

Lifeline



Dark



Lifeline 63
Year 15 - Edition 3

SCIENTIFIC NEWS

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PREFACE

Dear Reader,

In my opinion, the essence of science is the state of being in the dark. Ignorance can be a daunting thing, but good scientists know how to translate this feeling into curiosity and excitement. They know that the best part of discovery is whittling one's way from darkness into enlightenment, and the sense of mystery that comes with doing so. This edition's Lifeline bears the theme 'Dark', but among our pages you will find that beautiful things can be found when your vision is obscured. It won't be as frightening as it sounds, I promise! Within this edition, we give you the opportunity to divulge into the world of deep-sea creatures and nocturnal animals. For the entomologists among you, follow the trail of ants to the section 'Bas en zijn beestjes', and learn why these insects deserve more admiration than they currently have. If you happen to have a sweet tooth, we have taken the liberty of rating dark chocolate varieties for you, so that next time you are at the grocery store, you will know exactly what to buy! We have something for everyone this time, so flip the page and see what you can find.

Hugs and kisses,

Dana Frank

Lifeline editor in chief 2020-2021



Dear reader,

The third Lifeline of the year already! Time flies you know. This edition is called 'Dark', but what is that? Darkness is actually not really a thing- it's just the lack of light, and there is a lot to say about light. Light from the sun is important for our health: it is required to produce Vitamin D, and Vitamin D can play a role in depression. In these dark times, when everyone is expected to stay inside as much as possible, it can be hard to catch enough sunrays to stay happy and healthy. So I recommend poking your head out of your window every once in a while, when the sun is shining as brightly as it is at the moment I'm writing this (and hopefully when you're reading this as well). Anyway, now I'm talking about the opposite of the theme. I hope we won't descend into complete darkness in this 'Dark' edition. I am left in the dark about what the articles will be about, but knowing the Lifeline, they will probably not leave you with dark thoughts afterwards. Enjoy reading!

On behalf of the fifteenth board,

Aliëk Hasperhoven

Chairman of GLV Idun 2020-2021

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SCIENTIFIC NEWS



FROGS SEE COLOUR IN THE DARK

BY NADIA VAN EEKELÉN

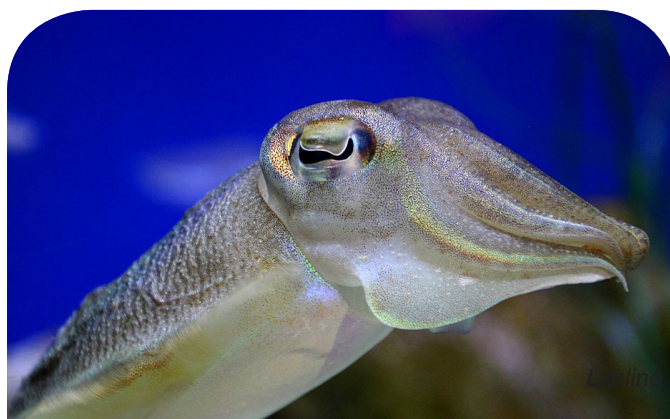
Researchers from Lund University in Sweden have found that frogs have superior night vision to that of all other animals. When it's so dark that we are not able to see anything, frogs have the ability to see colours. Most vertebrates, including humans, have rods and cones located in the retina. The cones enable us to see colour, but this requires a lot of light. So in low-light conditions the rods take over and enable us to still see something, but in black and white. In frogs, this works a bit differently. They have two types of rods with different sensitivities. They can use these rods in the dark to discriminate between colours. This comes in handy in situations where they need to exit from dark burrows, or when they are trapped somewhere in complete darkness. The researchers were also curious to find out for what behaviours the frogs use their colour vision, and found out that it's task-specific. Frogs use their colour information a lot when searching for food, whereas they quickly stop using it when they search for a mate. You would think it's important to make the right choice when it comes to mate-selection, but in the dark, frogs seem to lower their standards...

CUTTLEFISH PASS MARSHMALLOW TEST

BY LAUREN HANSEN-MANGUIKIAN

Cuttlefish are adorable relatives of octopuses and squids. They can change the color of their bodies to communicate, show off, or to match the environment. They are considered quite intelligent, but their ability to delay gratification has now been put to the test with the cuttlefish marshmallow test. This is an old psychology test where children are given 1 marshmallow but told if they wait they will get two. In cuttlefish, this was translated into getting good food immediately or better food if they waited.

Cuttlefish in this experiment preferred live grass shrimp the most over other food options such as king prawn and Asian shore crab. They were taught that if they went for the Asian shore crab when it first became available, the live grass shrimp would be removed. If they waited even after being given access to the crab, the door to the live grass shrimp would open and they would be able to get their preferred food. It was found that these cuttlefish were able to wait up to 130 seconds without eating the crab to get access to the preferred grass shrimp. While waiting, they would usually sit and stare at the two rewards, however sometimes they would turn away from the available food to distract themselves from it. Delayed gratification is an impressive display of intelligence, and not all animals can do it. So far it has been seen in humans, apes, crows, parrots, and dogs. It is unclear why they have this ability, but it may have evolved from having to wait very still to avoid detection by predators, even with delicious food floating by.



FEMALE FRIENDSHIPS IN GIRAFFES

BY DANA FRANK

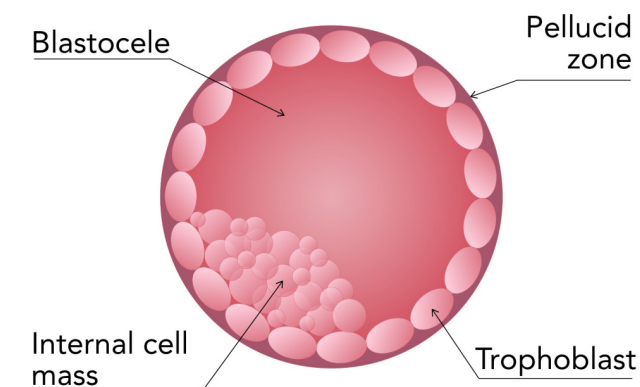
The social lives of giraffes have long been misunderstood and misinterpreted. Given that these dangly animals are not much for outward affection, researchers long believed that social bonds were not significant pillars of giraffe societies. Recently, however, evidence for the contrary has been put forth, specifically for the females of the giraffe family. Swiss scientists showed that female giraffes have preferences in members of their herd, choosing to spend time with certain individuals while actively avoiding others.

This kind of behavior is polarized to one sex, with males preferring solitude to social interaction. This may be because friendship does not have direct benefits for males as they do with females. Researchers investigated this and have shown that females with larger friend groups are better able to survive predator attacks and raise more children. During a dangerous encounter, calves gather by groups of females and are offered more protection. Similarly, acquainted females take turns to keep an eye on the surrounding terrain. The more friends you have, the fewer shifts you need to take! Ultimately it seems, giraffe mothers get a sense of unity through childcare.



GLV Idun

Blastocyst



INSTITUTO
BERNABEU
MEDICINA REPRODUCTIVA

BREAKTHROUGH IN STEM CELL BIOLOGY: LAB MADE BLASTOCYSTS

BY DEVI SEIJKENS

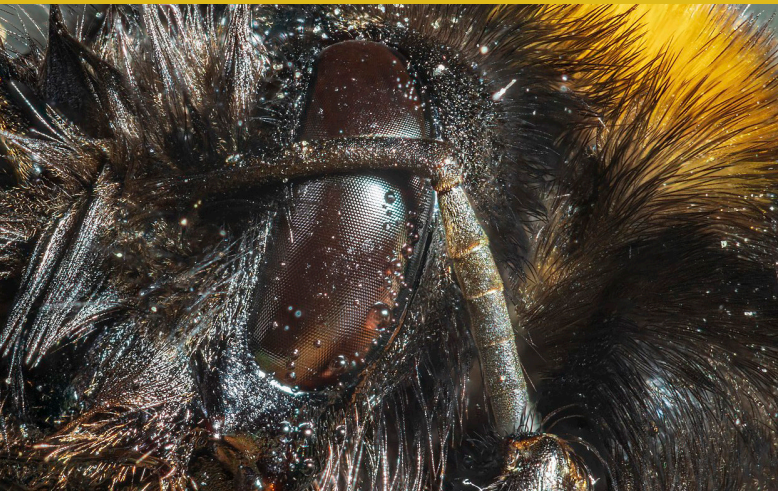
A new breakthrough for in vitro stem cell biology! Researchers from the University of Michigan and the University of Texas were able to generate blastocyst like structures from Human induced pluripotent stem cells. By using a specific culturing strategy, successive lineage differentiation and self-organisation, they were able to develop a model that resembles blastocysts in terms of their cell number, composition, size, morphology, and allocation of different cell lineages. This discovery will further aid the study of pregnancy loss, early human development and could help provide insights into early developmental defects. Furthermore, this model seems to be able to provide more accurate studies than the common alternatives: embryonic and extra-embryonic stem cell derivation. Lastly, the researchers believe this new model is accessible, scalable and versatile alternative to actual blastocyst studies. Their study also already provides the first finding within their model: Isozymes of protein kinase C have a critical function in blastocyst formation, specifically in formation of the blastoid cavity.

I CAN SEE CLEARLY NOW THE LIGHT IS GONE

THE EYES OF NOCTURNAL ANIMALS



By Juultje Eenink



For nocturnal animals, being able to form a good picture at night is of grave importance. Luckily for them, mother nature, also known as evolution, has made this possible through one of these four adaptations.

SIZE

As it turns out: size does matter. Not just the size of the balls, also the size of the hole – I am referring to the eye-balls and pupils here people! In a big eye, there is room for more photoreceptors, thus it is able to catch more photons. The bigger pupil simultaneously enables more photons to get into the eye and activate the photoreceptors. In some cases, a different pupil shape affects the ability to see at night. Cuddfish, for example, have a W-shaped pupil. This allows for even more photons to enter the eyes. They are even capable of seeing more wavelengths of light in this way.

GLEAMING EYES

I used to think gleaming eyes worked as a sort of built-in flashlight. The light coming out of the animal's eyes, brightening up their surroundings and thereby being able to see in the dark. It turns out that, while this is true, it is only part of the story. Firstly, the gleaming effect is caused by a reflective layer at the back of the animal's eyes, called the tapetum lucidum. An outer source of light is thus needed, as the layer merely reflects and cannot shine just by itself – just as is the case with the moon. More importantly, this reflective layer is situated behind the photoreceptors in the eye. This gives the receptors a second chance to detect photons, as the light passes them twice. Once on the way in, and once on the way out!

TAKE IT SLOW

It is toad-aly okay to be a bit more relaxed about this whole needing to see at night thing. There is another way

to be able to see something, eventually, and it is mastered by the toads. They just look at everything a little longer and thus allow their photoreceptors to catch photons for a longer period of time. You can compare their eyes to cameras with a slow shutter speed, which allows their receptors to collect photons for up to 4 seconds per frame they create. To achieve this, their photoreceptors are very slow. More than twenty-five times slower than ours! As you can imagine this causes some delay in the images they compose. Therefore, their reactions are also very slow and somewhat delayed. But the toad has another solution for this: it only targets sluggish prey. Take it slow.

GETTING RID OF DETAILS

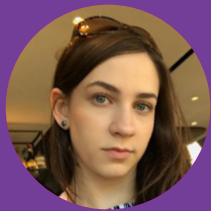
This is a technique often seen in insects. The neighbouring photoreceptors in their eyes are grouped together in their brains, and thereby more photons can be caught per area of grouped photoreceptors. Of course, this causes them to lose some details. You can compare it to an image that is composed of fewer pixels in total. But this loss of detail is worth it in the dark, as the photon catch of each of the groups is bigger compared to that of individual receptors and even allows insects to see colours.

Unfortunately, we, the species homo sapiens sapiens, do not have any of these adaptations. Thankfully, we are very adaptive. Evolution did not make it possible for us, so we made it possible for ourselves. Whether it is by creating light, or actually seeing in the dark by the use of night vision, we will find a way to see what is going on.



SILENT NIGHT

WHY SOME BATS DON'T ECHOLocate



By Dana Frank

The mysterious activities of bats have long been overshadowed by gloomy folklore and the darkness of their nocturnal lifestyle. While not all bats are meat-eaters, the reputation of blood-sucking and carnivory does not help with their status. But bats in the suborder Microchiroptera are among the largest contributors in insect control around the world, much to our benefit. They also possess a marvelous talent: using only sound to detect objects. How bats evolved to echolocate in this way and why some bats do not have this ability remains unclear.

Evolutionary scientists have been arguing about the emergence of biosonar for many years. The rise of echolocation is not unique, being possessed by shrews, rats, dolphins, whales, and even some bird species. It's easy to see why such a trait would be so valuable. The ability to locate objects and surfaces irrespective of light conditions opens the door to a plethora of new possibilities. Food detection and coordination at night become much easier when you don't rely on sunlight. Why then, given how useful it is, does it appear that some bats have lost this ability?

Fruit bats or Megachiroptera are, as their name suggests, the largest of the bat order. While they do not hunt for food (unless you consider fruit picking hunting), these bats are still, for the most part nocturnal, and eat exclusively at night. This means that, unlike their smaller bat counterparts, they rely on visual, olfactory, and tactile cues to move about and locate objects. Some scientists believe that these bats forgo the strategic use of sound waves in perception because of the steep energy costs it takes to produce them. Since fruit bats essentially focus on non-moving targets, perhaps echolocation became redundant and disappeared from that part of the bat lineage.

Another theory, which has been debated for the last few years, supposes that fruit bats never possessed the capacity to echolocate at all. Perhaps echolocation evolved after bats split into the Megachiroptera and Microchiroptera suborders, and fruit bats never developed the machinery necessary to send out calls and detect echoes.

One of these pieces of machinery used for Microchiroptera members is an enlarged portion of the inner ear called the cochlea. Comparing the cochlea of fruit bats and echolocating microbats shows just that, a substantial difference between the respective sizes of this inner ear component. But research into bat embryology has revealed something intriguing. Fruit bat fetuses have the same enlarged cochlea as echolocating bats, which become relatively smaller with development. This indicates that fruit bats possessed the ability to at least detect sonar echoes at some point in their evolutionary history.

Still, the evolutionary road it took for bats to be the way they are is foggy. It seems fitting that the master animals of the night would be surrounded by such mystery. Until more evidence is exposed about bat evolution, we will have to remain in the dark about their abilities.



Mastering student cooking

with Koen



Hi guys! In this new LifeLine edition of Mastering student cooking, I have something that fits the theme nicely. The following recipe contains dark chocolate. Not sure which brand of chocolate to use? Luckily for you we have reviewed different brands of dark chocolate! Check it out on page 20-21 and be inspired. Have fun cooking these special brownies!

My best,
Koen

Cauliflower Brownies

You can mix an awful lot of foods together for delicious results. For example, the hutspot and mayonnaise combination in the most recent recipe was a controversial one. It was even considered blasphemous by some stampot enthusiasts. However, it was loved by many of those who tried it. That is why I would like to continue with another very special combination: chocolate brownies and cauliflower. The cauliflower brings a different dimension to the brownies, making them nice and fudgy. This makes them even tastier. It is also healthier! This recipe is therefore a must try

INGREDIENTS:

- 110 grams of 90% dark chocolate chopped and 60 grams extra for the topping
- 80 millilitres coconut oil and 1 tablespoon for the topping
- 2 large tablespoons of soft cream cheese
- 120 grams of granulated sugar or three teaspoons of stevia
- 2 large eggs
- 220 grams mashed raw cauliflower (also sold as cauliflower rice or chopped up finely by yourself)
- 260 grams almond flour
- 50 grams cocoa
- Half teaspoon of baking powder
- Pinch of salt

HOW TO MAKE:

Preheat the oven to 180 degrees Celsius. Line a square baking tin with some baking paper. In a large bowl add the cream cheese and sugar. Beat this until combined and then add an egg. Stir it well again and then add another egg. Again, stir it well.

You can also stir the raw cauliflower puree into the mixture. Mix the ingredients again until everything is mixed. In a separate bowl you can add cocoa, almond flour, baking powder and salt. Then stir the ingredients into the cream cheese mixture.

Add 110 grams of dark chocolate in a small bowl and mix it with 80 millilitres of coconut oil. Then pour the melted chocolate into the rest of the batter and stir again. You can then pour the batter into the baking tin. Place in the oven for 25 minutes.

You can then let the brownie cool. Then make a topping by melting 60 grams of chocolate with a tablespoon of coconut oil. Let the chocolate cool well and afterwards cut the brownie into pieces.

Ready to serve!

“Sorry, I forgot”

BLACK OUTS!



By Marit Bonne

New Year's Eve 2020. Ready to forget about past year and move on to the next. And boy I did forget. I don't remember my friend pulling the vodka out of the pantry, nor the counting down until twelve. I missed Rollercoaster from Danny Vera being first in the legendary top2000 and I saw the photos on my phone that I don't remember taking anymore. The verdict: I definitely blacked out. Like the whole evening went dark.

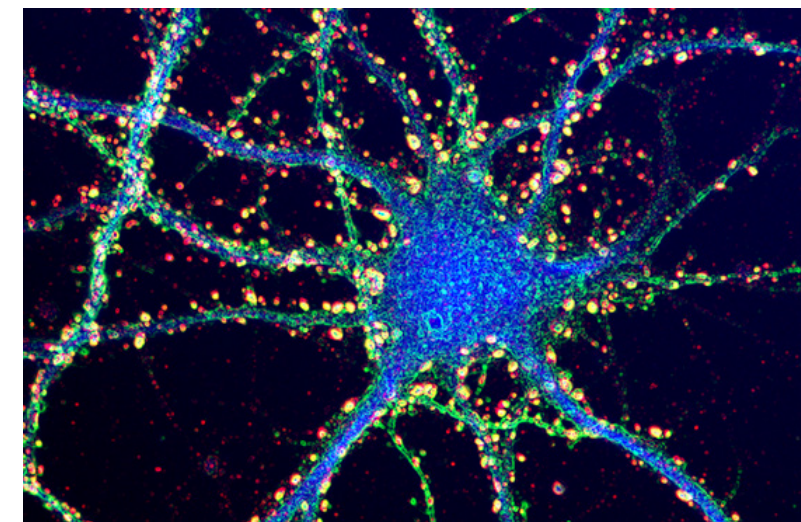
When I dove into the topic of black-outs and came across almost solely articles about binge-drinking and alcoholism. Not surprisingly, as black-outs usually begin at blood alcohol concentrations of around 0,2 percent (not permillage!) and higher, which is about twice the legal driving limit. However, I also know that these cases of temporary memory-loss occur every now and then among students. And since we ourselves forget what we are doing while black-out drunk, I figured it is only fair to tell you what happens to your body when you are.

‘Your brain stops recording’, is what a black-out is often explained as. And it makes sense, as this slight form of amnesia is not characterized by forgetting stored memories, instead, they are not stored at all. Especially the process of memory consolidation, or the conversion from short-term memory to long-term memory, is disrupted here. The exact disruption of hippocampal processes, however, are not specifically known.



The belief that black-outs occur because braincells are killed is outdated (however: long term alcohol abuse can permanently impact learning and memory processes). Currently, neuroscientists expect that alcohol consumption alters the activity of glutamate receptors, which boosts the production of some steroid hormones. In addition, this production can indirectly slow the process of memory formation down, by impairing the long-term potentiation of synapses at hippocampal pyramidal cells.

There are two types of black-outs known. The ‘gray-out’, or partial black-out, and the complete black-out. The latter speaks a bit for itself: you completely lost the evening (or day). Not even visual or auditory cues can bring back any memory of the night. Like a bad flash drive, you stored nothing. The gray-out is what I experienced on New Year's Eve: I could only remember snippets. I do vaguely remember calling my mum, but I have no idea what I said to her. Next to that, auditory cues, like a certain song you listened to that evening or a ringing phone, might help to retrieve some parts of your gray-out period.



Gray-out, black-out, and complete darkness of the evening. Is there a way to prevent all these missing parts when consuming booze? Well, go for 0.0 I would say. For those who still want to down a beer though, go ahead, but be aware that the faster you consume alcohol, the higher your chances to get a black-out are. Drinking on an empty stomach also doesn't work in favor of remembering the night.

Holes in your memory and being unable to recognize yourself in pictures and stories of a night drinking: black-outs are not nothing. I for sure will take it a little easier on my hippocampal synapses and maybe even stick to cola on New Year's. Because what good is experiencing a fun night, if you can't even remember it?

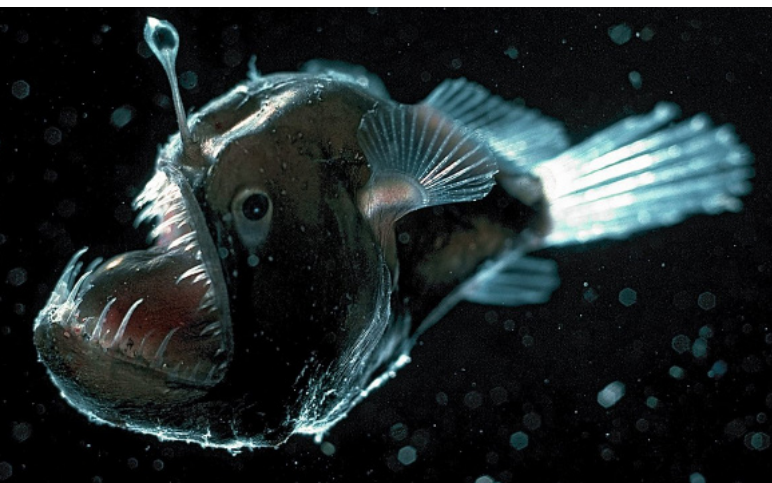


DEEP SEA CREATURES, WEIRD OR WONDERFUL?



By Nadia van Eekelen

Remember that scary part in Finding Nemo where Marlin and Dory go down into the deep sea? The screen turned pitch black and after a while only a little light showed up, followed by a fish with a huge head and an enormous mouth filled with big, sharp, translucent teeth... a fish that looked like it came straight out of your nightmares. This fish was not just an animal made up by Disney Pixar, it is real, and it is called the anglerfish, possibly the ugliest creature on this planet. However, it's not alone in its hideousness, as there are a lot more creepy-looking animals down there... but why do they all look so weird?



The deep ocean is a place with a lot of extreme conditions. Pressure is high, food is scarce, oxygen is low, temperature is cold, and of course, it's completely dark. In order to survive there, life needed many adaptations. All these adaptations cause the animals to look terrifying, but these same adaptations are also incredibly interesting.

One of the most used adaptations is bioluminescence. Take for example the anglerfish, famous from Finding Nemo, but more famous for the light that hangs above its mouth. Essentially, it's a piece of the dorsal spine that extends from their forehead. The end glows with the help of bioluminescent bacteria and lures prey close to them. As I said before, their mouths are super big and this, together with an extremely flexible body, allows them to eat prey up to twice their own size. That way, when the anglerfish is lucky enough to find food, it can stock up. Fun-fact: only the female anglerfish have this scary appearance.



Moving on to another fish that, for some reason, I've always wanted to own as a pet when I was younger. Maybe because I felt sad for it, as it has been voted world's ugliest animal. I'm talking about the blobfish. The blobfish looks the way it looks, because of an adaptation to the pressure at the bottom of the ocean. Under this pressure, bony skeletons would snap, so the blobfish's body consists of gelatinous mass and low-density flesh. However, the blobfish only looks like a saggy blob of jelly when it's out of the water. Inside the water, the pressure will push the blobfish into its normal fish-like shape, so it's not that ugly as we are made to believe. Because the blobfish's body density is lower than that of water, it floats slightly above the ocean floor, where it waits for small crustaceans to pass by so it can suck them up. Therefore, it's sometimes described as an inflatable balloon that has lost almost all its helium.

There are many more fish with weird adaptations to the deep-sea life, but I will describe one more for you, which is probably the freakiest one yet. The barreleye fish is a deep-dwelling fish that can see through its own forehead, because its head is completely translucent. I don't think it gets more bizarre than that. Inside the translucent head, you can see two big glowing green spheres, which are the eyes. It kind of looks like the canopy of an aircraft. The two dark spots above the mouth look like the eyes, but actually these are the olfactory organs. The barreleye fish thus is looking up most of the time, while it's sitting still and scanning the water above for shadows of prey. When it finally spots food, the barreleye fish rotates its eyes forward, so its mouth is in its field of view, and attacks. It is thought they steal food from siphonophores, which are relatives of jellyfish. The shield around the barreleye fish's eyes then protect against the stinging cells on the siphonophores tentacles.

To come back to my question: why do all deep-sea creatures look so weird? I think the answer is that living in the dark requires you to evolve into something ugly. You need adaptations in order to survive, and unfortunately they're just not pretty adjustments to your look. However, nobody can see you, so it doesn't matter anyway.



COME TO THE DARK SIDE, WE HAVE GREAT MUSIC



By Devi Seijkens

Many of you will know this iconic moment. Darth Vader reaching out to Luke Skywalker, after dismembering his arm. Luke is hanging on for dear life, as Vader asks him to join him. After Luke refuses, Vader speaks the iconic (and often misquoted) words: No, I am your father! Many people have a lot of amazing associations with the Star Wars movies. And one of the things most recognized in them is the amazing music used in the films. What you might not know, is that the music in Star Wars is composed by the same man who wrote the music for movies like Jurassic Park, Indiana Jones and E. T., the Extra-Terrestrial. That amazing man's name? John Williams.

John Williams was born in New York in 1932. He and his family moved to Los Angeles where he finished high school and started college. But after a couple of years in the US Air Force, Williams returned to New York where he attended Juilliard, one of the US' most prestigious conservatories. After studying there and at the Eastman school of music, Williams returned to Los Angeles where he started working as an orchestrator at film studios. Williams' first feature film score was for the not so critically acclaimed 'Daddy-O'. Although this movie didn't do too well, Hollywood started to take notice of his potential. Almost 10 years later, he received his first Oscar nomination, for a movie called 'Valley of the Dolls'.

About 6 years later, Williams was approached by an up and coming director by the name of Steven Spielberg. And although their first movie together, 'The Sugarland Express', wasn't as much of a success. Their second movie launched both their careers. With

Jaws being a hit film, Spielberg became a household name. But so did Williams. Who doesn't recognize the classic two notes in increasingly short succession to indicate impending danger. It was the first of many iconic tunes Williams would compose. While continuing to work together, Spielberg also introduced Williams to one of his close friends, a man by the name of George Lucas. Lucas needed a score for his 1977 space epic 'Star Wars'. And so

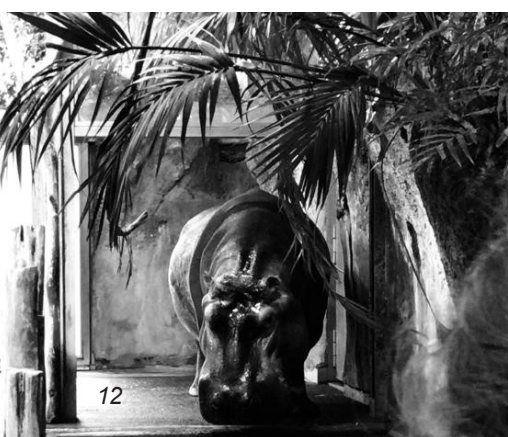
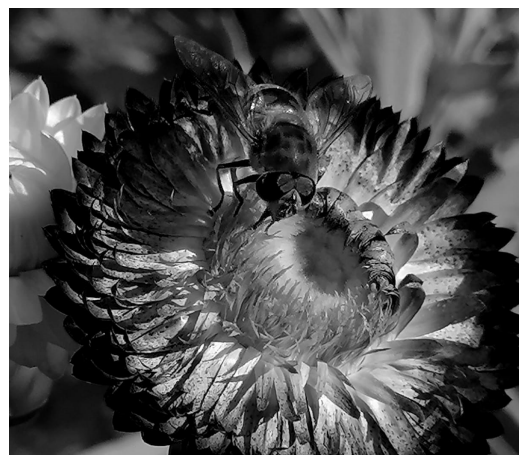
Williams wrote the iconic theme to Star Wars, that was most recently used in 'The Rise of Skywalker' in 2019. A truly timeless tune one might say.

But the combination of Williams and Spielberg turned out to be an absolute hit. Most notably the list includes movies such as 'Schindler's list', 'Saving private ryan' and 'Memoirs

of a Geisha'. But he did much more. He was involved in the final 5 installments of the 'Harry Potter' movies, wrote music for every episode of 'Star Wars' and was involved in 'Superman' and 'Superman Returns'. His prize cabinet includes 25 Grammys, 7 BAFTAs, 5 Oscars and 4 Golden Globes. Furthermore, his 52 Oscar nominations make him the second most nominated person ever, behind Walt Disney.

So, what are you looking for here Devi? Well, honestly, I wanted to achieve two things in writing this article. Firstly, I wanted to dedicate a little page to the man who I consider to be the greatest composer of all time. (Suck it Mozart) But secondly, and potentially just as important, I hope the next time you listen to an epic film score, you probably have a very good idea who could've written that amazing piece of music.







By Roos Slijfer

Once upon a time,



there was a wooden doll named Pinocchio. His only dream was to be a real boy. To learn what is right and what is wrong, Pinocchio has a companion that is a cricket. The cricket tells Pinocchio that he needs to do things right, otherwise he will never get rid of his ugly wooden face. Pinocchio got so angry at the cricket that the wooden boy grabbed an axe and chopped the cricket into pieces.

Once upon a time, a red-haired mermaid wanted desperately to become human and marry a handsome prince. She went to a sea witch and asked for legs. The witch agreed in exchange for her voice. The mermaid agreed but did not know what the witch actually meant. The witch grabbed the mermaid, pinned her down, and cut off her tongue. In the end, the mermaid didn't marry the prince but saw him marry a human. She smiled at him one last time and drifted off to heaven.

Did I already ruin your childhood, or can you manage to read about another fairy tale disaster? Here we go...



Once upon a time, there was a little girl with a little red hood on her way to her grandmother's house. When in the forest, she encounters a hungry wolf. "Where are you going, little girl?" asks the wolf. "To my grandmother, who lives in the forest," says the girl. The wolf proposes that the girl could pick some flowers for her poor grandmother. She agrees, and she takes her time picking the most beautiful flowers. A while later, she arrives at her grandmother's cabin. The door is open... She steps inside and sees that her grandmother is in bed, with the covers pulled up to her chin. "But grandmother, what big ears do you have", says the girl. "But grandmother, what big eyes do you have." "But grandmother, what big teeth..." But before she can continue, the wolf jumps out of the bed and eats the little girl. Shockingly, it was the wolf all along.

In some other stories, Red riding hood and her grandmother get saved by the hunter. Sometimes he shoots the wolf, sometimes he cuts his belly open, and grandmother and grandchild are still alive. But there is also one where Red simply gets eaten. It was thought to teach girls and women not to trust strangers because they could be sexual predators.



When these 'fairy tales' were written, the brothers Grimm focused more on the adults. They were dark stories, merely macabre. The brothers Grimm, however, were not the original storytellers. They used French fairy tales as inspiration for their books. When sales were not amazing, the brothers revised their stories and focused on the younger audience. However, the brothers did not exactly make the stories less scary because these fairy tales were now used to teach children about what is evil. It was Disney who made the stories less scary and more as feel-good stories with happy endings. So remember, when you are watching a Disney movie, most of the time, the character in the story dies in the original story, and the movie you are watching is a complete lie.

DINOSAURS IN DAYLIGHT: NO HOW ABOUT DI



By Renate Kloostra

Usually, when people think of dinosaurs they think of these great animals that roamed and ruled the earth about 65 billion years ago during daylight. And even though this is mostly very correct, one thing is not. Many of these animals were in fact, nocturnal, meaning that they lived during the night or they were active, both during day and night.

But how do we know this, if we can not study these animals in real life? They used a method of comparing the eye shapes of the animals back then to animals now.

If we take a look at the anatomy of the eye we find the retina, in this picture written on the top right. The retina is a thin layer of tissue that lines the back of the eye on the inside. It is located near the optic nerve. The purpose of the retina is to receive light that the lens has focused, convert the light into neural signals, and send these signals to the brain for visual recognition.

When animals are nocturnal they usually have quite a large pupil compared to their retina.

The soft tissues of the eye, including the iris, rarely fossilize, but most dinosaurs have a ring of bones within the eye called the sclerotic ring, which is preserved in some fossils. In modern dinosaurs, like chickens, the size and shape of this ring relative to the eye socket vary depending on whether the animal is diurnal, nocturnal, or is active mainly at dawn and dusk.

Fossils with a large internal scleral ring diameter relative to the diameter of the eye socket, or orbit, probably had a large pupil too – suggesting they were nocturnal.

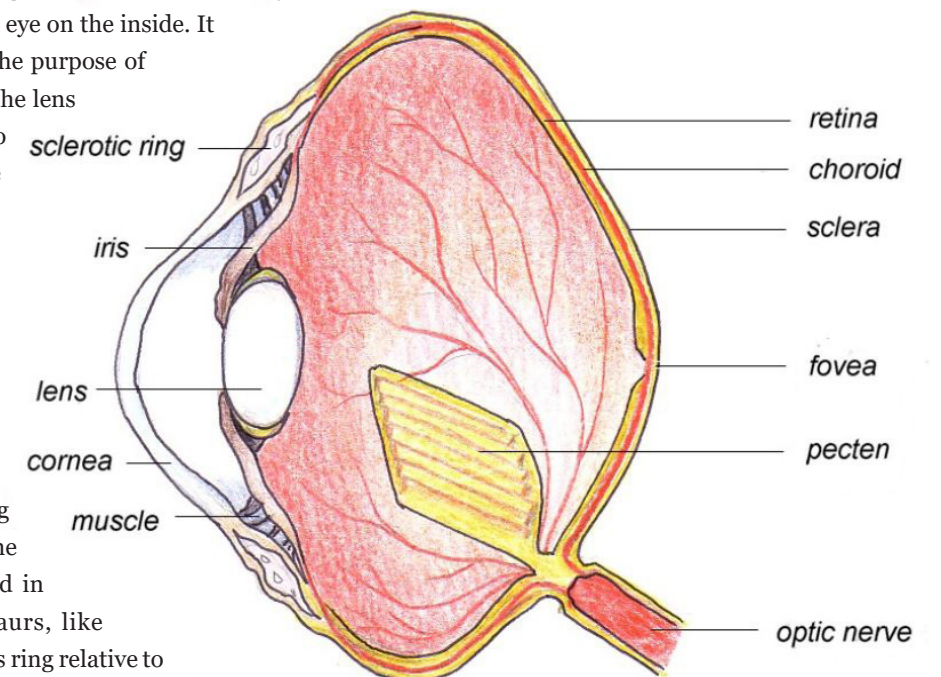
By contrast species active by day have a small pupil for the given eye size. This means they can avoid overstimulating the retina and contract the iris for better depth of focus.

"If you have a particularly circular orbit and a pretty circular scleral ring you can get a reasonably good idea of the size of the eyeball and the size of the iris within the eye," says David Hone of University College Dublin in Ireland

Researchers measured the eye-socket size and the external and internal scleral ring diameter in 33 Mesozoic archosaur species and compared them with similar measurements from 1401 living species of mammals, birds, lizards, and snakes with known activity patterns.

"What we saw is that the perception that dinosaurs were just day-active can be rejected," says Schmitz, who worked on the project. "Many were nocturnal and many were day and night active."

Terrestrial predators like Microraptor and Velociraptor emerged as at least partially nocturnal, and the eye shapes of large herbivorous dinosaurs like Psittacosaurus and Diplodocus suggested they were active both by day and by night.



But not everyone thinks this research was so decisive. "These results are very interesting and certainly plausible, but I would want to see other analyses before I was convinced," says one researcher. He suggests that adding more living species to the analysis, especially those with unusual ecologies – nocturnal species that are part of a wider, mainly diurnal group with a common ancestor, for example – could make a stronger case.

But he agrees that the presence of the scleral ring offers an opportunity to address the question. "We should be grateful dinosaurs have a scleral ring," he says. "We are trying to reconstruct the behaviour of animals which in some cases are 230-odd-million years old."

POCKETFUL OF SUNSHINE



By Anette Hallik

Although winter is full of wonders, snow, Bernie Sanders' mittens, and cold bitten noses, it also brings darkness. Sometimes addressed just as winter blues, but actually, lack of sunshine can have way more tragic results.

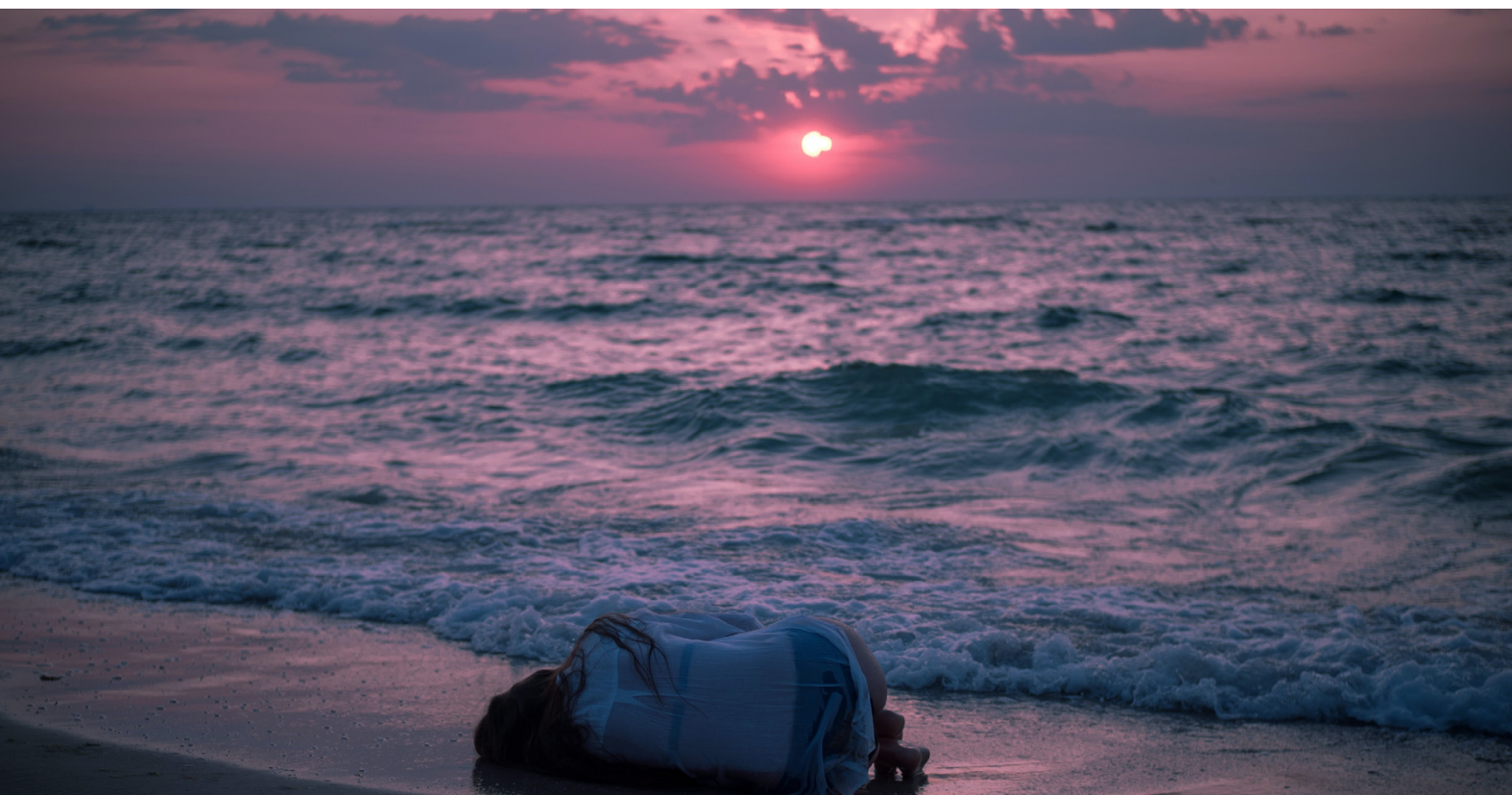
Seasonal Affective Disorder, also very accurately known as SAD, is a form of depression that occurs during autumn and winter. Statistically, the hardest months for people with SAD are January and February as there the sunlight levels are the lowest. Seasonal Affective Disorder is more common than one would expect, but due to the connection with the amount of sunlight, the frequency of this disorder varies drastically. For example, in Florida 1,4% of adults have SAD whilst in cold and dark Alaska almost 10% of the adults suffer from it.

Symptoms of SAD vary but the most common ones seem quite familiar to most of us. Shorter days limit the UV radiation we get and also prevent us from getting enough vitamin D. In Nordic countries almost every single individual suffers from vitamin D deficiency and is needed to be taken as a supplement. Lack of sunlight is the actual reason why depression symptoms occur. Due to darkness, the hypothalamus of one's brain produces too much sleep hormone - melatonin, which makes us sleepy, drowsy, and unmotivated to leave the bed. Also less serotonin - the happy hormone - is produced, making people feel unsatisfied. Funny

enough, lack of serotonin causes a craving for carb-rich foods to find satisfaction. So cravings for pasta and pizza on dark winter days are mostly due to lack of sunshine, don't worry! Also, the body's biological clock is very easily messed up by the lack of light, which also leads to other symptoms like loss of energy and motivation, problems with concentrating, and a desire to lay in bed all day.

SAD can be treated with antidepressants or cognitive behavioural therapy or just waiting for the spring in milder cases but there is also an alternative way of treatment, namely light therapy, which consists of standing in front of a UV-light box for 20 minutes a day, where the box is mimicking the sun. Paired with vitamin D supplements, this treatment is considered to be very effective.

So in a way we are like plants, in need of sunlight! Therefore if you feel like eating lasagna in your bed for the whole winter, consider seeking some sunlight (yes, there still is some) and treating yourself to vitamin D!



PLEASE, DO TRY THIS AT HOME

Brighten up your day with these things



EXPERIMENTS TO TRY AT HOME!
BETTER SAFE THAN SORRY, WEAR PROTECTIVE GEAR



By Prof MD

Since these pandemic times, everything is a bit darker. Curfew is really not making it better, and politics making love with the vaccine program is looking more f*cked in the arse than it is standing on paper. Your mood is meh. Online with your head for the screen is also meh. Therefore, let's put some light down in this "please, do try this at home (because where else are you gonna go)":

ENLIGHTEN YOUR DAY!

BOOKS AND MAGAZINES

During these times, it is normal that your screen time is going through the roofs. So getting away from your screen is much important. Getting rid of your square eyes by getting some reading done. Like reading the Lifeline, which you are doing now! A nice book series is also really sweet. The Baantjer series contains 87 books*. I am personally really into the Helen Grace series right now (I really enjoy a good murder detective before I go to bed). If you are not into books, get a (scientific) magazine, puzzle booklet (gotta love sudoku), or strips (Donald Ducks pockets are legend).

* = Dutch



PODCASTS

A sweet little girl (pun intended, LL'ers will get this) told me that taking long walks while listening to podcasts is a pro move. Not only are you getting your daily count of steps, but furthermore you can dream away with 'man man man*' or 'the Daily' by the New York Times. Moreover, Nature has its own Podcasts! For inspiration, just google: "Top 100 podcasts".

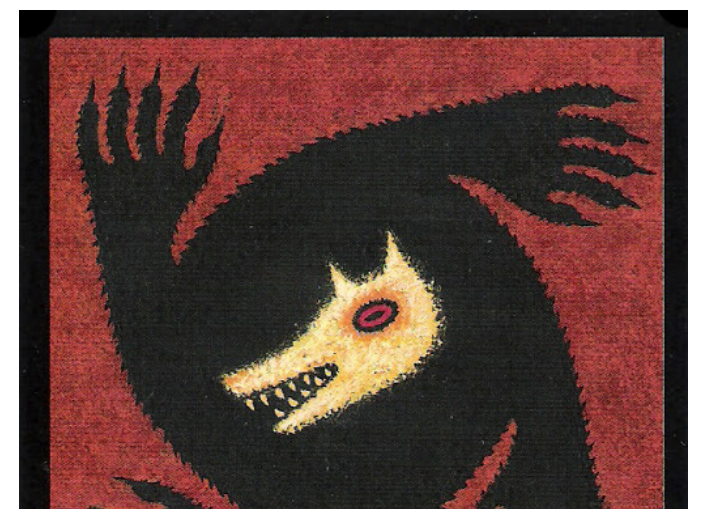


MENTAL RELAXATION

If you are really stressed and right before sleep, your brain goes also places instead of getting on the sleeping train, this might be something to try. You can do this right before going to bed, during the day between lectures, or whenever you have 5 or 10 minutes for it during the day. I prefer to use the app Headspace, but there are also videos on YouTube for mindful meditation. With mindful meditation, you are guided to train your awareness of what's going on in the present moment without any judgment. So do not judge this yoga exercise and just try it out if it something for you!

CORONA PROOF WEREWOLVES

We all are missing our friends, committee hangouts, and usual real-life games. A Lifeline classic on committee weekend is Werewolves of Miller's Hollow (Weerwolven van Wakkerdam). Instead of doing it irl, we are doing it on WhatsApp. You still make use of the rules only the game master has some more job guiding the game. He or she will reveal the cards of who died, make a secret Werewolves group chat, and ask the special players like the Witch if they want to kill or save someone. But now, instead of having a fantasy night, "All players of Miller's Hollow will now go to sleep," you make use of the normal nights. Therefore, the game (inclusive chaos, trust issues, and fun) can last for days!



AN ODE TO THE DARKNESS

By Marit Bonne



When the sun sets, and the darkness falls, there is nothing my brother and I like to do more than watch some good horror. Our eyes have seen many gory screenplays and our minds exposed to supernaturality, cults, and dolls, but there is one horror series that we think exceeds all this. That series is called ‘American Horror Story’.

I must warn you: the series is more absurd than you imagined, but in the best way possible. Ruthless murders, bizarre sex scenes (very NSFW series lol) and some intense plot twists: this series has it all. In total, there are nine seasons with each a different setting. To get an idea, there is a whole season dedicated to the 2016 elections in the USA (called ‘Cult’), which is one of the more realistic seasons, addressing phobias, racism, and feminism. The other seasons are a bit more out of the box, with witches (my personal favourite), ghosts, and aliens. However, serious topics like slavery, LBGTQ+, mental health, and how it is to be perceived differently or as a freak, also come across. It makes you root for

the villain and humanize him/her, even if he/she can set things on fire with just the look of an eye.

So, if you like having goosebumps, do not identify as a wimp, and have a fascination with darkness, I (we) strongly advise you to watch AHS. It is a well thought, good-weird, scary series that carries a more profound message (or at least I’d like to think too). It is now on Disney+ and perfect for a binge-watch session.

Ps. They also have some pretty attractive actors -ahum- Sarah Paulson.



THE DARK TRUTH BEHIND COCA-COLA LIGHT

By Renate Kloostra



Most people love soda. It’s nice, sweet and fizzy. But what if a version of this delicious drink existed, without the sugar? Wouldn’t that be the best? Well, that’s exactly what led to the invention of light drinks. The same beverages but without any sugars. Amazing right? But are they as amazing as they seem? Well, you’re about to find out. Because in this article, we’re going to dive into what happens the first hour after you consume a diet coke.

First 10 minutes – Your tastebuds are deceived, and your teeth are attacked

The high levels of phosphoric acid attacks the enamel on your teeth while the artificial sweeteners – aspartame hits your system and fires up your body’s response to sugar.

20 Minutes – May switch on fat-storing mode

Don’t be deceived by the “no sugar” claims; artificial sweeteners can trigger the exact same insulin responses as sugar does, sending your body into fat-storing mode.

This is due to artificial sweeteners and sugar alcohols interfering negatively with our natural gut microbiota, compromising our immune system and unbalancing the digestive system, according to Amanda Payne of Switzerland’s Institute of Food, Nutrition and Health.

40 minutes - you crave more

The combination of caffeine and aspartame creates a short burst of adrenaline, similar to how cocaine works. Excitotoxins are then released which act to overstimulate your brain and

neuron receptors.

According to a study published in The Scientist, “Cravings for more coke are explained by the release of two neurotransmitters in the brain, dopamine and glutamate. Caffeine and aspartame increases dopamine levels as shown in various studies.

Aspartic acid, taken in its free form (unbound to proteins), significantly raises the blood plasma level of aspartate and glutamate. “Researchers say glutamate is more essential to addiction than dopamine.”

60 minutes – The nutrient-less soda makes you hungry and thirsty for more

Marisa Peer, a behavioural psychologist who specialises in eating disorders, said that diet soft drinks are doing more harm than good. “Artificial sweeteners are associated with a drop in the appetite-regulating hormone leptin. Leptin is the hormone that inhibits hunger, so diet drinks like diet coke actually make you hungry and less satisfied with normal amounts of food. Finally, when you eat or drink a lot of chemicals that your body simply cannot break down, your body makes more and more internal fat to wrap the chemicals in keeping those harmful chemicals away from your vital organs,” she says.

“As diet coke has no calories and no recognised ingredients, we know it is a cocktail of chemicals that encourage your body to gain and store weight, especially on your legs and bottom away from your organs. Diet drinks are not good for your body, your health, or even, as it turns out, for dieting”

THE EVOLUTION OF DEATH



By Lauren Hansen-Manguikian

Let’s talk death. Why do we die? Sometimes things kill us, like predators, natural disasters, each other, or we get struck by lightning. But if none of those things happen, we die anyway. Why is death inevitable? Why do we have a ‘lifespan’?

Evolution maximizes fitness, or in other words survival and reproduction. This is the paradox: aging prevents both those things, so why hasn’t nature selected out the traits that cause it?

One might think this can’t be done, but this is just not true. As far as lifespan goes, the bristlecone pine can live to be up to 5000 years old. Maybe it’s just trees, you say. But no, a typical Greenland shark swims around out there for 400 years. Clearly, they have some

longevity traits that we do not. You might respond that they can live pretty long, but they still die, so isn’t death inevitable? Lo and behold the mighty hydra: a small, sea-dwelling animal that blows the minds of all who study it. If not subjected to any extrinsic causes of death (like disease or predators), they will not grow old and die. In fact, they show no signs of decline. Scientists claim that this creature could theoretically live forever.

So clearly it’s possible to go through endless repair. What’s the deal, evolution?

One intuitive answer is that death is beneficial. It makes room for the next generation, so it’s actually a benefit to the group. This argument rests on the concept of group selection, which also sounds nice, but doesn’t work in practice. For a simple example, if an individual mutates a gene that benefits it at the cost of the group, that gene will spread in the group anyway, because that individual’s fitness is increased relative to other members. It will have more offspring even if the group as a whole suffers. So group selection is considered a debunked theory by evolutionary biologists.

What is the benefit of death then? It must exist for a reason, right? The simple answer is that death isn’t selected for; it’s just

not selected against. Imagine a gene that, on one’s 20th birthday, turns you into a potato. That potato would no longer be able to have children and would have lower fitness than its non-potato buddies. This gene would be eliminated from the population pretty quickly. Now imagine a gene that, on one’s 100th birthday, turns you into a potato. Since most people are killed by predators, starvation, disease, spiders, snakes, or maybe struck by lightning long before then, this gene would not be selected against. As long as a potato-y gene is activated after the organism can no longer reproduce, it will not affect fitness and thus continue to be passed on. We die eventually because we have accumulated a bunch of mini potato-fying genes over the long course of our evolutionary history.

But that’s not all the potato genes have up their sleeve. Imagine the same gene that turns you into a potato on your 100th birthday, and also makes you a super sexy teenager. While the



sexy-potato gene sounds pretty far-fetched, it is certainly the case that a single gene can cause multiple traits. If a potato gene is beneficial during or before reproductive age, not only will it not be selected against, but it will be selected for. So our lifespans can easily be shortened by something that increases survivability or fertility at younger ages. Indeed when scientists selected for the longest living fruit flies in the lab, those long-lived fruit fly populations had a higher chance of juvenile death and also took longer to reach reproductive age. Remember the hydra? It reproduces via asexual budding, and thus its fertility rate remains constant throughout its life.

Next time you look in the mirror at your sexy ass, just remember, it will probably cost you later.

DARK CHOCOLATE IS THE BEST CHOCOLATE

THE REVIEW



By Devi Seijkens

Over the years there have been a couple of things you can rely on from our wonderful magazine. For starters, I think Bas has been writing about his magnificent beasts for as long as I have been an Idun member. Someone in our committee will deliver some nice scientific news. AND WE WILL REVIEW STUFF THAT NEEDS TO BE REVIEWED. This edition of the review is no different; as we took a look at some of the different types of dark chocolate your regular old supermarket has to offer.

For this review, we took 5 different bars of dark chocolate, with similar amounts of cocoa (70-72%, except for the Milka Darkmilk, but we'll get to that later). Next, our independent panel scored each bar on 5 categories: Taste, color, richness, smoothness and meltiness. Your humble and impartial writer then did some quick data analysis and low and behold, we found some very, very interesting things. Below I will discuss each bar individually, so you can get a nice idea of what they were all like. And of course as always, I will present you with our conclusions at the end.

MILKA DARKMILK €1,35 85G

First up, we have Milka Darkmilk. Milka is probably one of the most recognized brands of chocolate in the Netherlands. Milka is mostly known for milk chocolate, but with the recent rise of darker types of chocolate, they decided recently to branch out into darker chocolates. The problem here is that our buyer was misled, into thinking the Milka Dark milk was actually, like the other chocolates here, dark chocolate. But unfortunately it is simply darker milk chocolate. Damn you advertising!! This might have contributed to the low scores it got in this review, because Milka scored bad overall. It did pretty well on meltiness and smoothness, but other than that it scored the absolute lowest of our review. The result? An overall score of 6.9. Some comments?

Lauren: 'Milk is for cows.' Or Koen: 'Not good for the review.'

TONY'S CHOCOLONELY €2,89 180G

Next up we have Tony's chocolonely dark chocolate. This brand is known for their very big variety of amazing flavors of chocolate, with all kinds of weird additions. But again, here we used regular old 70% dark chocolate. One thing to note is that Tony's have always had these weird bars that aren't symmetrical that can be hard to divide and share. Because we always share our chocolate, right? Overall Tony's did average across the board, only scoring low on meltiness. The overall average came in at a 7.2, not bad Tony's! Marit expected a bit more from this one, while Meiske thought it was quite nice for dark chocolate.



BIO+ €1,49 100G

Next up, we have a very nice organic option with the Bio+ dark chocolate. Nowadays more and more people want to eat organic foods, and this is a nice option to have some organic indulgences. Bio+ scored a little better than Tony's, mainly due to better meltiness. Overall average came down to a nice 7.5, or as we say in Dutch: Gewoon goed man. Koen said it was kinda dry, while Dana said it doesn't taste organic. If you know what organic tastes like, please, contact us at redactie@idun.nl.

G'WOON €1,29 100G

Nou, here in the Netherlands, we like to say, act normal and then you're crazy enough. This brand kind of uses that in it's marketing, as this could be translated to N'rmal. But it definitely didn't score just N'rmal in our review! It came in at 2nd place overall, with a score of 7.7. Interestingly, this bad boy scored highest in the taste category! So if you're looking for good Dutch chocolate, this might be the one you're looking for! Dana tasted hints of coconut, while Lauren only disliked the size of the squares, calling them too big, but otherwise this one was 'perfecto'!

“
It doesn't taste
organic

LINDT €1,95 100G

Last but definitely not least, Lindt chocolate. I have to be honest, I expected this brand to be the most expensive, because the packaging looks quite expensive. And low and behold, it is the most expensive! (per 100g) But unfortunately, it looks like this review will once again confirm that quality comes at a price, because Lindt was the 'winner' with the highest overall score of 8.3. It got the highest score in 3 of our 5 categories, and beat out number 2 by 0.5 points, which I consider to be a substantial lead. Marit called this one richer than Jeff Bezos (nobody is richer Marit, I'm afraid we're gonna have to get used to that), while Koen said this was by far the best chocolate of the review. He went on a complete tirade that I won't quote here, but he wasn't very humble about it.



CONCLUDING REMARKS

Now, there have been many reviews in the lifeline. Many were written by me, but I don't think there was ever a more important review. This review proves that dark chocolate is the best chocolate (other chocolates score an average of 6.5 in other reviews*). But more importantly, we find here that quality comes at a price. But, then again, second best is also quite nice and in this case also came at a nice price. So maybe for the average student who likes to spend most of their money on other important stuff (like textbooks, lab-coats, glasses, Microsoft office licenses or wheat-smoothies), our second place is actually the winner. Maybe you can decide for yourself which you think is the best, because let's face it: YOU GUYS ARE SCIENTISTS AND CAN DRAW CONCLUSIONS FROM DATA YOURSELF.

Kisses from
your boy *xoxo*



Overall averages	Taste	Color	Richness	Smoothness	Meltiness	Average
Lindt	7,9	9,0	8,4	8,2	7,8	8,3
Tony's	7,5	8,3	6,9	7,2	5,9	7,2
G'woon	8,4	8,5	7,6	7,6	6,7	7,7
Bio+	7,5	8,2	7,6	7,2	6,9	7,5
Milka	7,5	4,3	4,8	9,3	8,5	6,9

*No actual research or review exists that confirms this, this is an unfounded claim by the author.

“
Milk is
for cows

BAS EN Z'N BEESTJES

BEASTS BY BAS



Just close your eyes for a second and imagine. Imagine an animal capable of cooperating with literally millions of others with a plethora of social behaviours. An animal that can keep track of its steps. An animal that is not only able to learn but also able to teach others. So advanced it can even hear without ears. This animal is not imaginary. It is spread worldwide. There are probably a couple in your backyard lurking in the dark undergrowth as we speak. So, let Bas en zijn beestjes light up your spirit during these dark days by introducing you to the astonishing amazing ant!

Ants form the family of Formicidae, which contains more than 13.000 species. They can be found on almost every landmass, except for Antarctica. Some large islands, like, for example, Greenland, originally avoided the ant invasion but have since been colonized by ants lifting on human settlers.

Ants lack both lungs and ears, yet they can breathe through their skin and hear through their feet, feeling vibrations in the earth. To compensate for lacking these vital organs, they double up on stomachs. The second stomach is not for desserts but for storing food that can be shared with other ants. In a colony of ants, it is the queen that rules with a strict and long regime.

While most ants live up to 3 years, the queen of the ant species *Lasius niger* can live up to 3 whole decades. The queen is responsible for producing new ants, which are often females. Male ants are produced solely for their sperm. The queen of *Mycocepurus smithii* has gone one step further, getting rid of male ants completely by using a cloning technique to produce offspring. By making sperm obsolete in the reproducing cycle, it means that technically all ants in *smithii* colonies are female.

As well as displaying these fascinating physical feats ants also possess some impressive cognitive skills. Several ant species are known to farm their own food, cultivating fungi species that can feed the colony later. Other ants go out to search for food. When food is found, they run back to the nest and use the so-called tandem running technique to teach other ants the route from the nest to food. In this tandem running, feedback is exchanged in both directions via tapping each other's back. If tandem running is not athletic enough, ants are even able to keep track of their step count! Dessert ants can wander for metres (which is a lot for an ant!) through a similar-looking environment, yet, when food is found, they take the most direct

route back to the nest. How they did this was a mystery until a brilliant piece of research uncovered their secret step tracking. In the experiment, one group of ants were given stilts after finding food, while a second group of ants was given stumps. The stilted ants walked back double the distance before looking for the nest, while the stumpy ants only came halfway before looking around. However, the most amazing part is that, after the modified ants were returned to the nest, they could go out and get back home just as accurately as normal ants. This proves they really keep track of their number of steps and can adjust flexibly!

Ants are co-operative livers, but while they work well together with members of their own colony, there are some ant species that will conquer other ant colonies, enslaving the inhabitants for the own gains! But, on a good day, they also can form wonderful relationships with other species. In Kenya, there are four ant species that form a special relationship with the Whistling thorn acacia (*Vachellia drepanolobium*).

While all four species form mutualistic/parasitic relations with the tree, it is a strict one-colony-per-tree set up, and whole wars are waged where branches of two different trees meet. The tree supports the ants with a nest and some nutrients, and in return,

the ants will attack any grazer that tries to browse the tree using both their mandibles and formic acid. The tiny warriors keep animals as big as elephants away. For the complete story of the ants and the acacia, check out episode 5 of Secret safari, into the Wild. Another sadder but still fascinating relationship is between the ant and the zombie fungi *Ophiocordyceps unilateralis*. The ants pick up the spore of the fungi lying on the forest floor. Once inside the body, the fungus will slowly take over the ant's body, causing it to make convulsive movements and fall from its home in the canopy. The fungus takes over completely, zombifying the poor individual and forcing it to climb up the nearest plant and secure itself on the end of a leaf, piercing its mandibles in a dead-lock grip. There the ant dies while the fungus flourishes, growing out of its head spreading its spores for the next batch of innocent passers-by.

As you can see, ants are not just interesting eusocial insects mindlessly doing their thing. They are a pinnacle of society and outdo other species regardless of their size. They show that wonders can be achieved by not only being smart but also by working together, using the strength, and weaknesses, of others, all the time keeping track of your steps. With those qualities, they are rightfully the newest member of the hall of fame.



NEXT EDITION

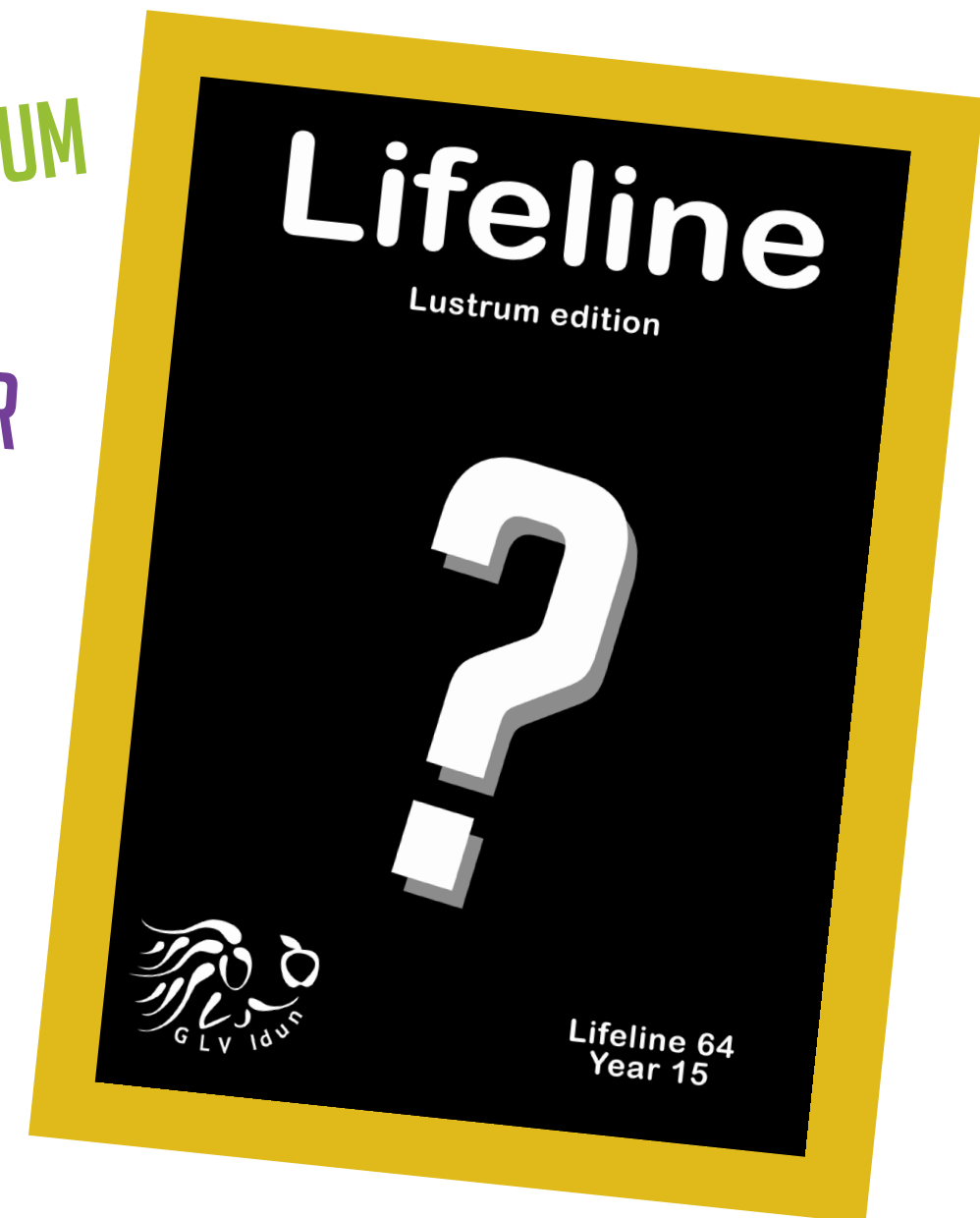
COMING AT YOU SOON, BUT A LITTLE LATER THAN YOU'RE USED TO: LIFELINE 64! FOR OUR NEXT EDITION, WE ARE TEAMING UP WITH THE LUSTRUM COMMITTEE TO CELEBRATE 15 YEARS OF IDUN.

SO FASTEN YOUR SEATBELTS, AS WE TAKE YOU ON A JOURNEY...

LIFELINE X LUSTRUM

HARDCOVER

BUT THE GOOD OLD
A4 SIZE



SEPTEMBER/OCTOBER 2021

IDUZZLE....



By Juultje



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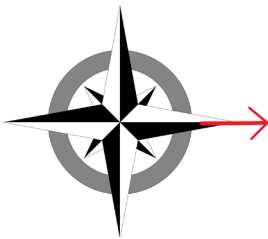
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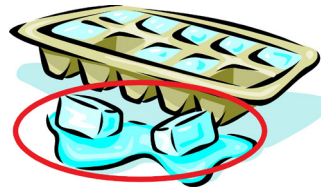
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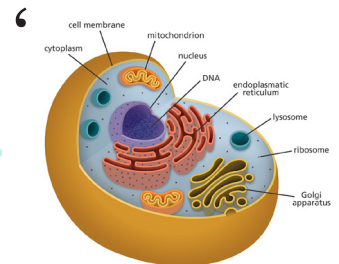
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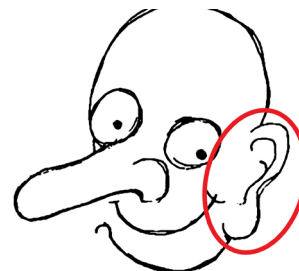


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The previous Iduzzle was won by **Elise de Groot**. Congratulations! She has won a marvelous prize, which she is very happy with! Would you like to be mentioned here in the next Lifeline? Please submit your answer to the Iduzzle to redactie@idun.nl before September 14th.

Answer to iduzzle 62: Life is a series of thousands of tiny miracles.