus, the researchers found. Mice without the structure showed no elevated electrical response to the sequences when tested, no ability to recognize them in reverse or when delayed

and no inclination to “fill in the blank” when one was missing. It was as if the visual sequence—and even each image in the sequence—was not familiar.

“Together these findings are consistent with a specific role for the hippocampus in predictive response generation during exposure to familiar temporal patterns of visual stimulation,” the authors wrote.

New finding from a classic approach

The experiments follow in a long tradition of attempting to understand the hippocampus by assessing what happens when it’s damaged. For decades, neuroscientists at MIT and elsewhere were able to learn from a man known as “H.M.,” who had undergone hippocampal removal to relieve epileptic seizures. His memory of his past before the surgery remained intact but he exhibited an inability to form “declarative” memories of new experiences such as meeting someone, or performing an activity. Over time, however, scientists realized that he could be trained to learn motor tasks better, even though he wouldn’t remember the training itself. The experiments helped to reveal that for many different forms of memory there is a “division of labor” among regions of the brain that may or may not include the hippocampus.

The new study, Bear and Finnie said, produces a clear distinction through the division of labor in visual memory between simple recognition of images and the more complex task of recognizing of sequence structure.

“It’s a nice dividing line,” Bear said. “It’s the same region of the brain, the same method of an animal looking at images on a screen. All we are changing is the temporal structure of the stimulus.”

Alzheimer’s assessment?

Previous research in the lab showed that SRP and visual sequence plasticity arise via different molecular mechanisms. SRP can be disrupted by blocking receptors for the neurotransmitter glutamate on involved neurons while sequence plasticity depends on receptors for acetylcholine.

The next question Bear wants to address, therefore, is whether an acetylcholine producing circuit links the hippocampus to the visual cortex to accomplish sequence learning. Neurons that release acetylcholine in the cortex happen to be among the earliest disrupted in Alzheimer’s disease.

If the circuit for sequence learning indeed runs through those neurons, Bear speculated, then assessing people for differences in SRP and sequence learning could become a way to diagnose early onset of dementia progression.

The National Eye Institute of the National Institutes of Health and the JPB Foundation funded the research.

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Aerosmith



Aerosmith's style is rooted in blues-based hard rock, elements of pop rock, heavy metal, glam metal, and rhythm and blues. Often referred to as the Bad Boys from Boston the primary songwriting team of Tyler and Perry is also known as the "Toxic Twins".

- Dream On <https://youtu.be/89dGC8de0CA>
- Sweet Emotion <https://www.youtube.com/watch?v=CIwxHvKykvY>

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Kelli O'Hara



- Obsessed! Kelli O'Hara and "The Old Snippetty Snap"
<https://www.youtube.com/watch?v=b3N1P0d4SfM>
- The Don't Let You in th Opera
<https://www.youtube.com/watch?v=Q2PBOAbdIcU>

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Instead of a sign
that says 'do not disturb'
I need one that says
'already disturbed
proceed with caution'



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Chimps Use 'Hi' And 'Bye' Greetings, Just Like Humans

By Laura Geggel

But bonobos are more "polite" than chimps.



Eastern chimpanzees (Pan troglodytes schweinfurthii) groom each other.
(Image credit: Anup Shah via Getty Images)

Chimps and bonobos signal "hello" and "goodbye" to one another when entering and exiting social encounters, a new study finds.

In other words, these apes, which share about 99% of humans' DNA, politely greet and bid adieu to each other, just like humans do. Until now, this behavior hasn't been documented outside of the human species, the researchers said.

"Our findings show that two species of great apes habitually go through the same process and stages as humans when establishing, executing and terminating joint actions" of hi and bye, the researchers wrote in the study, published online Aug. 11 in the journal *iScience*.

Granted, the apes didn't just give their equivalent of a vocal "What's up?" during social visits. Rather, they had a slew of nonverbal cues. This happens with humans, too. For instance, when people approach to interact, they often orient their bodies toward each other, look at each other and display the intention to touch, hug or kiss before they start talking, the researchers wrote in the study. When leaving an interaction, people often turn their bodies away from each other.

These behaviors amount to a "joint commitment," which is partly a feeling of obligation that we feel toward one another, but also a process of setting up a mutual interaction and agreeing when to end it, the researchers said.

To determine whether chimpanzees and bonobos practice these behaviors, the researchers analyzed 1,242 interactions of apes at zoos, and they discovered that these primates often communicate with one another — often with gestures that include gazing at and touching each other, holding hands or butting heads — before and after encounters such as grooming or play. Of the two species, however, the bonobos were definitely the more polite ones, greeting each other more often than the chimps did, the researchers found.

When beginning a joint interaction, bonobos exchanged entry signals and mutual gazes in 90% of cases, whereas chimps did so 69% of the time, the researchers found. During departures, bonobos also outshined chimps, displaying exit behaviors 92% of the time, whereas chimps showed it in 86% of interactions.

The research team also investigated whether these behaviors changed when the apes interacted with close confidants. They found that the closer bonobos were with one another, the shorter the length of their entry and exit behaviors. This isn't so different from human behavior, said study lead researcher Raphaella Heesen, a postdoctoral researcher in the department of psychology at Durham University in the United Kingdom.

"When you're interacting with a good friend, you're less likely to put in a lot of effort in communicating politely," Heesen said in a statement.

In contrast, the length of the chimps' entry and exit behaviors was "unaffected by social bond strength," the researchers wrote in the study. This might be because in comparison with the hierarchical chimp society, bonobos are largely egalitarian, socially tolerant and emphasize friendships and alliances between females and mother-son relationships, the researchers said. As such, it makes sense that the bonobos' social relationships would have strong effects on their "hellos" and "goodbyes," the researchers wrote in the study.

Meanwhile, there was no significant effect of rank difference on the presence of entry or exit phases in either ape species, they noted.

The findings suggest that perhaps a common ancestor of apes and humans practiced similar behaviors, the researchers said.

"Behavior doesn't fossilize. You can't dig up bones to look at how behavior has evolved. But you can study our closest living relatives: great apes like chimpanzees and bonobos," Heesen said. "Whether this type of communication is present in other species will also be interesting to study in the future."

Originally published on Live Science.

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Glen Campbell Amazing Grace



https://www.youtube.com/watch?v=4_DqmyI_YNE

Bagpipes? Well, his name *is* Campbell

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Not Only Corny...but Flaky as Well

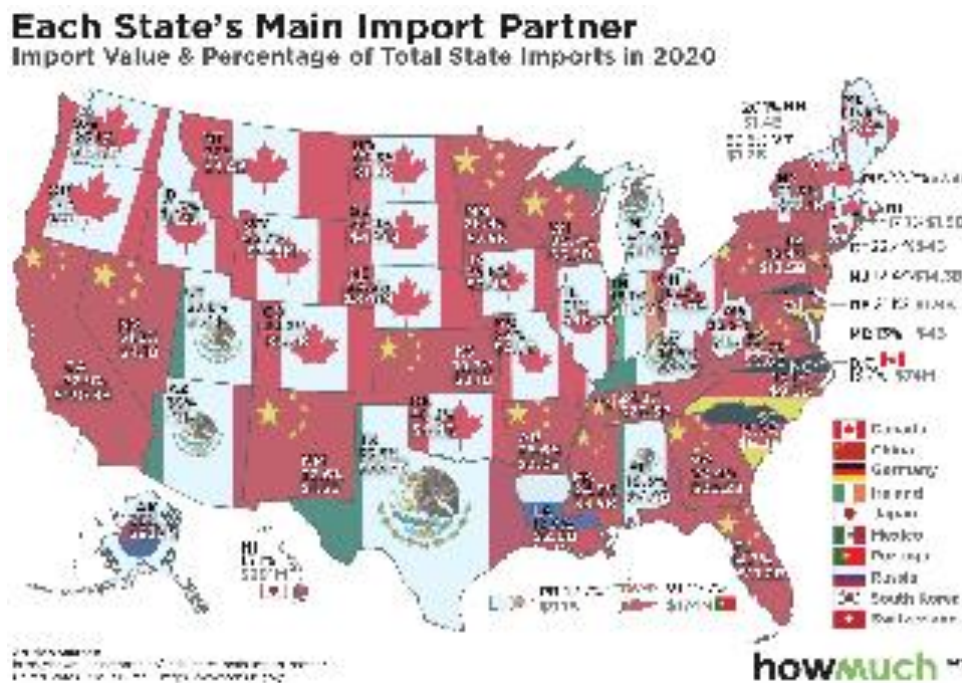
- John Travolta tested negative for corona virus last night. Turns out it was just Saturday night fever.
- The World Health Organization has announced that dogs cannot contract Covid-19. Dogs previously held in quarantine can now be released. To be clear, WHO let the dogs out.
- I saw an ad for burial plots and thought to myself that's the last thing I need.
- Intelligence is like underwear. It is important that you have it, but not necessary that you show it off.
- Relationships are a lot like algebra. Have you ever looked at your X and wondered Y?
- A courtroom artist was arrested today for an unknown reason, details are sketchy.
- People are making end of the world jokes like there's no tomorrow.
- Whatever you do, always give 100% unless you're donating blood
- What do you call a sleepwalking nun? Roamin' Catholic.
- What did Snow White say when she came out of the photo booth? Someday my prints will come.
- A girl said she recognized me from her vegetarian club but I'd never met herbivore.
- Dad, are we pyromaniacs? Yes, we arson.
- I've always had an irrational fear of speed bumps but I'm slowly getting over it.
- What word becomes shorter when you add two letters to it? Short.
- I've finally told my suitcases there will be no holiday this year. Now I'm dealing with the emotional baggage.

- If you're not supposed to eat at night, why is there a light bulb in the refrigerator?
- My friend died when we couldn't remember his blood type. As he died, he kept insisting "be positive," but it's hard without him.
- Don't let your worries get the best of you; remember, Moses started out as a basket case.
- There was the person who sent ten puns to friends, with the hope that at least one of the puns would make them laugh. No pun in ten did.

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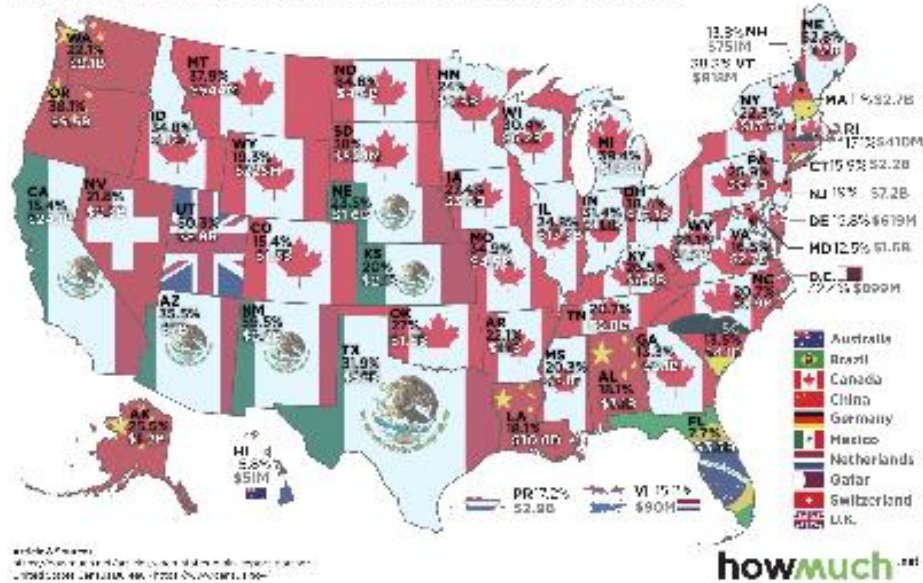
The Top Trading Partner of Every U.S. State

This map from HowMuch.net uses flags to show which country each U.S. state is importing the most from. Below, there is an additional graphic showing where each state is exporting the highest amount of goods and services to



China and the U.S. have an imbalanced trade relationship, with China buying much fewer goods from the U.S. than the U.S. buys from them. In fact, China's monthly trade surplus with the country sat at \$31.8 billion as of May 2021.

Each State's Main Export Partner
Export Value & Percentage of Total State Exports in 2020



The trade war that started during the tenure of former U.S. president Donald Trump is still ongoing and tariffs set by the U.S. are not expected to be lifted by president Joe Biden, as tensions have expanded beyond just trade issues.

These tariffs, however, have not helped to rectify the significant trade imbalance between the two countries. The states are still extremely reliant on imports from China, and it is not a reciprocal relationship.

Any Questions?

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Thrift Shop Find of the Day: Jackson Pollock Painting



Jackson Pollock at work
pinterest

In 1992, Teri Horton visited a thrift shop and bought a big, ugly painting for \$5 as a gag gift to cheer up a friend.

When the friend didn't have room for it, Horton tried to sell it at a garage sale where an art teacher told her it might be a Jackson Pollock.

After hiring a forensic specialist, Horton was able to trace the painting back to Pollock's studio. Horton was once offered \$9m for it but wanted to hold out for \$50m.

She's since passed, but not before a documentary was made about the experience, aptly titled "Who the #\$&% Is Jackson Pollock?" in which art experts question whether the painting is a real Pollock after all.

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19 Years and Curiosity Continues to Count



NASA JPL

August 5th 2021 marked the 19th anniversary of the Curiosity rover landing on Mars. Originally slated for a two-year mission, the rover, operated from JPL's mission control in Pasadena, is still actively exploring the Red Planet.

<https://www.jpl.nasa.gov/missions/mars-science-laboratory-curiosity-rover-ms>

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Mildred, the church gossip and self-appointed monitor of the church's morals, kept sticking her nose into other people's business. Several members did not approve of her extra-curricular activities, but feared her enough to maintain their silence.

She made a mistake, however, when she accused Frank, a new member, of being an alcoholic after she saw his old pickup parked in front of the town's only bar one afternoon. She emphatically told Frank (and several others) that everyone seeing it there would know what he was doing!

Frank, a man of few words, stared at her for a moment and just turned and walked away. He didn't explain, defend, or deny. He said nothing. Later that evening, Frank quietly parked his pickup in front of Mildred's house ... Walked home... And left it there all night. You gotta love Frank!

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Random Thoughts

- Your bank account can be empty but it can never be full.
- The Universe might've already ended, and we're just waiting for it to reach us, like cosmic dominos.
- We always refer to things being "on fire" when in reality fire is always the one on things.
- The posted speed limit is the legally-accepted maximum limit, but the socially-accepted minimum limit.
- You have fallen asleep thousands of times, and seen it, but you never remember it.

via Reddit

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Elephants Singing" with Piano in Their Own Way

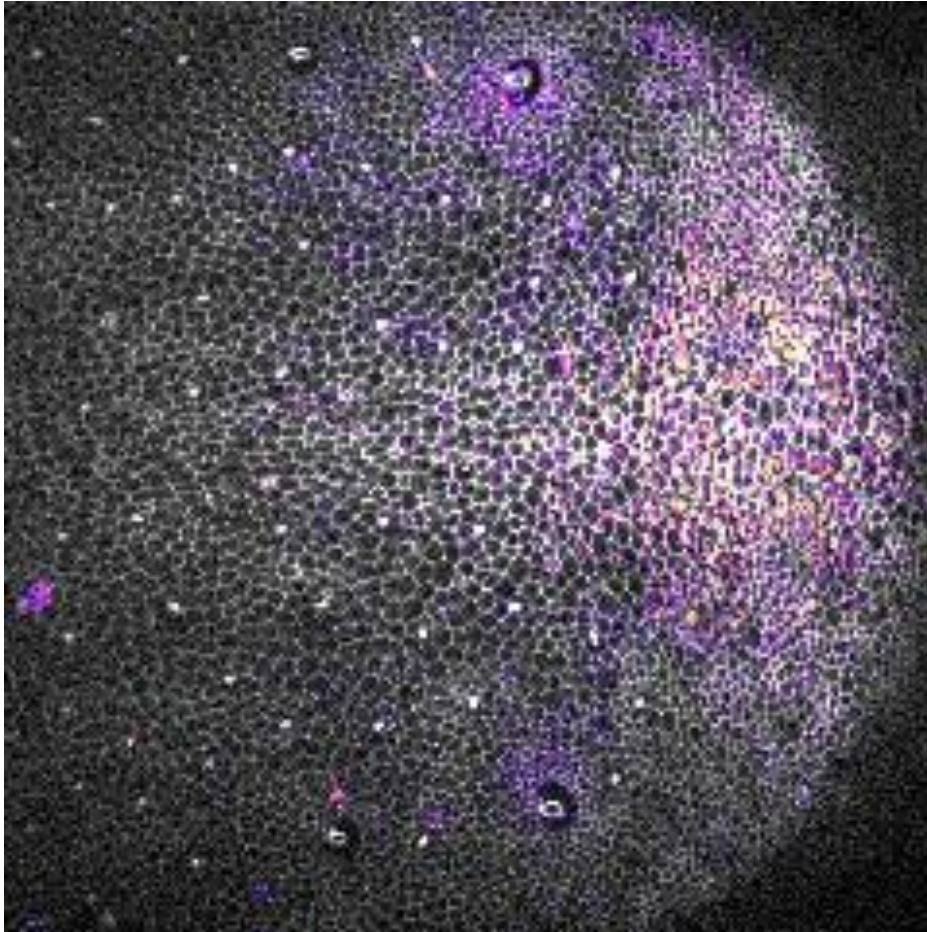


<https://youtu.be/8NPCplrXViUWatch>

A number of elephants and their mahout out for a walk in the mountains passed by the piano. When they heard Greensleeves they stopped walking of their own accord and trumpeted along with the music.

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Cells Undergoing Cell Death Protect Their Neighbors to Maintain Tissue Integrity



A Drosophila pupa epithelium showing cell contours (gray) and the reporter of the EGFR-ERK pathway (yellow/purple gradient).

© Institut Pasteur / Romain Levayer et Léo Valon

To enable tissue renewal, human tissues constantly eliminate millions of cells, without jeopardizing tissue integrity, form and connectivity. The mechanisms involved in maintaining this integrity remain unknown. Scientists from the Institut Pasteur and the CNRS revealed a new process that allows eliminated cells to temporarily protect their neighbors from cell death, thereby maintaining tissue integrity. This protective mechanism is vital, and if disrupted can lead to a temporary loss of connectivity. The scientists observed that when the mechanism is deactivated, the simultaneous elimination of several neighboring cells compromises tissue integrity. This lack of integrity could be responsible for chronic inflammation. The results of the research were published in the journal *Developmental Cell* on June 2, 2021.

Human epithelia are tissues found in several parts of the body (such as the epidermis and internal mucosa). They are composed of layers of contiguous cells that serve as a physical and chemical barrier. This role is constantly being put to the test by both the outside environment and their own renewal. Tissue renewal involves the formation of new cells by cell division and the elimination of dead cells. The mechanisms that regulate the ability of epithelia to maintain their integrity in contexts involving large numbers of eliminated cells remain poorly understood, despite the fact that this

situation occurs regularly during embryogenesis or the maintenance of adult tissues. For example, more than ten billion cells can be eliminated every day in an adult intestine. How are these eliminations orchestrated to maintain tissue integrity and connectivity?

Scientists from the Institut Pasteur and the CNRS set out to identify the mechanisms involved in epithelial integrity and the conditions that can affect epithelial connectivity by using *Drosophila* (or vinegar flies), an organism studied in the laboratory with a similar epithelial architecture to humans.

Using protein-sensitive fluorescent markers, the research team revealed that when a cell dies, the EGFR-ERK pathway – a cell activation signaling pathway known for its involvement in the regulation of cell survival – is temporarily activated in the neighboring cells. The scientists observed that the activation of the EGFR-ERK pathway protected neighboring cells from cell death for approximately one hour, thereby preventing the simultaneous elimination of a group of cells. "We already knew that this pathway plays a key role in regulating cell survival in epithelial tissue, but we were surprised to observe such protective dynamics between cells," comments Romain Levayer, Head of the Cell Death and Epithelial Homeostasis Unit at the Institut Pasteur and last author of the study.

The scientists' research also shows that inhibiting this protective mechanism has a drastic effect on epithelial tissue: cell elimination becomes random and neighboring cells can be eliminated simultaneously, leading to repeated losses of connectivity. The elimination of groups of neighboring cells is never observed in epithelial tissue in normal conditions, when the EGFR-ERK pathway is not deliberately inhibited, even if a large number of cells are eliminated.

By using a new optogenetic tool that can control cell death in time and space and bypass the protective mechanism, the scientists confirmed that epithelial integrity was compromised when neighboring cells were eliminated simultaneously. "Surprisingly, epithelial tissue is highly sensitive to the spatial distribution of eliminated cells. Although it can withstand the elimination of a large number of cells, epithelial integrity is affected if just three neighboring cells are eliminated simultaneously," explains Léo Valon, a scientist in the Cell Death and Epithelial Homeostasis Unit at the Institut Pasteur and first author of the study.

The scientists' observations confirm that tissues need to develop mechanisms preventing the elimination of neighboring groups of cells. "These observations are important as they illustrate the incredible self-organizing ability of biological tissues, a property that enables them to withstand stressful conditions. So there is no need for a conductor to orchestrate where and when the cells should die; everything is based on highly local communications between neighboring cells," adds Romain Levayer.

This process seems to have been conserved during evolution. The same protective mechanism based on local EGFR-ERK activation was discovered independently in human cell lines by the research group led by Olivier Pertz at the University of Bern in Switzerland (the results are published in the same journal²). The results of the other

study suggest that the protective mechanism is conserved between species separated by hundreds of millions of years, indicating that it is a relatively universal mechanism.

Future research will reveal whether disruption to this cell death coordination mechanism and repeated loss of connectivity in epithelial tissue could be one of the roots of chronic inflammation, a phenomenon responsible for various diseases that are currently among the leading causes of death worldwide.

<https://youtu.be/M2bfQqok2z0>

Development of the Drosophila pupa epithelium showing the location of all cell deaths (colored dots). The cell contours are shown in gray.

© Institut Pasteur / Léo Valon et Romain Levayer

<https://youtu.be/ftZUSFdf-Yk>

Activation of the EGFR-ERK pathway in the neighbors of a cell extruded from the tissue. The reporter on the left is excluded from the nucleus when the pathway is activated (the eliminated cell is circled in green). Activation can also be viewed by other pathway sensors (the FRET sensor – red for strong activation)

© Institut Pasteur / Romain Levayer et Léo Valon

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Source

1. Robustness of epithelial sealing is an emerging property of local ERK feedback driven by cell elimination, *Developmental Cell*, 2 juin 2021

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Doi: 10.1016/j.devcel.2021.05.006

2. Collective ERK/Akt activity waves orchestrate epithelial homeostasis by driving apoptosis-induced survival, *Developmental Cell*, 2 juin 2021

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World Record Domino Robot (100k dominoes in 24hrs)



<https://www.youtube.com/watch?v=8HEfJlcFbs>

Former NASA and Apple engineer Mark Rober built a robot that can set up a 100k-domino mural in 24 hours. Why? Why not?

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Solar Plane to Fly for 90 Days



The US Navy is developing an unpowered, solar-powered plane that can stay aloft for 90 days at a time. (Eat your heart out, Jules Verne.)The design is based on the Solar Impulse 2 solar plane, which flew around the world in 2015 to 2016, though it had a pilot.The new plane, made by US-Spanish firm Skydweller Aero, will be able to carry more cargo than other high-altitude solar aircraft, and could be used as a communications relay platform or an escort for ships on the ocean.

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**Amal & Juan are
identical twins.
Their mom only
carries one photo
because if you've
seen Juan you've
seen Amal...**

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Gerry Mulligan



Though primarily known as one of the leading jazz baritone saxophonists, Mulligan was also a significant arranger, working with Claude Thornhill, Miles Davis, Stan Kenton, and others.

While arranging for Kenton, Mulligan began performing on off-nights at The Haig, a small jazz club on Wilshire Boulevard at Kenmore Street in Hollywood, Los Angeles. During the Monday night jam sessions, a young trumpeter named Chet Baker began sitting in with Mulligan. Mulligan and Baker began recording together, although they were unsatisfied with the results.

His pianoless quartet of the early 1950s with trumpeter Chet Baker is still regarded as one of the best cool jazz groups.

Satin Doll <https://www.youtube.com/watch?v=DQLtNSPC7P0&authuser=1>

With Dave Brubeck & Paul Desmond <https://www.youtube.com/watch?v=KWIBSXSjuyY>

The Shadow of Your Smile <https://www.youtube.com/watch?v=KWIBSXSjuyY>

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Another Flash Mob

The USAF Band with a Space Shuttle in the Audience



<https://www.youtube.com/watch?v=vniBBT7nRJg>

The USAF Band Holiday Flash Mob 2014 at the Smithsonian's National Air and Space Museum, Steven F. Udvar-Hazy Center.

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Get your relatives speaking to one another again by sending a heartfelt Christmas card with a picture of your family with an extra child nobody knows.

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The Pandemic Crimped the Wedding Industry. Now, Business is Booming.

It's a good time to be in the wedding business.



While COVID lockdowns wiped out the wedding season in 2020, the industry has recovered sharply, creating a flurry of business for vendors, per The New York Times.

The boom is expected to last beyond this year

While many of these ceremonies are socially-distant “micro-weddings,” not everybody is cutting back, which brings good news for vendors.

Independent research firm Wedding Report expects the average price per wedding to rise through 2023:

- 2021: 1.93m weddings, average spend of \$22.5k
- 2022: 2.47m weddings, average spend of \$24.3k
- 2023: 2.24m weddings, average spend of \$24.9k

Increased spending could be due to a number of factors, including couples saving up during the pandemic, stimulus checks from the government, and the surging stock market.

But the boom may actually be a blip

Wedding Report expects 2022 to have the most ceremonies since the 1980s before settling back to pre-COVID numbers, which weren’t exactly on the upswing.

Data from the National Center for Health Statistics (NCHS) maps the decline in marriage rates along the following timeline:

- 1982-2009: Marriage rates declined steadily
- 2009-2017: Marriage rates stabilized
- 2017-2018: Marriage rates dropped 6% to the lowest rate recorded between 1900 and 2018

One boom may lead to another

Since many couples wait to get married before having children, a baby boom could be next.

Recent data reported across multiple states hints at a turnaround from early in the pandemic when birth rates were declining.

With that in mind, it may not be a bad time to brush up on your babysitting skills.

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