KINESIS

magazine

POP SCIENCE EDITION

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“Butterfly Wings and Glaucoma”
Art inspired from the podcast “30 Animals That Made Us Smarter”: The transparent wings of the longtail glasswing butterfly may hold the key to more effective eye implants.

By Lucie Gourmet

Review:

The big mess of evolution by Léo Grasset

Léo Grasset is a French Youtuber known for his channel 'Dirtybiology', created in 2014. After getting a master's in biology, he decided to share his passion on the internet. His content focuses on an array of diverse topics, by asking out-of-the-box questions, such as 'how much is Nature's worth?', 'How did dinosaurs have sex?' and 'Why do humans crave stories?' As his channel's name indicates, his aim is to encourage creative thinking and explore areas of biology which may seem unconventional. He aims to vulgarise science and make it accessible by delivering it through an appealing format. In his latest book, which can be translated as "The big mess of evolution", he summarises most of his YouTube content.

The book centres on the unexpected aspects of evolution, as he explains that many traits occurred independently. Multicellularity as we know it exists in multiple forms which appeared at different times. The evolution of vision is also interesting as our ancestors had an additional cone which enabled them to see UV light, but our species lost this ability. At the time of dinosaurs, mammals had to live during the night, and they had no selective pressure to see colours present only during the day. Most mammals today are consequently dichromatic, but a few primate species obtained a new cone sensitive to green. He also explains that there is great variety regarding the eye anatomy of different animals, such Anableps which is often referred to as four-eyed fish. They only have two eyes, but these are split horizontally into two sections which allows them to have aerial and aquatic vision simultaneously, thereby protecting them from any predator. Other examples include the giant guitarfish Rhynchobatus djiddensis which can retract its eyes into its head to protect them and the mantis shrimp which has 16 cones enabling it to see more colours than we can imagine.

The strength of this book lies in the diversity of fun facts it provides. I discovered that female kangaroos have three vaginas, naked mole rats have almost no cancer incidence and the Australian government released the myxoma virus to control the population of rabbits. Also, the subjects he tackles are unusual and are often topics we tend to avoid talking about such as where the female orgasm comes from. It encourages the reader to open their mind and be more curious without fearing science. Moreover, the writing

style is easy to follow and does deter the reader from opening the book. Multiple illustrations accompany the text which helps visualise difficult concepts, memorize them and encourages to continue reading. I loved the underlying message the book has: don't be afraid to ask yourself questions even if they seem weird as there probably is a scientific answer. The book makes biology accessible to everyone and is an extraordinary model of science popularisation.

Written by Lucie Gourmet
Art by Patrick Marenda

A scientist's guide to perfecting and understanding your home-cooking

From cooking the perfect al dente pasta to maximising the health benefits of garlic, here is what food science has to say about how you can improve your next meal

Written and designed by Sophie Maho Chan

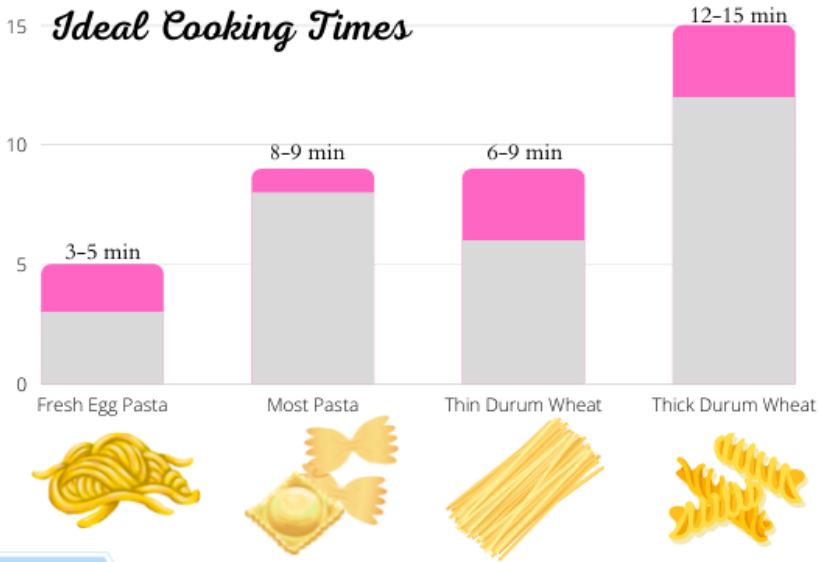
Cooking is fundamentally a science

Cooking is fundamentally a science: a marriage of chemistry and physics outside the lab, built upon centuries of meticulous experiments, observations, and discoveries. Seen from another perspective, cooking is an applied science where you can exercise and combine your evidence-based, systematic scientific thinking with some creativity and fun—much like what we do here at Kinesis! Why do certain foods taste good? How do you keep ingredients fresh? Heck, how can you even tell what is edible? While cooking really doesn't need to be that deep, underlying every question and practice is science. But don't worry you don't need to collect data from repeated experiments to perfect your al dente pasta–generations of dedicated chefs, home cooks, and food scientists have it all figured out for you. Here is a scientific guide to mastering your cooking!

Cooking the al dente pasta that will impress both Italian nonnas and chemists

Most historians suggest that pasta's origins can be traced back to China, only brought to Europe by Marco Polo in the 13th century, where it subsequently became an Italian staple. Simply made of eggs, water, and flour, pasta consists of starch and protein. The proteins help bind the starches together to make the dough stretchy but not sticky. When cooking the pasta, you are manipulating the protein-starch interactions.

To prevent pasta from becoming a mushy clumped-up ball, you may have seen people mix olive oil in the pot, because oil and water separate and stop the pasta from sticking together… right? Chemists would tell you to ditch the olive oil because it would get washed away when straining the pasta anyways. What would actually help is to make sure the water is on a rolling boil to keep the pasta circulating and add a ladle full of the salted, gelatinised starchy water leftover from the pot into the sauce to improve the texture.



Stepping up your garlic game

Garlic is perhaps one of the most versatile, well-loved ingredients in kitchens around the world, but understanding the biochemistry behind this humble ingredient can take your cooking to the next level.

Have you ever wondered why the seemingly unassuming garlic can produce such a strong smell and burning sensation when you bite into it raw? This is caused by allicin, which acts as the garlic's natural chemical defense against animals in the wild. Crucially, allicin is only released when the garlic's cells become damaged; the enzyme alliinase is released from cellular stores to act on allin to produce allicin, an organic sulfur compound. Furthermore, allicin is antibacterial and antifungal, inhibiting pathogenic enzyme cysteine proteases. It is thought that allicin is what gives garlic its immune-boosting health benefits.

TWO DIFFERENT WAYS OF PREPARING GARLIC

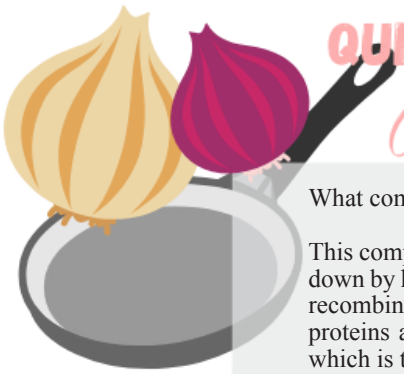
Fiery and Sharp vs Mellow and Sweet

1. If you like the fieriness of garlic then you want to damage the cells (i.e. mincing, chopping, and crushing). Leaving them for a few minutes to let enzymes from the allicin to start working and then eating it raw is the best way to maximise its health benefits. A good way to utilise raw minced garlic is in sauces like aioli or toum, as garlic also contains natural emulsifiers.

2. If you want to appreciate a more mellow, sweet side of garlic then you don't want to damage any cells directly; instead, keep the cloves intact and slowly let them cook. When cooking garlic, allinase is deactivated, preventing allicin production. Try confiting your garlic to see the difference!

The secret to caramelising your onions

QUICKLY, EFFICIENTLY AND SCIENTIFICALLY



Caramelising 101

What comes to mind when you hear the word "caramelisation"? Brown, sticky, nutty, sweet, bitter goodness.

This complex flavour comes from an oxidising chemical reaction. Large sugar molecules, like sucrose, are broken down by heat into smaller molecules like fructose and glucose. The sugars lose water, reacting with each other and recombining into hundreds of new aromatic compounds constituting a rich amalgamation of flavours. Crucially, proteins also break down into their amino acids to react with sugars in a process called the Maillard reaction, which is thought to be the crux of what makes caramel… well, scrumptious.

Caramelising onions faster and simpler

There are many ways you can incorporate caramelisation to your cooking, from perfectly searing a ribeye steak, to spicing up some apples to pair with pie or waffles. Perhaps the easiest to cook are caramelised onions which you can add to your burgers, soup, or even mashed potatoes. But those of you who have tried caramelising onions on the stove with butter and sugar may know that this simple process is deceptively time-consuming. Scientists however have found some ways around this:

1. ADD BAKING SODA (SODIUM BICARBONATE)

By adding alkali and raising the pH, you can optimise the Maillard reactions that speed up browning. It also weakens the pectins in their cell walls. But make sure you add nothing more than a quarter of a teaspoon for two or three onions; the last thing you want is soapy mushy onions.

2. MOISTURE IS YOUR BEST FRIEND

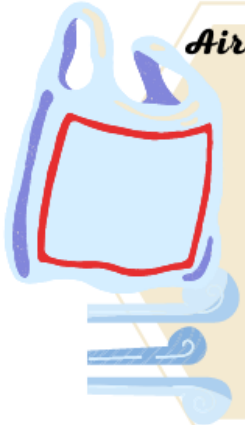
Add some water (or any liquid like wine or stock) to raise the heat without burning the onions. Water can also dissolve the brown molecules stuck to the pan and reacquaint them with the onions.

STORING VEGETABLES AND FRUITS THE RIGHT WAY

Happy biologists and environmental scientists

We may only see vegetables and fruits in grocery stores, perfectly wrapped up and ready for our consumption—but they are living organisms with biochemistry at their heart.

One easy way to reduce food waste is by ensuring you store ethylene-producing (that is gas that speeds up ripening) fruits and vegetables away from highly ethylene-sensitive fruits and vegetables.



Air circulation is your best friend

Vegetables need to be stored in air-permeable bags to allow them to breathe and prevent water in tissues from accumulating. Poking holes in the plastic bags or keeping vegetables in reusable mesh bags can do the trick. For onions, store them without plastic wrap, but using mesh or clean pantyhose. For potatoes, you want to keep them in a dark, cool place in a breathable bag; don't refrigerate them where the moist air will convert their starch into smaller sugars. Avoiding packing too much food in the fridge also aids air circulation.

Cleaning

Finally, this may sound like common sense, but clean your fridge regularly! You are bound to bring in hungry microorganisms from outside when putting all kinds of groceries in your fridge. Experts advise wiping down the inside of your fridge with vinegar and soapy water.

Which Brain Region Are You?

Well, this is very meta...Find out which brain region matches your personality! (P.S. for entertainment purposes only–with a dash of neuroscience)

Written by Perside Ngani
Art by Lia Bote

1. What drink do you have first thing in the morning?

A) Water
B) Coffee
C) Green tea
D) A protein shake
E) Chocolate milk

2. You get a text from a friend; when do you reply?

A) Within 5 minutes and no later
B) Straight away, since you were on your phone anyways...
C) Depending on the text, between 5 minutes to 16 hours
D) You create a reminder to reply when you get the chance
E) You replied in your head , but forgot to send the message...

3. You have a pending deadline; when do you plan to start it?

A) It's the first thing on your to-do list
B) It's the last thing on your to-do list
C) After creating a timetable to spread the workload
D) On your lunch breaks
E) With your study group

4. You are bored; what do you do?

A) Clean your bedroom, bathroom, kitchen, attic...
B) Eat your favourite snack
C) Read a book
D) Go for a run
E) Finish your artwork

5. When you're tired during the day, how often do you nap?

A) Never! It would mess up your sleep schedule
B) Occasionally, mostly during lectures
C) Anytime, Anywhere
D) There's no time to nap!
E) Nothing beats a nap with a rerun of a show in the background

6. Pick a holiday destination:

A) Florence - Italy

B) Rosario Islands - Colombia

C) St Austell - Cornwall

D) Manhattan - New York

E) Blue Lagoon - Iceland

7. You've picked the dates to go to your holiday destination; when do you book the flights?

A) Well in advance

B) When you find the right holiday bundle

C) After rounds of being convinced by friends

D) At the very last minute

E) Once your travelling friends confirm

8. You're dining at a restaurant you've never been to before; what is your top priority?

A) Your budget

B) Asking for the "chef's choice"

C) Going with what looks familiar

D) Ordering the starter and the main together

E) Asking for the waiter's opinion on the menu

9. Pick an item that you can´t leave the house without:

A) Portable Charger

B) Gum

C) Earphones

D) Water Bottle

E) Lip balm

10. Lastly, which image represents you?

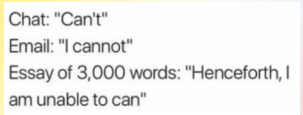
A)

B)

C)

D)

E)



Mostly A's

Prefrontal Cortex: The "Responsible" One

You will most likely step up to lead the group project...and kudos to you! Wise beyond your years, you are quick on your feet and always think ahead. As a bearer of fun facts, your peers come to you for guidance and financial advice (credit to your stellar excel budget sheet!)...so keep being you!

Mostly B's

Limbic Lobe: The "Free-Spirited" One

As a lover of life, you live for the spontaneous moments! You are in tune with your emotions, do whatever and go wherever your heart leads you. Whether it's a new country or a niche restaurant, you seek daily adventures to mentally capture (since your camera is full!) fond memories. Keep being you!

Mostly C's

Temporal lobe: The "Introverted Extrovert"

Books and music, these are a few of your favourite things! You are passionate about the things you care about and can thrive in social environments. Equally, you prioritize your inner peace and love to recharge with your go-to hobbies (which may include napping)...so keep being you!

Mostly D's

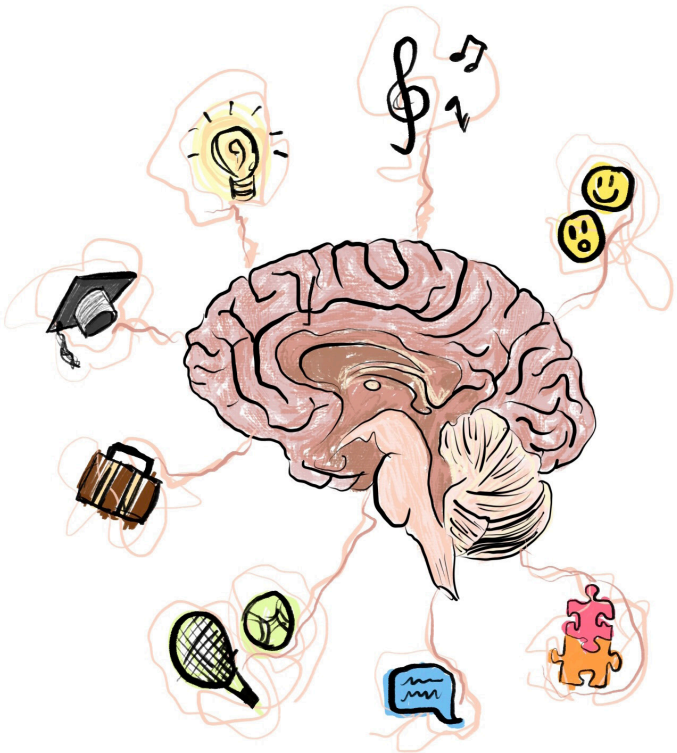
Cerebellum: The "Active" one

That's right, you are always on the move! Your active routine has made you more disciplined than most and you are not one to say no to a challenge. A positive attitude and hard-working mindset is your secret to a happy life and it inspires your peers...so keep being you!

Mostly E's

Thalamus: The "Social Butterfly"

People admire your ability to talk with just about everyone! As an all-rounder, you have your social and "homebody" moments. You cherish solo trips as well as meeting new people and learning about different cultures. Your uniqueness is your special quality, and those around you affirm it...so keep being you!



SIPHONOPHORAE

By Summer Chiuh

LIVING AQUATIC CITIES

Siphonophores (*Siphonophorae*) are an order of hydrozoans that can be found from the surface of the ocean to the deep sea. Like corals, siphonophores are colony animals formed of tens to hundreds of highly specialised zooids, working together to operate the colony much like a very efficient city. Below are a few example species, as well as some basic facts about their anatomical parts.

BASIC ANATOMY

BASIC ANATOMY

BASIC ANATOMY

PHYSALIA PHYSALIS

AGLAMA CAIUSI

MARRUS ORTHOCANNA

"GALAXY SIPHONOPHORE"

STEPHALIA CORONA

PNEUMATOPHORE

Filled with gas, these buoyant structures help the siphonophore orientate and stay afloat in the water.

NECTOSOME

Made up of multiple nectophores. These are in charge of movement, using jet propulsion to propell the colony around.

APPEARANCE

Siphonophores come in an uncountable number of varieties: they can range from a few centimeters to over 500m in length with all sorts of shapes, colours and arrangements.

S. Corona for example, has a highly unusual clustered formation of nectophores around a large round pneumatophore (in some colour photos, it even looks like an egg)

DACTYLOZOOIDS

Most siphonophores are carnivorous, and some have specialised zooids for catching prey.

The iconic Portuguese Man O' War (often mislabelled as a jellyfish) has ones filled with venmomous nematocysts that paralyse unsuspecting prey. It is also responsible for stinging thousands of beachgoers each year, with some leading to fatalities due to its incredible toxicity.

SIPHOSOME

The rest of the zooids make up this region which serves multiple purposes including food intake (gastrozooids), reproduction (gonophores) and defense (palpons/dactylzooids).

GONOPHORES

Siphonophores reproduce asexually through a budding process, aided by gonophores which can contain either male or female gametes.

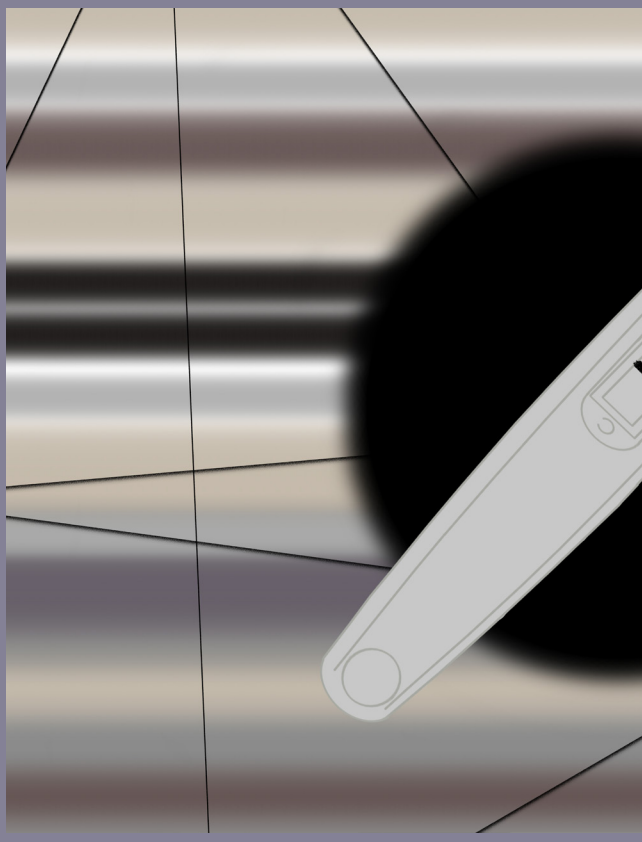
* Illustrations have artistic libreties taken

Sci-fi Review: The Child

In a World With

Written by Gracie Enticknap

Science fiction is a fascinating and transfixing genre which many consider the height of imagination. It takes science and technologies from real life, twisting and morphing them into fantastical or threatening innovations ingrained into futuristic societies. The Children of Men, however, takes a turn from this common trope, to build and explore a world in which experimental scientific solutions and innovation have failed to resolve impending human extinction.



The Children of Men, was written in 1992 by P.D James and takes place in the then-future year of 2021 (how meta is that). It's a bleak, dystopian imagination of the future, where a global infertility pandemic has prevented the birth of any babies for 25 years, and with it society has descended into a state of emotional and economic chaos. Below the overtones of nationalism, authoritarianism, and racism, science relentlessly attempts to discover the cause of this issue and the solution to it. But in a world without the revolutionary technologies of artificial wombs or reproductive cloning, scientific efforts cannot be the hope and hero we so often expect it to be.

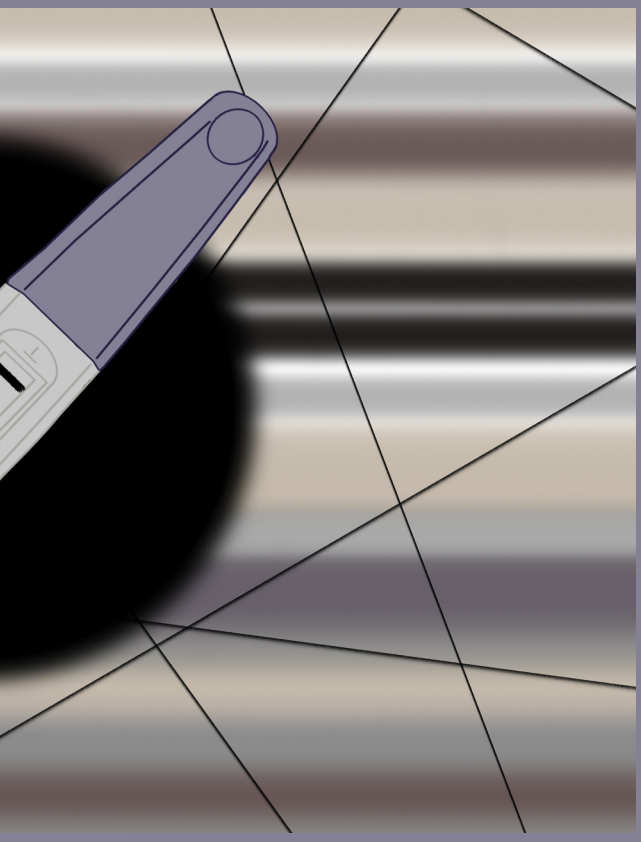
The cultural impact of science is told in the novel through the social consequences of a society without children. Raising children is an integral part of all global cultures, and here, without it, we see how women push around empty strollers and pose as mothers, causing immense distress and delusion. As a central part of many relationships, the absence of children results in disconnection, tension and the unfolding of relationships in the novel. Through this, James suggests that with the loss of children comes the loss of the primary purpose for sex or love. This way, at the hand of innovative failure, James uncovers a world that is disinterested, even from recreation, as the imminent death of humanity drains the meaning from life.

dren of Men, P.D. James

hout Innovation

Art by Patrick Marenda

This disinterested attitude, a sign of dejection and lack of confidence in the future, explains its society's increasing comfort with authoritarianism. The novel therefore subtextually reminds us how science and democracy are mutually reinforcing institutions. Democracies depend on science to effectively address public problems and provide a model of rational deliberation. Science can provide a freedom from fear, from want and from hopelessness, but without objective public engagement in problem solving, without successful science and necessary experimentation, these problems are left at the responsibility of the government who take yield of people's civil liberties to provide such freedoms.

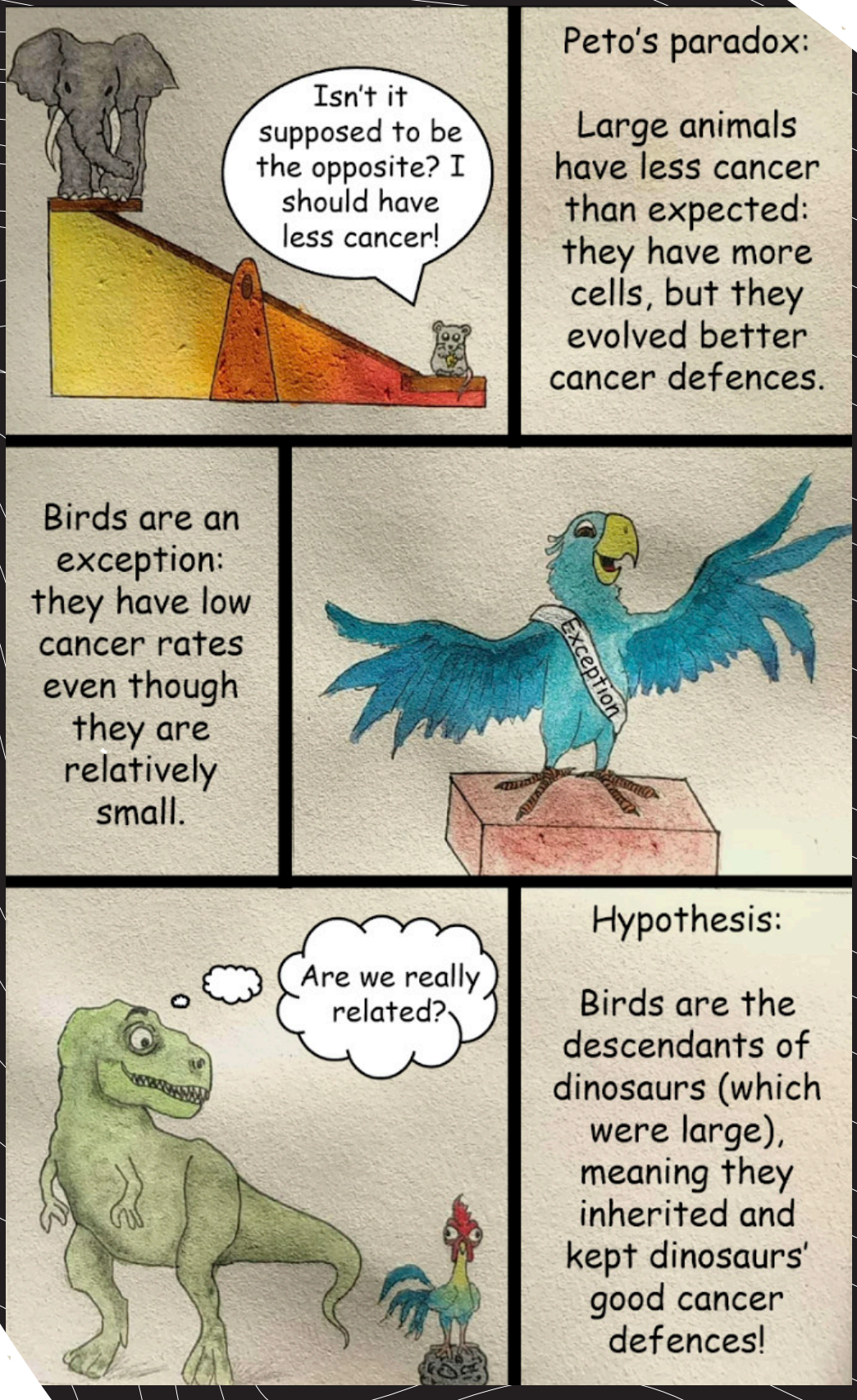


Here, the failure of science further intersects with authoritarianism, brutality, exploitation, and despair. Freedom from fear is manufactured by the Warden through banishing criminals to the Isle of Man, an island devolved into anarchy. Freedom from want is provided by the purchase and exploitation of migrant labour to serve and support the ageing population. Freedom from hopelessness, however, is the greatest incapacity of the government, and so with euthanasia and organised dying, society places a huge and haunting importance on suicide, or the so-called 'Quietus'. It is here that the most tragic consequence of scientific failure is imagined and made palpable.

Throughout its subtext, James' novel awakens us to the influence of science meeting our needs, resolving our concerns and being our hope for a better future. Yet with a childless future devoid of legacy, it would appear James believes that the ordinary, extraordinary human life we live and experience has lost its entire appeal. As sci-fi characteristically carries an element of truth, the gradual disintegration of society explored in The Children of Men is therefore a powerful telling of science's impact on culture, the security it gives us, and a chilling reminder of our incredible reliance on scientific invention.

CANCER IN DINOSAURS

By Lucie Gourmet


Isn't it supposed to be the opposite? I should have less cancer!
Peto's paradox:
Large animals have less cancer than expected: they have more cells, but they evolved better cancer defences.
Birds are an exception: they have low cancer rates even though they are relatively small.
Exception
Are we really related?
Hypothesis:
Birds are the descendants of dinosaurs (which were large), meaning they inherited and kept dinosaurs' good cancer defences!

Hi·a·tus

noun

- A prelude to the next different

Written by Haytham Malik

Photography by Lola Artiles

At its outset, 2021 was hailed as a time of re-emergence. 2020 had set the initial bar low, so logically, whatever followed in the next 365 days would set the tone for the Roaring Twenties. With a promising vaccine rollout and fresh stock of optimism, it seemed a frightening period of our lives was over. But, instead, this year was marked by a slightly manic quality. Our expectations for a period of relative normalcy were sidelined as our world was greenlit for a second season of Hieronymous Bosch-style pandemonium. Cue new variants of concern, political incompetence adding more insult to injury, UFO sightings, Bennifer's reunion, hybrid workplaces, the reprise of toilet paper shortages underscored by the accelerated pace of species extinction, global deforestation, deepening social divides, the collective recovery from complex grief, and a pandemic ennui repeatedly testing our patience.

For all its dysfunctions and shocks, 2021 was a year peppered with many firsts: the first transplant of both arms and shoulders for an amputee, NASA's Perseverance collecting the first piece of Martian rock, the first meeting between a pope and a grand ayatollah (and the start of good joke), scientists announcing that they successfully injected human stem cells into the embryos of monkeys, creating chimera-embryos (I've read enough sci-fi to know what follows in this second act), SpaceX launching the first all-civilian space flight, online currencies booming, and owning a Bored Ape NFT is now parallel to possessing a Picasso. So, 2021 has been an iconic year.

After our moment of pandemic in-betweenness, what's next for us in 2022? At times like these my meliorism insists that, we try for a better world, and I want to encourage people to live in it. Not just to endure it, not just to suffer it, not just to pass through it, but to live in it. To look at it. To try to get the picture. To throw caution to the wind and live with risk. To take chances. To make your own work and take pride in it. To accept the challenge. And if you ask me why you should bother to do that, I could tell you that the grave's a fair and private place, but none embrace these moments there. Nor do they write there, or dance the tango, or argue, or dive the great barrier reef, or make history. And that's what there is to do in 2022. Get after it while you can, keep living forward, and good luck at it.

hiatus /hʌɪˈeɪtəs/ noun
a pause or break in continuity
in a sequence or activity

Plan a holiday and we'll tell you what science-y show you should watch next!

Count the number of as bs, cs, & ds as you go and your recommendations will be at the end. Enjoy!

Quiz by Keerat Singh

1. Why are you going on holiday?
a) De-stress
b) Pandemic blues - I need to get out of the house!
c) Why do I need a reason to go on holiday?
d) I love travelling

2. How long are you going for?

a) A week
b) As long as possible
c) Two weeks to a month
d) Just the weekend

3. Where do you want to go?
a) On safari/anywhere with animals
–› Continue to Q4 if you chose safari/somewhere with animals

b) Somewhere tropical
–› Skip to Q5 if you chose somewhere tropical

c) Mountains
–› Skip to Q6 if you picked mountains

d)A pretty city with history
–› Skip to Q7 if you picked a pretty city with history

4. If you chose on safari or somewhere with animals, what are you most looking forward to?

a) Spending time with animals
b) Bush breakfasts and sundowners (with cocktails)
c) Seeing animals in the wild
d) Taking lots of pictures

–› Now go straight to Q8!

5. If you chose somewhere tropical…what are you most looking forward to?
a) Lying on the beach sipping a drink, reading, soaking up the sun
b) Snorkelling/scuba diving
c) Swimming in the ocean
d) Water sports

–› Now go straight to Q8!

6. If you picked mountains, what are you most looking forward to?
a) Stargazing
b) Hiking
c) Skiing
d) Paragliding, white water rafting - anything kinda scary but exhilarating!

–› Now go straight to Q8!

7. If you picked a pretty city with history, what are you most looking forward to?
a) Shopping
b) Sight-seeing - I wanna see all the pretty buildings!
c) Night life
d) Concerts and shows in old buildings

8. Who is going with you?
a) Solo trip
b) Couple's getaway
c) Friends
d) Family

9. Where are you staying?
a) Camping
b) Hotel
c) At a friend's
d) Air BnB

10. How will you spend your downtime?
a) Shopping
b) Sight-seeing, generally roaming around and exploring
c) Lying in bed napping before a night on the town
d) Fooooooood - I wanna be on the See-food diet.

If you got...

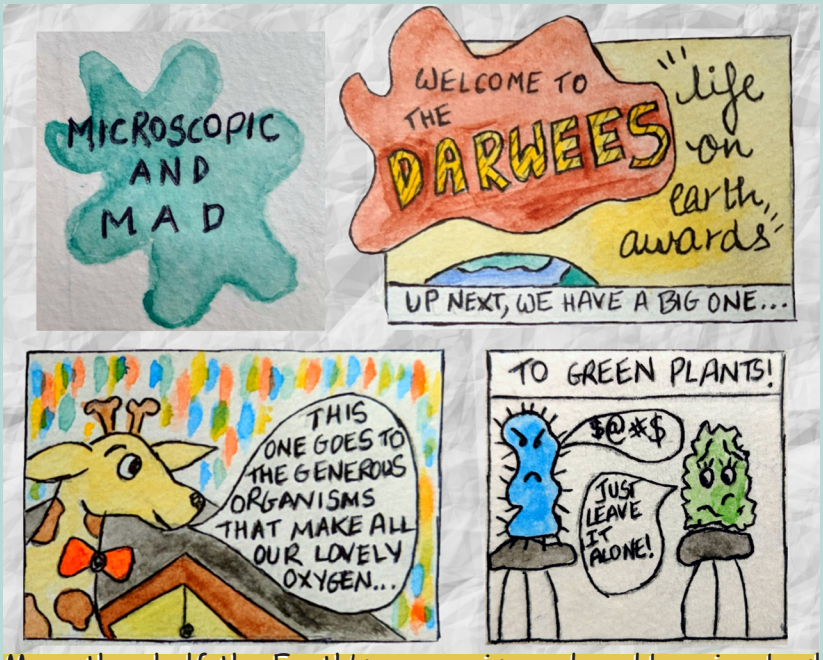
Mostly As:
Seems you'd appreciate something calming you could watch snuggled up with a blanket in bed.
Try ***"Night on Earth"*** , a beautiful documentary that gives an amazing insight into how creatures live once the sun goes down.
"Our Planet" is another good one - or anything by Sir David Attenborough really. It explores different ecosystems across over 50 different countries.
"David Attenborough: A Life on Our Planet" is another great one. It chronicles his life and work while highlighting the threats nature currently faces.

Mostly Bs:
This is for the water and aquatic-life lovers.
"My Octopus Teacher", a documentary about a South African free diver who forms an interesting relationship with an octopus he comes across. It explores the deeper relationship between nature and humanity, especially how important it is for our wellbeing.
"Chasing Coral", a documentary that showcases the beauty in our oceans, but highlights their uncertain future as the effects of climate change start to manifest.
"The Blue Planet"

Mostly Cs:
"Bill Nye Saves the World" - Host Bill Nye brings experts and guests in to discuss lots of scientific issues affecting our lives, from time travel and designer babies to evolution and extinction.
"Dancing with the Birds" - birds have some pretty quirky behaviours and their dances are no exception. Striking colours and pretty feathered funny creatures.
"Magical Andes" - a journey across the gorgeous mountain range

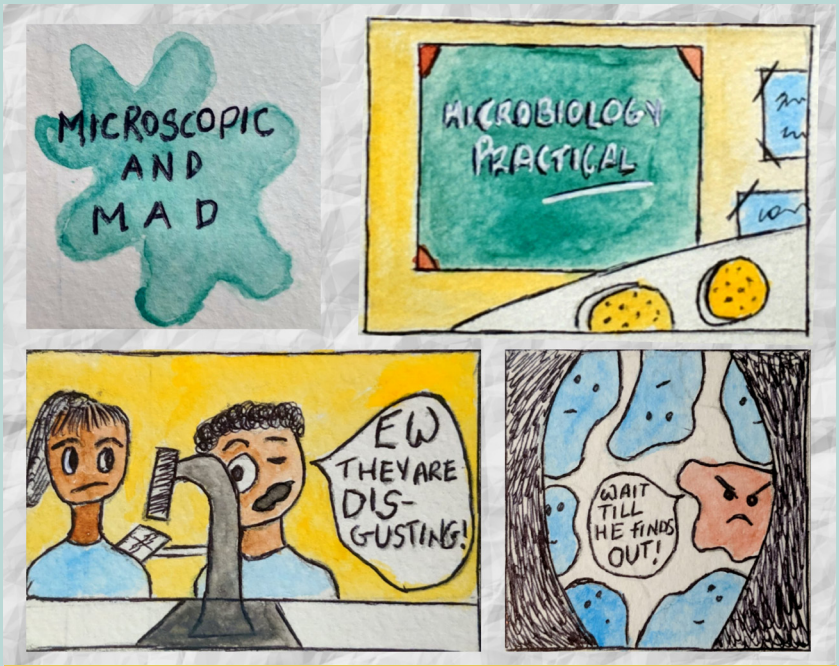
Mostly Ds:
"The Mind Explained"
"Down to Earth with Zac Efron" - a travel show across 8 different locations illustrating sustainable living.
"72 cutest animals" - A feel-good documentary series with short (<30min) episodes featuring some adorable animals. Will definitely make you smile!

MICRO SCOPIC AND MAD



More than half the Earth's oxygen is produced by microbes!

Bacterium Deinococcus radiodurans can survive almost 10,000 times the dose of radiation lethal to humans!



There are more bacterial cells in the human body than human ones - 10 times as many!

COMIC BY PRIYANKA PERES

Me and my older sister: frozen embryos born 7 years

Written by Madeleine Throssel Art by Sophie Maho Chan

Most children get told stories of storks when they inevitably ask how babies are made. My parents chose to handle my story in a different way. From an early age, I knew me and my sister were test tube babies but, more than that, they told me I was cryogenically frozen as an embryo and reimplanted into my mother seven years later (although my language around that subject was significantly less scientific!). For many years, I wasn't aware that the way I was brought into the world was quite atypical. This was of minimal relevance to my life, and other than jokes about being cold all the time, I didn't think about it much.

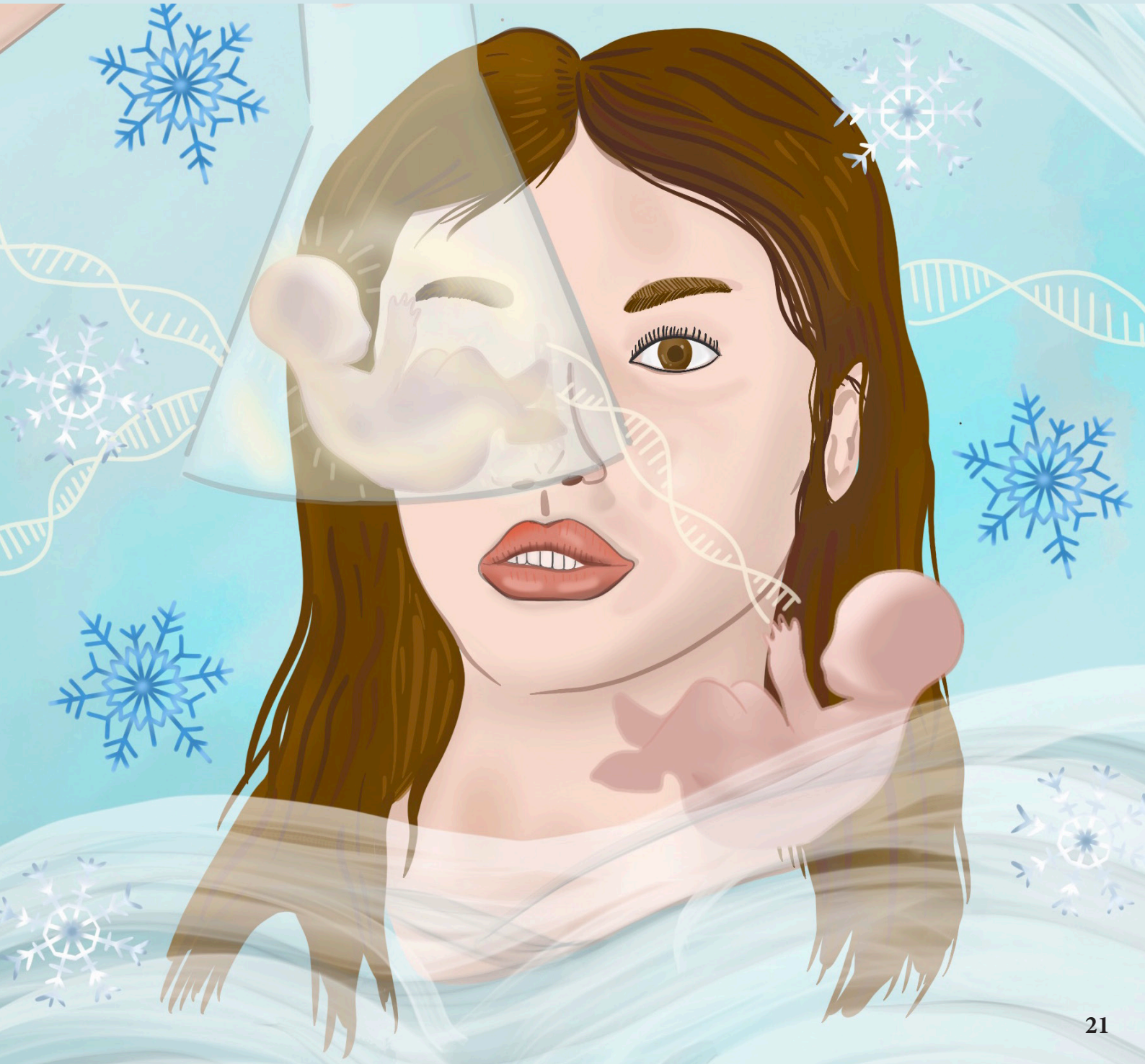
As my life and education progressed, I came to study in vitro fertilisation (IVF) in my biology class. By this point I had become intrigued in how the human body worked, so I was proud enough to tell my teacher, who then offered me the option of leaving the class. This came as a surprise; I thought that while some religions disagree with IVF due to the technology meddling with the natural path of life, this was unlikely to be a sentiment shared by my young, all female, extremely intelligent classmates. She mentioned we would be discussing ethics but I hadn't encountered any issues when telling my primary school classmates, so why would this be any different?

I was cautious but I still told some of my classmates. Most didn't take much interest - it wasn't relevant to our experiences so far so most didn't have a strong opinion . However, the first exception to this consensus was a girl in my cohort whose Catholicism brought her to disagree with IVF. She never confronted me directly, but I found out through others that she personally disagreed with the concept. Despite this, I was confused and hurt to a degree but tried not to take personal offence.

On the contrary , another girl in the year was amazed, and as she was a friend, I told her my story in some detail. Perhaps it seemed to her that I seemed to be very open about the topic, and maybe I didn't make it clear that it felt personal. However, she then mentioned it to a boy at the counterpart school. For some reason, the information spread, and before the end of the week, some of my friends at the school were asking me about it. Again, I thought it was very unnerving for people to know this about me.I felt disturbed as it seemed like a part of my identity was being equated to an interesting piece of gossip. I was out of control of the narrative and it bothered me that people I didn't know were discussing my life. In retrospect, it was likely paranoia, but I was conflicted. How could I both be open and accepting of my own circumstance, but care about who is told?

As I moved further through my education I became more interested in human biology. After I finished my school career, I was looking to gain experience in science. My mum suggested that I contact the clinic that helped my parents to conceive me and they were kind enough to let me shadow various roles throughout the process. It was only then that I came to understand how incredible the process was. I even spoke to one of the doctors who worked with my mother who explained to me how much the field has progressed from the time I was born. Even normally, the chances of an egg and a specific sperm meeting in the womb during sexual intercourse, followed by the successful implantation and a complete pregnancy is complex. The process of harvesting multiple embryos, selecting the healthy ones and injecting the best sperm into them, then reimplanting the best of these back into my mother for my sister seemed an even more tenuous endeavour. For me, this risk was increased by the less-perfected cryogenic freezing process, which meant that some embryos would not survive the process, so it was necessary to reimplant multiple healthy embryos to ensure that at least one was implanted, which in this case was only me. The effort spent into my creation by not only my parents, but a team of scientists and doctors was amazing in many ways. Whether it was some kind of fate or luck or medicine, however you prefer to think about it, my entry into the world was in no way simple.

I also experienced the hurt and pain along with sheer happiness that some of the patients of the clinic felt throughout their treatment. I became more quizzical of my mother and began to wonder what she had gone through. She hadn't been forthcoming with me as a child, only talking about me and my sister as miracles. I found out she had been diagnosed as infertile due to twisted fallopian tubes and then had undertaken countless procedures and frequent hormone injections to generate my sister. She then had a complicated pregnancy, culminating in an emergency C-section with placenta praevia and a premature infant on a ventilator. After healing and some adaptation to having a child, my parents began to think about repeating this procedure with the frozen embryos they had stored. They reimplanted a few of the healthiest embryos, which now isn't required due to the improved freezing process combined with the higher chance of multiple implantations. While this took less effort than the initial egg recovery, it still required a lot of energy and was not undertaken lightly.



It is clear to me now why my mum always told us how much she wanted us; she had gone through a lot to bring us into the world. Admittedly, it is something that has bound us together and while I felt it was part of my identity I see it was also part of hers. This is why I believe she chose to tell me from a young age, it was part of my story and she was proud it was part of hers. Realistically, the experience of infertility is not always shiny and magical. Telling me her story took a lot of strength and honesty, but it also opened up our channel of communication and brought us closer.

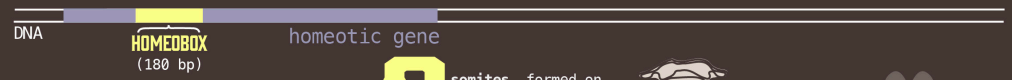
In actuality, this is not always the case and as a child I was naive and unable to understand the stigma surrounding fertility treatments. Realistically, the numbers show that this is much more common than we think, suggesting many parents chose not to tell their children that they may have been conceived this way. Maybe this is the only downside of knowing my story - I was not prepared for the way the outer world may perceive it, as most children aren't when they find out some people dislike parts of their identity they were taught to be proud of.

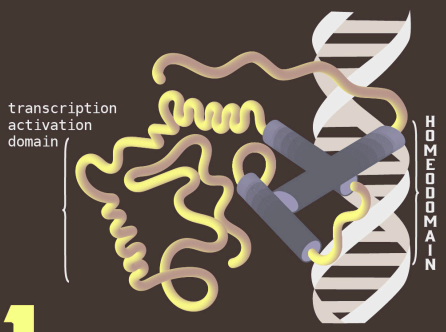
Truthfully, I don't know that I can comprehend the impact of being an IVF baby has had on my life, if any. Maybe I will never completely understand how it has informed who I am, or whether it has been part of the reason that I gravitated towards science. However,I hope that as time goes on it becomes more common for people to talk about this experience, especially as these treatments become more common and important for those unable to conceive naturally.

By Rahel Kiss

HOX GENES

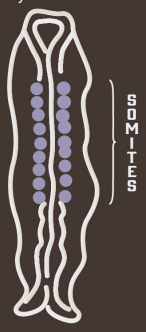
the only transcription factor whose order in the genome actually holds meaning



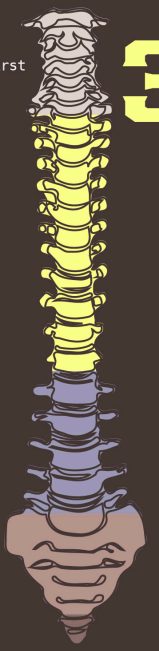


1 **homeotic genes** contain a homeobox which control the formation of somites, ensuring that each segment takes on its correct identity

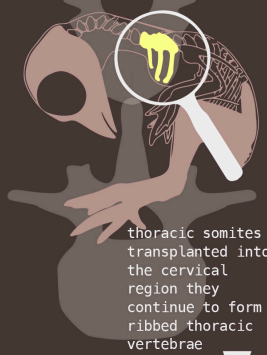
2 **somites**, formed on either sides of the notochord are the first sign of segmentation in the vertebrate embryo



3 in **vertebrates**, somites subdivide and ultimately give rise to the cervical, thoracic, and lumbar vertebrae of the vertebral column



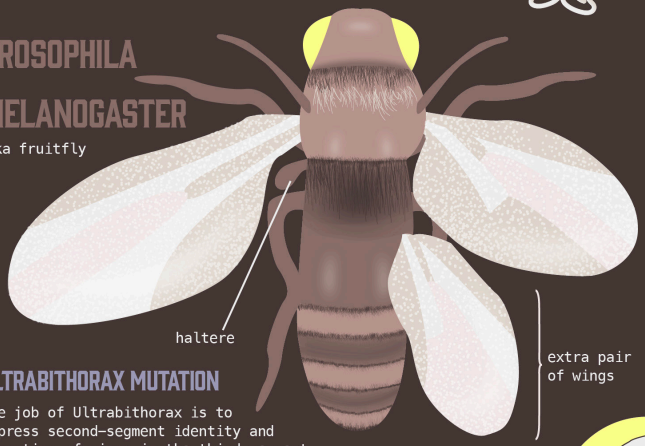
a somite will retain this identity even when trans-planted to a new location



thoracic somites transplanted into the cervical region they continue to form ribbed thoracic vertebrae

DROSOPHILA MELANOGASTER

aka fruitfly

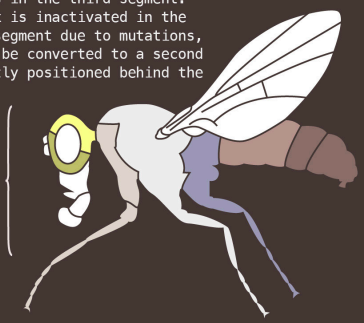


HOMEOSIS

the replacement of part of one segment of an insect or other segmented animal by a structure characteristic of a different segment, especially through mutation.

ULTRABITHORAX MUTATION

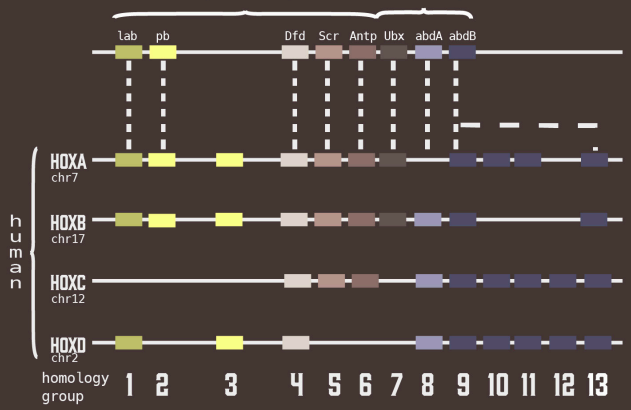
The job of Ultrabithorax is to repress second-segment identity and formation of wings in the third segment. When Ultrabithorax is inactivated in the developing third segment due to mutations, the halteres will be converted to a second set of wings, neatly positioned behind the normal set



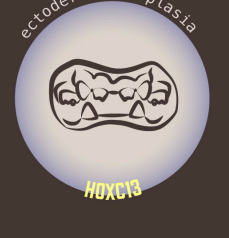
EDWARD LEWIS (1918–2004)

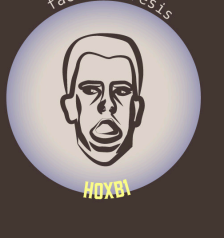
combined different recessive bithorax mutations to **transform the entire third thoracic segment** into an additional second thoracic segment, giving an extra pair of wings

AWARDED NOBEL PRIZE IN PHYSIOLOGY OR MEDICINE 1995



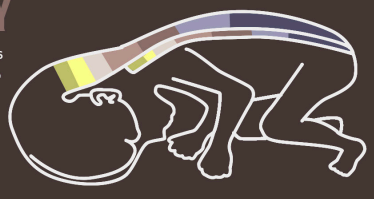
HUMAN HOX DISORDERS





COLINEARITY

mammals have 39 hox genes grouped into 4 complexes. there is excellent correspondence between a genes position on the chromosome and the segments in which it is transcribed



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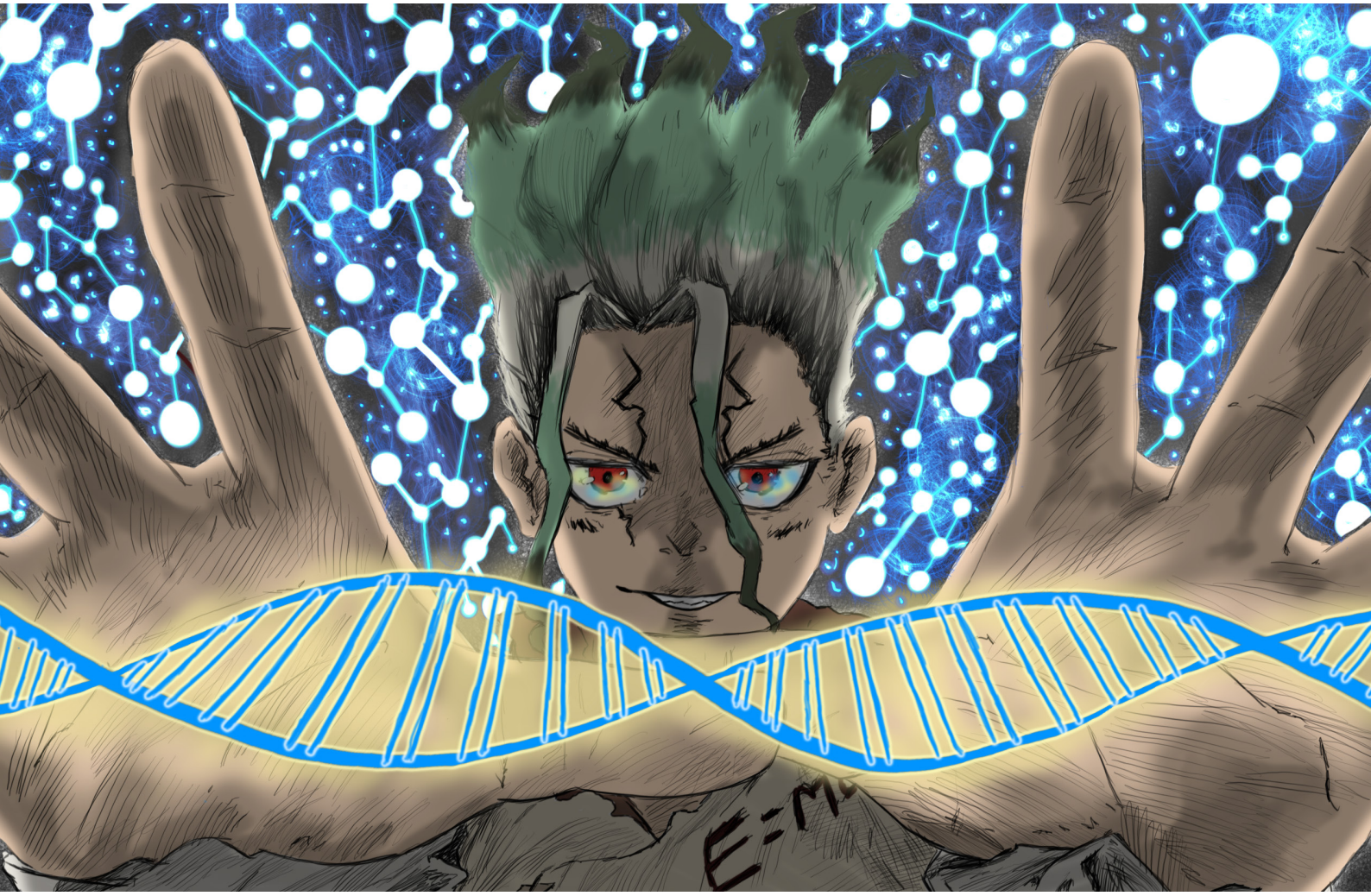

“Get Excited!”

Art by Zach Ng

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