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PREFACE

Dear reader,

I thought it proper to address you all with a capital letter, and although I don't know your names, I would like to honor you, at least with an incident of higher case. Maybe I'll keep doing so. But regardless of how you got ahold of this Lifeline, which articles you decide to read, whether this is your first Lifeline or 10th, I welcome you to the opening Lifeline of the year! Perhaps now more than ever, it seems that we are all in need of some proper scientific distraction. This edition, we intend to do so with the theme 'Scales'. It is quite astounding how broadly our sweet Lifeline writers were able to stretch their curiosities, and offer to you, dear Reader, a vast array of interesting pieces to read. So, no matter what tickles your fancy, you are sure to find adequate amusement among our pages.

I look forward to addressing you all again for the next three editions.

Hugs and kisses,

Dana Frank

Lifeline editor in chief 2020-2021



Dear reader,

Here it is, the first Lifeline of the academic year 2020-2021! A magazine filled with interesting and fun articles. The theme of this edition is 'Scales,' which I think can mean a lot of things. Maybe it's about the scale we study as a biologist. Do we study life at the atomic scale, at the scale of tissues, or even at the scale of ecosystems? But it can also be about the Richter scale, maybe not as related to biology but relevant in Groningen, where we can experience earthquakes sometimes. Another thing is, of course, the scale on which you weigh yourself. I think many of us gained some weight during our student life, so I recently had the courage to buy one for myself (the result was disappointing). Even in music, we can talk about scales, sequences of notes increasing or decreasing in pitch. Still, there are probably a lot more meanings to 'Scales'. I'm sure the Lifeline committee has thought of them all.

Have fun reading this first Lifeline of the year!

On behalf of the fifteenth board,

Aliëk Hasperhoven

Chairman of GLV Idun 2020-2021

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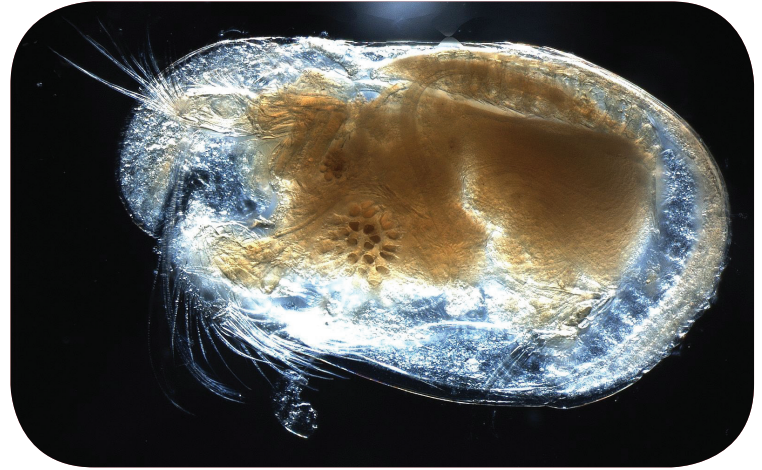
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SCIENTIFIC NEWS

By Meiske Pieters & Renate Kloostra

NOT ALL VIKINGS WERE BLOND

With the technology of DNA analysis researchers were able to study the genetic backgrounds of Vikings. Apparently, those raiding, blonde warriors were much more diverse than how they are portrait nowadays. During the Viking Age (about AD 750-1050) the Scandinavian populations had such a great maritime expansion, they transformed world history. To get a grasp of their influence, 442 humans from archaeological sites across Europa and Greenland were sequenced. When they followed the gene flow, they came across astonishing evidence: a major influx of Danish ancestry into England; a Swedish influx into the Baltic; and Norwegian influx into Ireland, Iceland and Greenland. But not all the gene flow went out of Scandinavia, substantial ancestry entered Scandinavia from somewhere else in Europe during the Viking Age. The DNA analysis also showed that family members often went on expedition together. However, there was also an instance where two family members were hundreds of kilometers apart, which shows the mobility of the Vikings.



OLDEST SPERM EVER

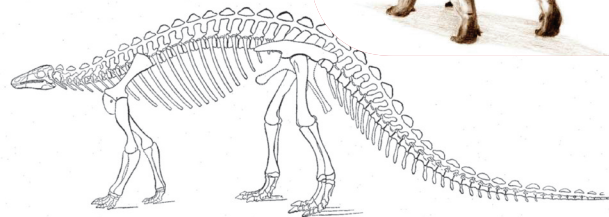
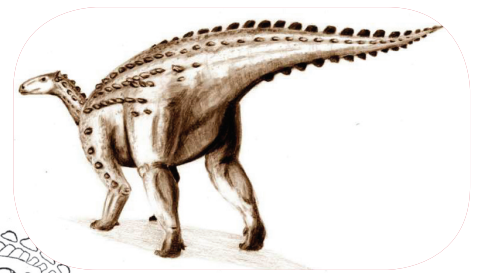
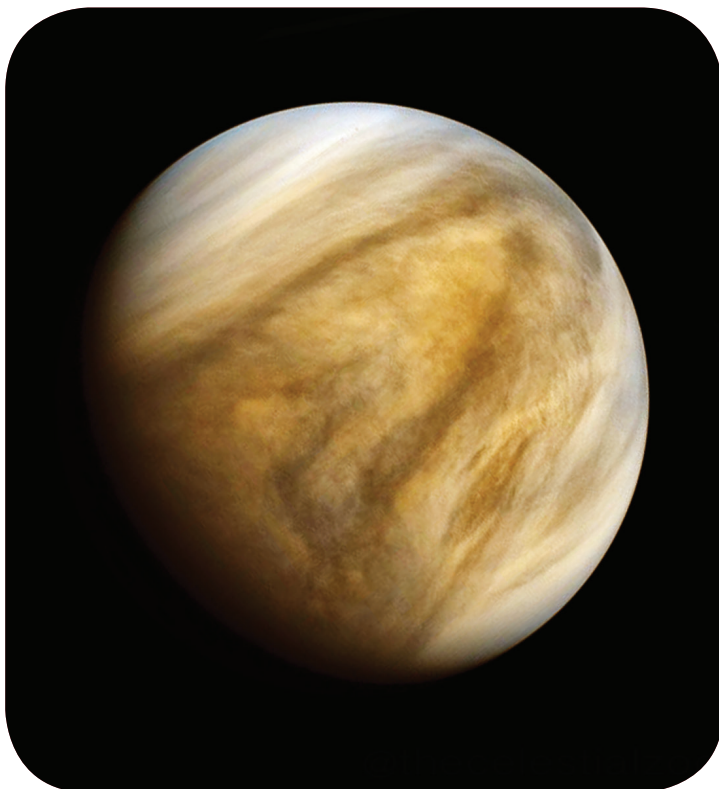
Accidentally sitting on sperm stained bed sheets of your friend is annoying and disgusting, but finding the oldest known sperm in the world, locked in a piece of amber is awesome and fascinating. Even more so when I add that this was during the time that dinosaurs dominated the earth. The 100 million-year-old sperm comes from an ostracod, which is a class of the Crustacea and is sometimes called “seed shrimp”. Their bodies are only a few millimeters long, their sperm on the other hand can be up to 11.8 millimeters, depending on the exact species of course. A piece of amber, not much bigger than a postage stamp, was found in a mine in Myanmar. In the tree resin were 39 ostracods, 31 weren’t an identified species yet but may know call themselves *Myanmarocypris hui*. Inside was also an adult female *M. hui*, its soft tissues were well preserved, including four eggs with a diameter of only 50 micrometers each. After using computed tomography to reconstruct a 3D image and sending it to Renate Matzke-Karasz, an ostracod expert, He Wang had reconstructed the oldest animal sperm. Together with their colleagues they estimated that each sperm was about 200 micrometers long.





NO LIFE ON VENUS

You might have seen some headlines, suggesting that there is a sign of life on Venus. But before you go pack your back and hop on a spacecraft to escape life and reality, let me explain what has actually been discovered. On the 14th of September, it was published in Nature Astronomy that traces of phosphine (PH₃) gas were found in Venus' atmosphere. On earth this gas comes from microbes and it is thought it can only be made by life. So, it was quite shocking that it was found in our closest planet's atmosphere, where phosphorus should only be in oxidized forms. Even after extensive studies, the researchers couldn't figure out where the PH₃ is coming from. There are no known abiotic production routes on Venus that could explain the finding. This leads to two possible options, that there are unknown photochemistry or geochemistry processes, or there is presence of life. Sadly, no conclusions can be drawn, and experimentation will continue. For now, we are stuck on Earth.



DINOSAUR PROJECT TOOK 160 YEARS

The first complete dinosaur skeleton ever recovered, has finally been studied in detail and they are now sure which species was actually found. This project took about 160 years to complete and was finally completed at the end of last august. This dinosaur appeared to be a Spinosaurus, a plant eating dinosaur which lived during the early Jurassic era in what we now call England. The original researcher of this skeleton, Richard Owen, named it and did a little research before ditching it and working on other projects. A decade and a half later, palaeontologist David Norman decided to pick up the project and give this cute dinosaur a place in the dinosaur family tree. They made a reconstruction of what the Spinosaurus probably looked like in real life. For almost 150 years it was assumed that the Spinosaurus was probably the "missing link" in the family tree between the Stegosaurus (the dinosaurs with the Doritos on their backs) and the Ankylosaurus (a famous armour-plated dinosaur). But Norman found that the Spinosaurus is just an ancestor of the Ankylosaurus.

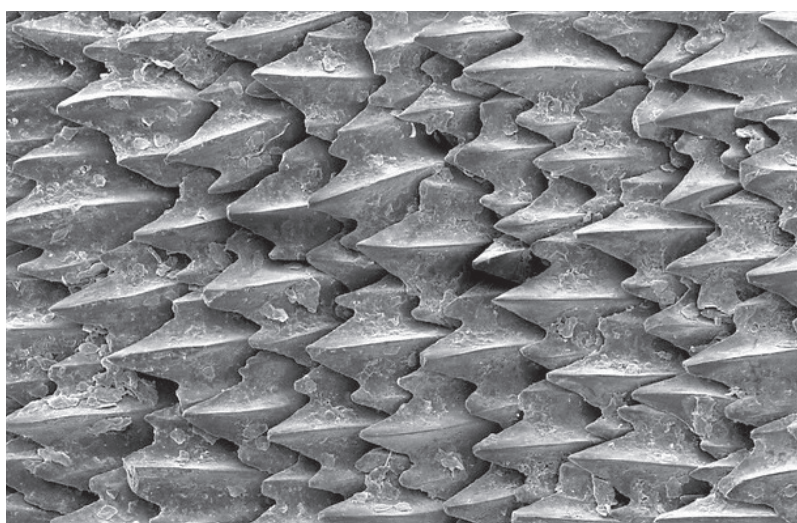
SWIM LIKE A SHARK



By Nadia van Eekelen

Did you ever wonder why sharks can swim so fast? Of course, their body shape makes them extremely streamlined, but that's not the only thing. It's their skin.

Unlike other fish in the ocean, the skin of a shark is made out of dermal denticles, a type of scale that resembles teeth. This makes the skin of a shark feel rough, like sandpaper. The denticles are shaped differently from the head to the tail, which allows the



Denticles on the skin of a great white shark (c) Corbis

shark to swim faster and easier than other fish.

When we swim, we experience a force called drag that is working against us. A shark experiences this force too, but the first denticles are ridged and manage the water flow closest to the skin. They reduce the drag and enhance thrust, so the shark is pushed forward. The less-ridged denticles are a bit thicker and protect the shark, for example, from parasites and scratches by hard surfaces or other animals. The scales are aligned with the flow of the water, and they are flexible, so sharks can quickly change their direction and angle of attack without experiencing sudden strong forces against them.

So this is how sharks are, quite literally, made for speed. Humans, on the other hand, are definitely not. Nevertheless, (most) humans love to swim, and one of the most popular Olympic sports is competitive swimming. To win a swimming competition, you must be the fastest. Like a shark, you do this by creating the least resistance in order to obtain maximum speed. Still, your maximum speed will never even be close to that of a shark. Or will it?

What if something were designed in order for humans to slip through water like a shark? It shouldn't be too difficult: to swim like a shark, you must look like a shark. This is where the sportswear company Speedo came in. In 2008, they had developed a material called 'Fastskin'.

Speedo took the findings regarding the texture of shark skin and used that to recreate their swimwear. With different types of fabric, they created denticles and applied them to the surface of their new 'fast' swimsuits. The Fastskin suit is made of a super-stretch nylon/elastane/polyester fabric with V-shaped ridges and a denticle surface print. So, when you wear this during swimming, the water is sucked closer to the body and then passes over you more effectively. The fabric not only reduces drag, but it also compresses the body to stop muscle fatigue, so you can save energy and swim longer.



In the Olympics, record after record fell. All records were broken by swimmers who wore the Fastskin suit. This raised a lot of questions. Were the games still fair? Was it really because of the suit? Weren't the winners just better trained?

George Lauder, a professor at Harvard, tested the Speedo suit to see how similar it was to actual sharkskin. And found that the Fastskin is nothing like sharkskin at all. The suits do seem to increase the swimmers' speed, but it's not because of drag reduction. This is because drag reduction only occurs when the denticle-skin is attached to a flexible body. So, it works for sharks, but not for humans.

The reason why Fastskin-wearers are faster is probably similar to the placebo effect. Heather Greenwood: "It may be more psychological than physical; I always think I'm going to win when I wear it."



EVOLUTIONARY RECYCLING

HOW SCALES BECAME TEETH



By Dana Frank

It is my belief that no human endeavor could ever exceed the imaginative capacity of nature. The self-replicating beings which have occupied the planet for the last 3 billion years constitute nature's masterpiece. And while painters handle brushes, musicians play instruments, and poets wield pens, natural selection has an infinitely vast array of tools at its disposal to sculpt life into existence. Exaptation is one of the clever ones. And you owe your ability to chew to it (and to fish scales).

In 1882, Stephan Jay Gould and Elizabeth Vrba described a concept of evolutionary resourcefulness, whereby a trait takes on a different function according to changing environmental necessities, re-using what you already have, as it were. Just because a trait has a particular role today does not necessarily mean we know its evolutionary origin.

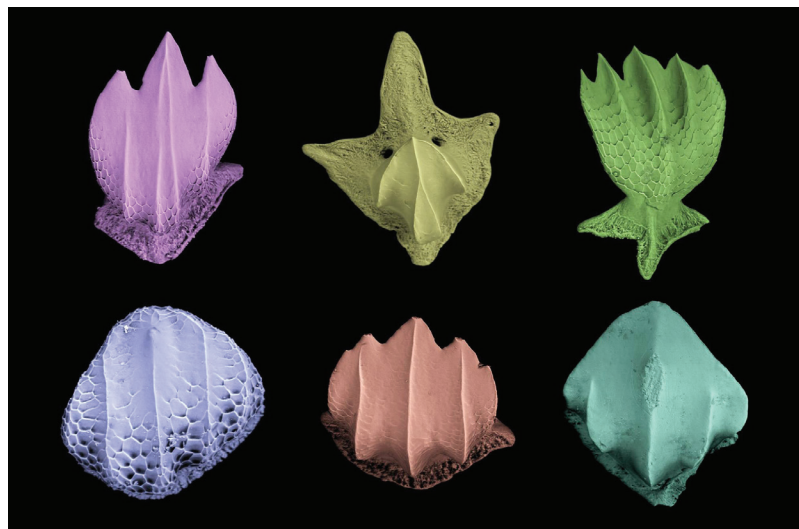
As it happens, a class of cartilaginous fish, which includes sharks, skates, and rays, possesses a trait that we share but use with a somewhat different purpose. They retain primitive spiny scales rooted within their skin called dermal denticles.

The name itself might have already aroused your suspicion for oral purposes, as denticles get their name from their constitutive material, dentine. This firm, calcified tissue, also makes up the majority of our teeth even today.

Developmental biologists have shown that the pointed structures responsible for the sandpaper-like texture of shark skin reside within our own jaws. In the aquatic part of our developmental history, these scales migrated from the skin into our early vertebrate ancestors' mouths. Over time, jawed vertebrates became the standard. How many vertebrates can you think of without a jaw?

What's more, is how much more tooth-like these scales were before becoming actual teeth than the scales of fish living today. In classes of fish, other than our cartilaginous friends, they look and feel entirely different.

By examining the physiology of animals like sharks, which still possess some primitive traits like dermal denticles and cartilage skeletons, we can very effectively look into the biological past. Consider the majesty of something like that.



The most beautiful aspect to me is the mechanism itself. What a crafty and, I dare say, almost Dutch manner in which natural selection can act. After all, it's much more efficient to use already existing genes than form new structures from scratch. That way, you can adapt in whatever way is presently urgent and make use of those pesky, semi-vestigial organs you didn't really need anyway. How convenient!

The one thing I would say about natural selection in view of this is that anything is conceivably possible when you allow enough time for it to occur. The interplay between environmental pressure and adaptation is boundless. Eyes could become noses, legs could become fins; if natural selection favored it, it could become reality. There's no telling what will happen to life as we know it now in the next few million years. That is if we haven't completely abolished it by then...



Mastering student cooking

with Koen Freerks



Now that the summer has come to an end and we are slowly drifting towards colder months, I would like to invite you to an experience of extraordinary flavours and delicious recipes suited for the necessitous, busy and famished student! Starting from this Lifeline edition and onward, I will gift you a share of recipes. Focusing around student life, there will be recipes for all kinds of situations we might get ourselves into. Whether you are hung over from yesterday, studying hours and hours for that exam you are not looking forward to or waiting desperately for uncle DUO's gifts. These recipes are made for you. These cheap, healthy and tasty recipes will also be flexible to incorporate either vegetarian or vegan ingredients in replacement of meat where it is necessary.



A signature dish of the Netherlands, *Hutspot* is a very nice meal for colder days. It is a type of *Stamppot*, which is an accumulation of Dutch dishes that are fully mashed together. The original Hutspot original recipe is very simple, using only potatoes, carrots and onions mashed together with either belly pork or brisket on the side. My version is Hutspot with a little twist, incorporating extra ingredients and a different style of cooking. Although the recipe is different than the original Dutch Hutspot, I have noticed a lot of people, including international students, really like the following recipe. The main difference is that the carrots and the onions will be stir-fried separately from the potatoes instead of being cooked with the potatoes. I believe this method improves the flavour of Hutspot greatly. This version of Hutspot is served with sausages, with vegetarian or vegan options available at your local supermarket. Also, (vegan) mayonnaise was added to the dish to incorporate the fat that would otherwise be added as bacon lard, thus making the dish suitable for vegans.

Ingredients for two people:

1 kilogram of potatoes
650 grams of peeled winter carrot
350 grams of white onion rings

3 tbsp. of (vegan) mayonnaise or yoghurt mayonnaise
2 tbsp. of turmeric
2 tsp. of harissa paste
Salt and pepper to taste

2 Sausages (vegetarian or vegan options available)
1 sachet of Jus (gravy)
(I prefer Stampot Jus by Maggi)

Kitchen utensils:
Big pot
Wok (optional but better)
Small pan
Small saucepan
Potato masher

How to make:

Peel the potatoes, onions and winter carrots. Cook the potatoes in a big pot with extra space for around 20 minutes until they are soft.

In the meantime, grate your winter carrots and cut your onions into rings. Stir fry these together in a wok until soft for around 10 to 15 minutes.

Tip: If you do not have a wok, you can also cook the onions and grated carrot with the potatoes in the same pan for 20 minutes.

While everything is cooking, start preparing the (vegan/vegetarian) sausages by cooking them in a pan. Also prepare the Jus (gravy) from the sachet using its instructions and a small saucepan.

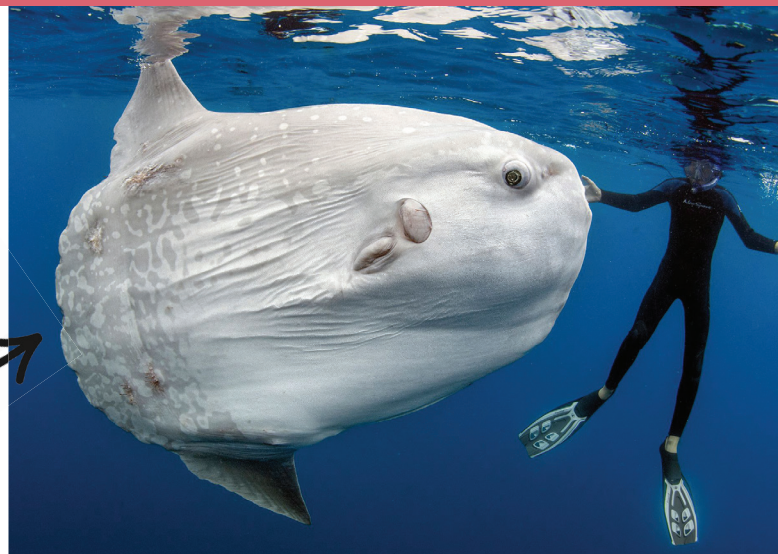
When the potatoes, onions and carrots are ready, drain the potatoes and add the onions and carrots to the big pot containing the drained potatoes. Add the mayonnaise, turmeric and harissa paste to the mix and mash all the ingredients together using a masher to create a Stampot. Add salt and pepper to this mix to taste.

Scoop some nice amount of the stampot on a plate, add the sausages to the meal and finally, put some Jus (gravy) over your Hutspot. Enjoy your Twisted Hutspot!

THE BEST AT GETTING BIGGER



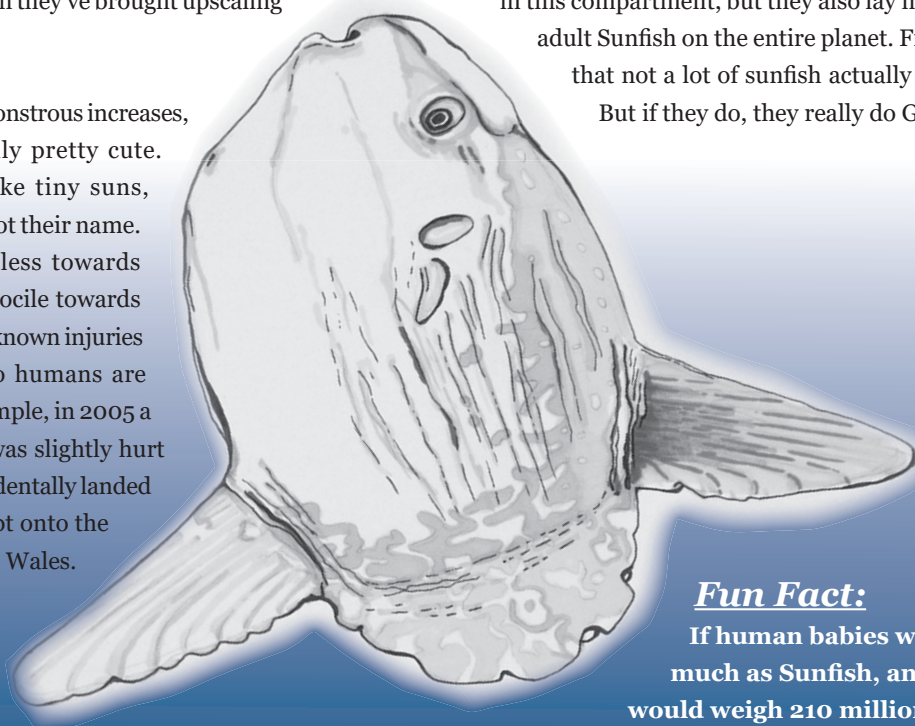
By Juultje Eenink



If you think you might have gotten bigger during this pandemic, taking a look at the Ocean Sunfish will help you put this in perspective. Whether it is fat, muscle, or height you gained I can guarantee the Ocean Sunfish puts you out of scale.

While Sunfish are one of the heaviest bony fishes in the world, they are not this big from the start. The adult sunfish can weigh up to 2,300 kilograms and be 3.3-metre-long with their fins being 4.2 metre in height. However, at birth these fish are tiny – only about 2.5 millimetres. In fact, Sunfish increase more from birth to adulthood than any other animal in mass. With an increase of more than 60 million they've brought upscaling to a new level.

Despite these monstrous increases, Sunfish are actually pretty cute. Their eggs look like tiny suns, which is how they got their name. The fish are harmless towards humans, they are docile towards divers and the only known injuries they have posed to humans are accidental. For example, in 2005 a four-year-old boy was slightly hurt when a Sunfish accidentally landed on him when it leapt onto the boy's family boat in Wales.



Luckily, only relatively young Sunfish are able to swim fast enough to leap out of the water - the Sunfish that struck the little boy weighed only about 30 kilograms. As they get older, they become slower and slower. At one point it was believed that adult Sunfish weren't capable of swimming at all! But it is now thought they can swim, but choose to be motionless most of the time.

Sunfish are also on a whole other level than us when it comes to the amount of eggs they lay. The female Sunfish can lay more eggs at once than any other vertebrate. With more than 300 million eggs at once they not only beat all other vertebrates on earth in this compartment, but they also lay more eggs than there are adult Sunfish on the entire planet. From this you can gather that not a lot of sunfish actually make it to adulthood...

But if they do, they really do GROW up.

Fun Fact:

If human babies were to grow as much as Sunfish, an adult human would weigh 210 million kilograms.

STEPPING ON THE SCALE

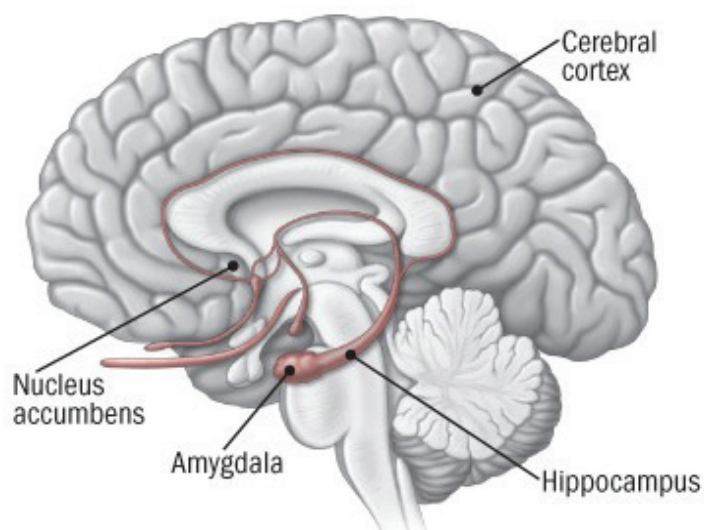
TRIGGER WARNING! IN THE FOLLOWING ARTICLE, EATING DISORDERS WILL BE DISCUSSED



By Marit Bonne

With the Covid-19 pandemic still in our midst, the words “Corona kilo’s” or Quarantine kilos dominate the internet. For many people, the relationship with food hasn’t always been an easy one, and using the guilt of the “Corona kilo’s” to promote diets is certainly not going to improve this. With that said, the relation between humans and food is an interesting one. Without food, you die. The simplicity of this statement, however, is nowhere to be found when exploring food and humans.

Brain's Reward System



Eating disorders - like anorexia nervosa, bulimia nervosa and binge eating disorder – show the complexity of human/food relations. A person’s physical appearance does not define these disorders; rather, they are mental illnesses characterized by abnormal eating habits. Understanding eating disorders is a challenge of its own, but an overlap between symptoms of eating disorders and processes of neurotransmitters serotonin and dopamine, provided a good start.

And so, they started. The overlap caused researches to investigate possible associations with the two neurotransmitters. Walter Kaye, a psychiatry professor and specialized in eating disorders,

hypothesized that due to restricted food intake, serotonin levels would drop. The body responds to this by increasing the number of serotonin receptors. However, when individuals with anorexia start eating again, serotonin levels spike immensely, resulting in anxious feelings and emotional chaos. This response makes it incredibly hard to recover by oneself.

The other presumed troublemaker in eating disorders, is the neurotransmitter dopamine. Dopamine plays a big role in reward-motivated behavior. When we eat when we are hungry, dopamine is released in the pleasure area of the brain (nucleus accumbens), meaning that our act of eating is rewarded. In people suffering from bulimia this rewarding system is way more active, while in anorexic individuals, this rewarding response is severely decreased. The urge for people suffering from bulimia to binge eat may result from this hypersensitive rewarding system. Similarly, when people with anorexia eat something after a period of starvation, the reward system will not respond as it would in healthy individuals. Moreover, instead of a reward response, a punishment response will be activated in people suffering from anorexia.

Eating disorders are deadly diseases that cannot be underestimated. While we know a bit about the role certain neurotransmitters play, it is essential to realize that these disorders go beyond some chemicals in the brain. The impact of eating disorders on the life of those who are suffering and those who care about them is bigger than we can imagine. Stepping on the scale is not easy for the majority of us, and the relationship between humans and food is still complicated. But please remember: your weight may fluctuate, but your worth will definitely not.



MUSIC SECTION

I'M IN LOVE WITH THE SCALES OF YOU



By Devi Sejkens

So, this edition's theme has put me in quite a conundrum. You see, the easy choice would be for me to talk about the musical scales, which are used to describe how certain notes relate to each other and are commonly used for things like guitar solos. The problem there, is that music theory is rather boring and I would like to write about more exciting music related things. So I thought about the band Dragonforce, or the theme song to dragon ball Z, or... yeah no all of those ideas suck too, so scales it is.



In order to get you guys up to speed, I would like to start with the 'easiest' scales of all: The chromatic scale. The chromatic scale is easy, because it contains all 12 notes in commonly used music. So if we start at C, the start of every scale is called the root note, the (ascending) chromatic scale is as follows: C, C# (or C sharp), D, D#, E, F, F#, G, G#, A, A#, B and then we get back to the root note C but an octave higher. This sequence is ascending, but of course we could descend the scale too, resulting in the inverted of the form I mentioned before. The nice thing for the rest of this piece is that with that form, we now have introduced all 12 notes in common western music. This will become handy when we look into other scales.

Now the forementioned root note becomes more important when we discuss other scales. The most commonly used scale is the major scale, and starting from the root, it takes the following pattern: whole step (ws), ws, half step (hs), ws, ws, ws, hs. Now, I already hear you thinking: 'Devi, what are these steps you're talking about?' I'm getting there. A whole step means 2 semitones, where a half step is only 1 semitone. Now we can look at this major scale, using the same root note as we used above, C. If we do this, the major scale in the key of C is as follows: C, D, E, F, G, A, B and back to root note C. Are you seeing why I used C as an example? The key of C major has no sharp or flat notes, only regular old letters. And what's fun about scales is that they relate to each other quite often. If we were to take a new example, the A minor scale, we would have a new start and a new form. The form for the minor scale is: ws, hs, ws, ws, hs, ws, ws. Now some of you might already have a sense of where we're going with this, but if you don't, this will clear things up. The notes in the A minor scale are A, B, C, D, E, F, G and back to the root A. Again, no weird sharps or flats, and actually the exact same notes as the C major scale. This is called a relative minor, and A is the relative minor to C. This means that although their root notes are different, you can essentially use the A minor scale to play on a song in the key of C major. And this applies to any scale, the relative minor is always 3 half steps lower than its relative major.

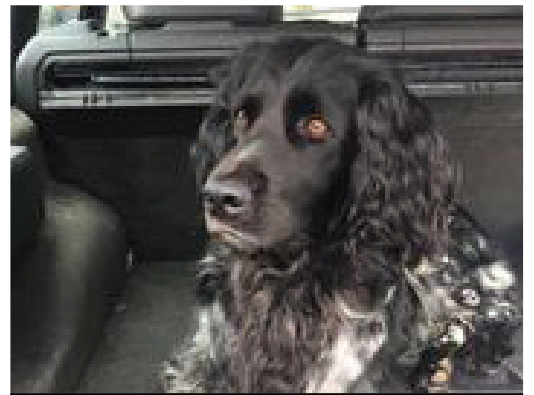
Now, there are tons of more scales that can be used, all of which have a different 'vibe' to them because of their different key signature. Most commonly used these days is the pentatonic scale, where there are only 5 notes in the scale. This and some other parts of music theory is what Ed Sheeran uses to literally only write hit songs. And if I'm being honest, the sound of a guitar solo using predominantly the pentatonic scale just hits my ears right. And that's not just because it's the only scale I've bothered to learn on guitar. I swear. Swear.



Bliss, *C. familiaris*



Harry, *S. s. domesticus*



Bruno, *C. familiaris*



Alfred, *P. campbelli*

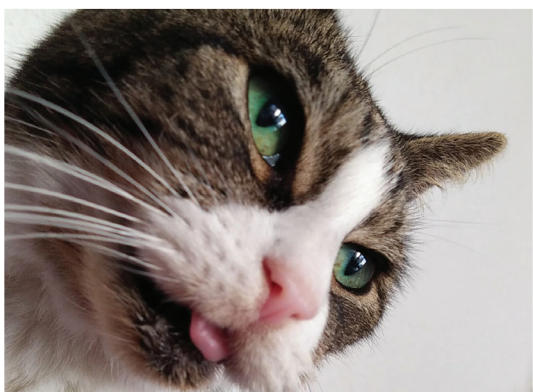


Karel, *F. Catus*

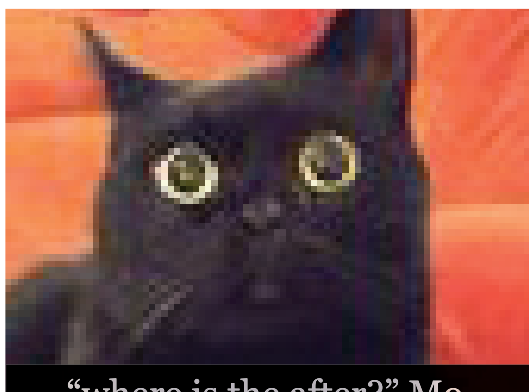


Ichiro "AJAX", *P. erithacus*

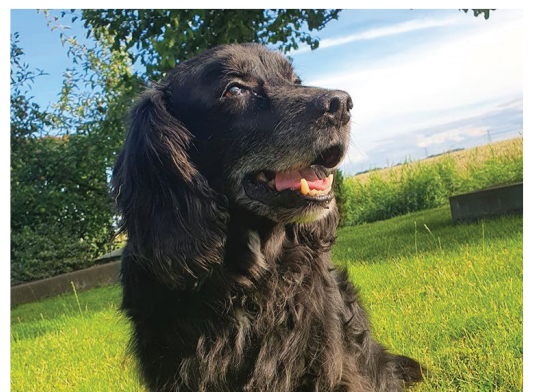
Khloe, *C. ducorspii*



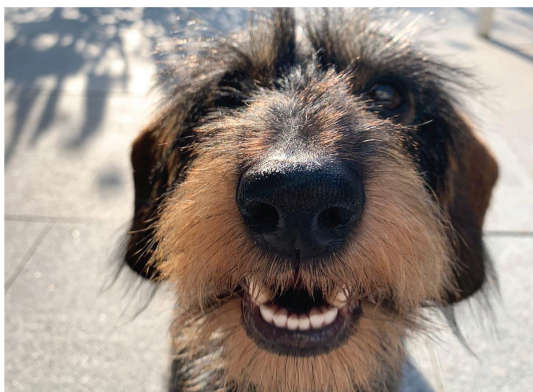
Kitty, *F. Catus*



"where is the after?" Mo,
F. Catus



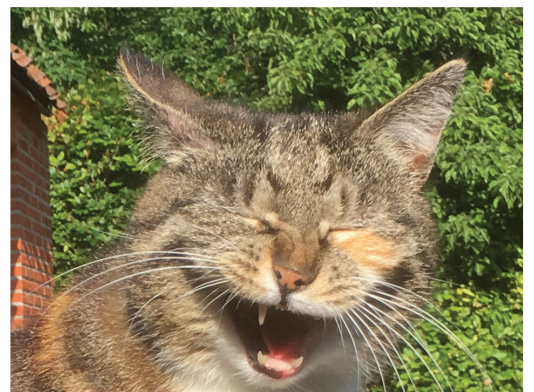
Dio, *C. familiaris*



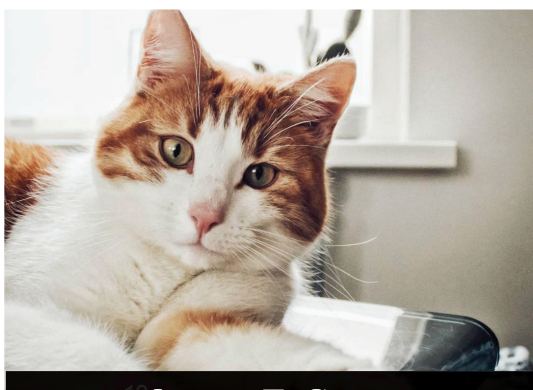
Yalu, *C. familiaris*



Gandalf, *R. norvegicus*



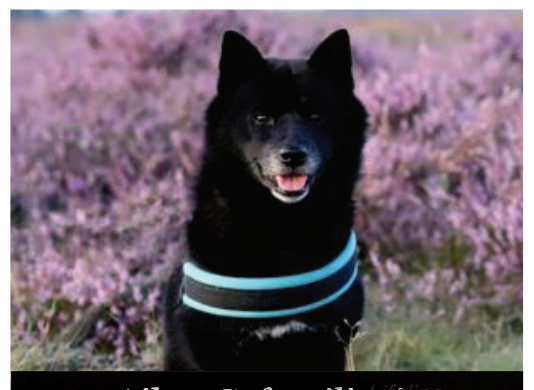
Luna, *F. Catus*



Oscar, *F. Catus*



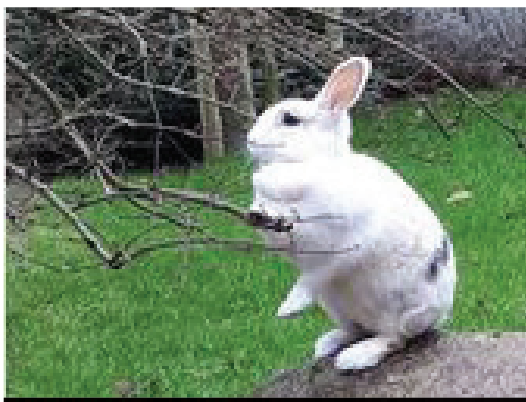
Remi, Kees & Michel Vlap,
G. g. domesticus



Aiko, *C. familiaris*



Sam, *V. komodoensis*



Rebbel, *O. c. domesticus*



"CB cat" Mango, *F. Catus*



Rocky, *F. Catus*



Emmy, *C. familiaris*



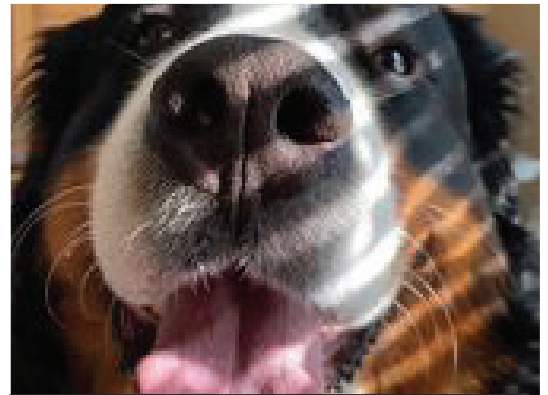
"Texel Lam", *O. o. aries*



"Duo of kittens", *F. Catus*



Joaquina, *R. caerulea*



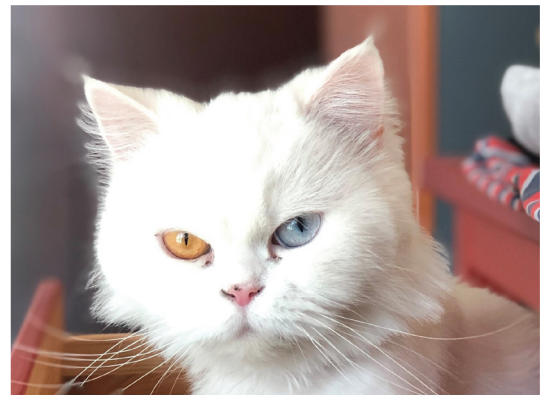
Buck, *C. familiaris*



Jut, *C. auratus*



Boef, *C. familiaris*



Lunca, *F. Catus*



Binq, *C. familiaris*



Koda, *F. Catus*



Rogier, *Brachiosaurus Pet*

FUN FACTS



THE DINOSAUR EDITION



By DINO<3lover

When we came up with this theme a problem immediately arose. Am I going to write about dinosaurs or about reptiles? Both are the love of my life and I didn't know what to pick. But when we had empty pages to fill, I knew exactly what to do. Write about both of course! Duh. So today I'm going to tell you some weird facts about or beloved dinosaurs, because that is what we need in life.

1 The time separating Stegosaurus (the one with the Doritos on its back) and Tyrannosaurus (the big not so vegetarian one) is greater than the time separating Tyrannosaurus and us.

2 Only 59% of U.S. adults know humans and dinosaurs did not coexist.

Tyrannosaurus Rex, Velociraptor (the one that Chris Pratt tamed), Gallimimus (it looks like a chicken), Triceratops (spiky rhino dino), and all other dinosaurs in the film Jurassic Park other than the Brachiosaurus (long neck boi), did not actually live during the Jurassic Period, but in the late Cretaceous Period.

3

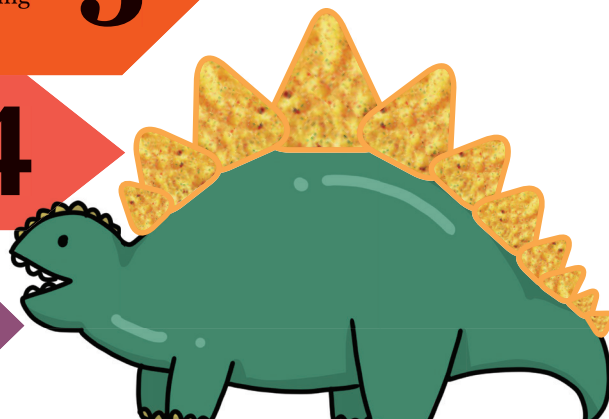
The Nigersaurus had +500 teeth: 50 columns with 9 replacement teeth behind them. The front ones would be worn out in just a month, making the Nigersaurus the fastest teeth-replacing dinosaur.

4



Prison officials has used the children's song "I Love You" by Barney the Purple Dinosaur as a form of torture in Guantanamo Bay. Let's be honest, that song is pure torture.

5



6

Some dinosaurs, such as the Apatosaurus, formerly known as the Brontosaurus, may have been able to break the sound barrier with their tails, creating a sonic boom.

7

The brain of the Stegosaurus (the Dorito boi) was about the size of one Brazil nut.

8

The fastest dinosaur was called the Ornithomimus, it could run nearly 60 km/h.

9

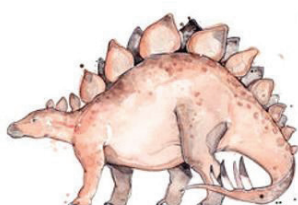
The biggest dino

-saur was called the Argentinosaurus, it was about 30 metres long and could weigh up to **100,000 kilograms!**

10

Most dinosaurs are actually vegetarian. A nice little way to tell if a dinosaur is an herbivore or a carnivore is by counting on how many legs it's standing on. I made this stupid rhyme in case you encounter a dinosaur and want to give it a good hug: Only standing on two, not good for you. Standing on all fours? He is all yours.

The moral of the story here is that dinosaurs are brilliant and fascinating creatures. They come in all shapes and sizes and there is still so much to learn about them.



STEGOSAURE



PTERODACTYLE



IGUANODON

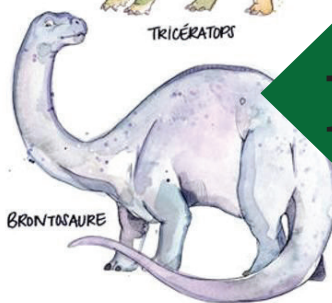


ANKYLOSAURE



TRICERATOPS

SPINOSAURE



BRONTOSAURE



WIGGLE WIGGLE WIGGLE



By Renate Kloostra

Snakes, murder spagurder, boop noodle, danger noodle, hazard spaghetti, et cetera. They may not be everyone's favourite creatures but they certainly are very fascinating creatures. These animals have been loved and feared for many years. But even though not everyone can appreciate them, you cannot argue the fact that they are very cool. Did you, for example, know that garter snakes have two penises? And even though snake penises are very interesting, they are, unfortunately, not today's subject. In this article, we will discuss the different ways in which a snake can slither and how it exactly moves its body.



Serpentine locomotion

A snake can move its body in 4 different ways. The first and most used method is called serpentine locomotion. This is the method that is mostly used by snakes, legless lizards (yes, they exist and no, they are not snakes), earthworms, and other limbless creatures. In this method, the body makes a series of horizontal loops shaped like an S, each one of which pushes away all the resistance underneath the snake. As you can imagine, creatures that use this method are unable to move on surfaces with no resistance like glass.

Concertina or accordion

The second method is called Concertina or accordion locomotion. In this method, the snake twists or turns its body, until it contracts very tightly. Then it lets go, and like a kind of "spring" system, the snake moves forward. This one is common in burrowing snakes.

Sidewinding

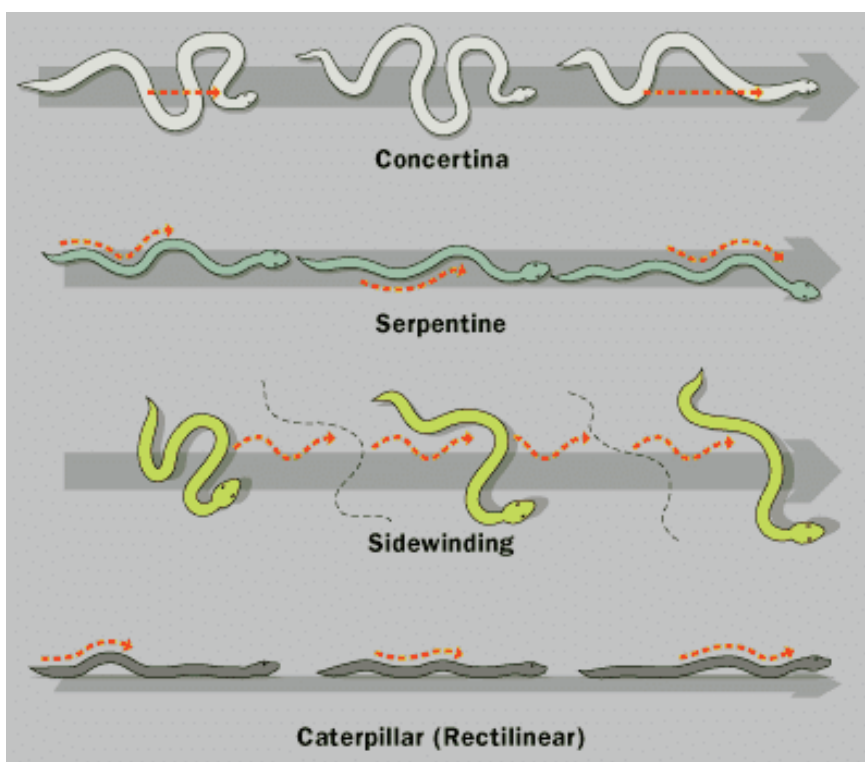
The third method is used mostly by snakes that live in the desert. In this method only

two parts of the snake touch the ground. The rest is lifted off the ground. The body moves in a set of sinuous curves. The snake, lying extended on the sand, lifts the anterior part of the body, moves it several centimetres to the side, and rests that part on the sand, maintaining the rest of the body as a lifted loop. This loop is then progressively shifted along the body to the end of the tail, at which time the entire snake has moved to the side from its previous position.

Rectilinear locomotion

Last but not least is rectilinear locomotion. In all the previous methods, snakes had to form several loops with their bodies to move forward. In this method, snakes move forward in a straight line. This one is used mainly by larger snakes like pythons and boas. In this one, the muscles are used for lifting, anchoring, and pushing against individual ventral scales, which results in an inching along.

You still may not like snakes after reading this article. Of course, that would be weird because they are stinking rad, but there are always a few special snowflakes amongst you. But the point is that whether you like them or not is not that important. Just like all other creatures, they do deserve your respect. So the next time you see a snake, and you think it's scary, just remember: All it wants to do is have a good life and slither away from its problems.



FISH SCALE DISEASE

BEING A 'MER-PERSON'



By Roos Slijfer

You know how when you were little you wanted to be something? Like a professional footballer or a ballerina or an astronaut. Well, some of us wanted to be a mermaid(or man). Unfortunately for some people this became kind of true. You see, the tail of a mer-person is covered in scales. These fish-like scales are perfect to discover the wide open sea. Some people, however, experience these 'scales'. They can be covered from top to bottom. This skin condition is called Ichthyosis vulgaris (ik-thee-O-sis vul-GAY-ris). It is an inherited skin disorder in which dead skin cells accumulate in thick, dry scales on your skin's surface. The scales of ichthyosis vulgaris, sometimes called fish scale disease or fish skin disease, can be present at birth, but usually first appear during early childhood. Sometimes, mild cases of ichthyosis vulgaris go undiagnosed because they're mistaken for extremely dry skin.

Most cases of ichthyosis vulgaris are mild, but some are severe. Sometimes other skin diseases, such as the allergic skin condition eczema, are associated with ichthyosis vulgaris. No cure has been found for ichthyosis vulgaris, and treatments focus on controlling the condition. Thus, unfortunately, there is no cure yet. Controlling the condition means managing the symptoms: dry, scaly skin, tile-like small scales, Scales coloured white, dirty grey or brown with darker-coloured scales typically on darker skin, flaky scalp and deep, painful cracks in your skin. Ichthyosis vulgaris slows your skin's natural shedding process. This causes chronic, excessive build-up of the protein in the upper layer of the skin (keratin).

There are four types of ichthyosis vulgaris that are 'common':

- 1. Autosomal dominant ichthyosis vulgaris**

This is common with 0.25% of the population. Baby's commonly have a normal skin at birth, when they get older a white shimmering gets over the body.

- 2. X-bound recessive ichthyosis vulgaris**

The skin shows more symptoms. This type only occurs in men (1:2000,1:6000). Big dark diamond-shapes flakes are a clinical phenomenon for this type.

- 3. Autosomal recessive ichthyosis vulgaris**

This rare type of this disease is seen in both genders (1:100.000,1:250.000). The disease already starts at birth and features as a sort of wrapping around the body. This disappears over time, but the skin underneath stats red, scaly and tight around the body.

- 4. Epidermolysis hyperkeratosis**

This disease is also seen at birth. The child shows blisters on its high-red skin. These blisters heal over time but it leaves thick scales on the body and armpits. (1:100.000,1:250.000).

There are some other forms of ichthyosis, but these forms also cause other organs than the skin to be affected by the disease and is, therefore, really severe.



PLEASE, DO TRY THIS AT HOME

SOG'en



By Prof. MD



EXPERIMENTS TO TRY AT HOME!

BETTER SAFE THAN SORRY, WEAR PROTECTIVE GEAR

Uni has started again, meaning there are also some new freshmen. For your amusement and to educate the freshmen with some new student-slang, we are going to talk about SOG'en. SOG stands for 'studie ontwijkend gedrag' (=study evasiveness or study avoiding behaviour). You can SOG in many different ways. I, professor MD, put down the different scales of SOG'en. This is so you can see how much trouble you are in for your exams, and if you maybe get a student-10 (=the bare minimum to get your ECTS or a 5,5). This scale will work from 0 to 10. Let's get started!

0/10: Making a plan, actually sticking to the plan, and getting a nice grade.

1/10: Making a summary of the lectures and the right parts of the book. Additionally, you have also been nice and shared it with your friends. Afterwards, you get a nice grade and send your summary to the Idun board to help even more students.

2/10: Going to all the lectures and paying full attention (even if you have a killing lecture of 4 hours). Studying your lecture notes and being a smart nerd learning biology, you will get a nice grade with an effort of 70%. Because you could also make a summary but nah, too much work.

3/10: Going to all the lectures but living on coffee. Also, the lecturer is talking way too fast and half Dutch-English, so it doesn't make sense, and as a result, your notes don't make sense either. Still, that nice summary on the Idun summary base helps to clear up some of the blanks in your head.

4/10: On Nestor, you have the option of looking into the slides of your upcoming lectures. Seeing that your lecturer will talk 3 hours only on mitochondria doesn't stimulate enough motivation to actually attend the lecture. Who needs a 3-hour lecture about mitochondria when you have incredible mitochondria memes on the internet, right? But since this is the only lecture you skipped and you got the notes from a nice friend, you pass the exam.

5/10: You have been to most of the exams, only the 9 A.M. lectures were pretty hard to attend since you had a hangover most of the times. Why? Beer, that's why! But a week before the exam, you don't go partying anymore and lock yourself in the

UB (university library). You study your ass off and get a nice 6 or higher.

5.5/10: You know what you have to do to get a 5,5. So that's the only effort you are going to put in. Taking some risk and gambling with your grade, it maybe turns out to be a 6 with some luck. However, it can turn out bad, and you have to do the resit.

6/10: Going for the resit already because you have been SOG'en the last few days. Only 3 days for the exam, you started to lock yourself up in the UB and tried to play the UB out (= "de UB uitspelen" in Dutch, meaning staying in the UB until it closes).

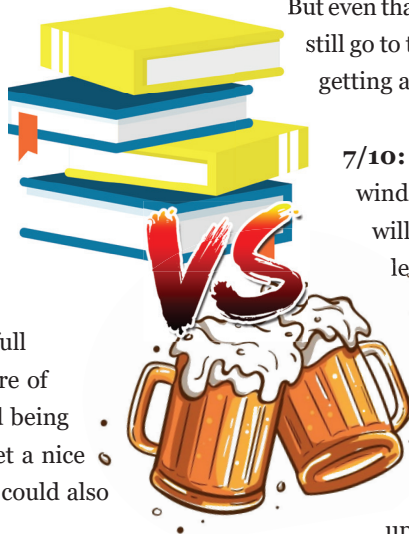
But even that didn't help to go through all the material. So, you still go to the exam to write down something in the hopes of getting a sufficient grade.

7/10: Going to the UB, but instead of studying, you wind up talking to your friends all the time, and you will not get through the material fast enough. But at least you are together with your friends in one and the same bio-SOG-boat. Of course, your smart ass friend gets an 8 with no effort, and you plus your best bio-bud have to do the resit. While studying for the resit, you and your bio-bud start having the same pattern as before. You talk way too much instead of studying. Ending up gambling your grade and maybe have to do the course again next year.

8/10: just going for the resit; why study the first time if you can do a nice resit? But only read a summary of the summary database before the resit.

9/10: the night before the exam, you and some friends decide to go 'kleintje stad' (=a small tour through the poele and the peperstraat) instead of laying in bed before 2 AM as you promised yourself, you are sitting at 5 A.M. at a Turk (=where they sell sandwiches döner) with your drunk head. You forget to set the alarm, and you sleep through the exam. At least you had a nice night tho!

Idun/10: (=10/10) Going to Idun Night before the day of the exam, which always escalates, but you already knew that. You also don't care if the exam is your first, second, third, or fourth-time go of that course because it is Idun Night.



A CHAT WITH ...

Prof. Rampal Etienne



By Dana Frank

As the resident Lifeline interview journalist, when the pandemic hit, a (minor) concern of mine was whether or not I should continue doing this section. Like with everything these days, there just seemed to be so many more barriers to overcome. Since I used to do this in person, my fears were rooted in the notion of dry, short, unelaborated answers. I tried anyway, and luckily for me, I approached Prof. Rampal Etienne. Rest assured, no color was lost through online correspondence.



When did you realize you wanted to become a biologist? Very late. In fact, in high school, we had no biology in the third year, and after the second year, I was happy that I would never have biology again. Then, in the fourth year, I (reluctantly) chose biology. Then I went to the US as an exchange student in high school. After a week or so of biology classes, I asked whether I could switch to psychology (mostly because the teacher was very demanding and hoping for an easy year). After I returned, I studied physics and environmental science. I applied for three different Ph.D. positions, one in solar cell physics, one in environmental science, and one in theoretical biology. I was offered all three of them. I eventually chose the one in biology.

Where do you spend most of your workday? Who are the people you work with? In my office or at home (due to corona). I work with collaborators from many places, particularly

with Bart Haegeman, who is in Moulis, France, and Luis Valente, who is at Naturalis. And of course, I work with my Ph.D. students and postdocs. It is often very rewarding to see them grow from student to collaborator.

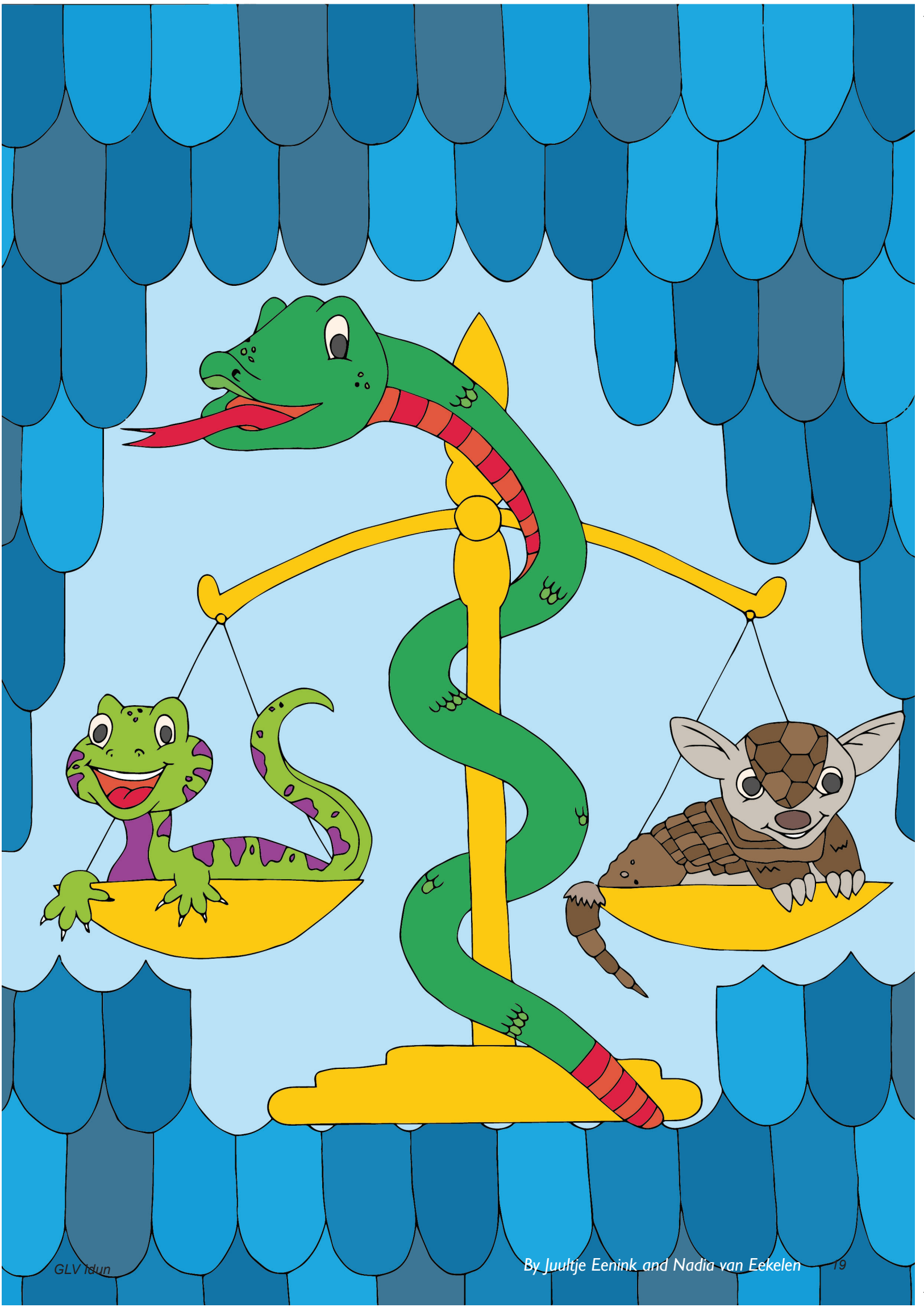
Favorite thing to do when you're not working? I like to make music, both writing new material and playing it (guitar or piano and singing). With some of my (ex) MSc and Ph.D. students, I play in a band called The Happy-Face Spiders, named after the Hawaiian spider, that looks like a happy-face. We have a website www.thehappyfacespiders.nl, and a YouTube channel with live recordings. I'd like to do more studio recordings because we have over 50 tracks, most of which we have never recorded (except on our phones as a reminder of how it should sound) or played live. My dream would be to record them all with a professional producer, but that will cost a fortune. And then, of course, score a big hit, so rather than writing grant proposals, I would write songs to get money for research :-)

What is your favorite/least favorite part of your job? I like problem-solving, a mathematical problem or a programming problem. They can drive me nuts sometimes, but it is a great feeling to find the solution. I also like discussing science very much, thinking about interesting problems and possible directions for solving them. It is also a rewarding feeling when a student sees the light, i.e., gets a deeper understanding. I don't like bureaucracy: filling in endless forms and writing reports about meetings etc. Basically, all the bla-bla around things.

What's the most exciting development in your field in the last 10 years? What will be the most exciting development in the next 30 years? At the risk of sounding arrogant, I believe our work on island biogeography is one of the major advances in the last 10 years. If I knew what the most exciting development in the next 30 years was, then I would probably be doing it ...

Do you have a favorite plant/animal? I don't have a favorite animal or plant. I think every animal or plant species has a cool story once you get to know it. If I have to name one, then the Happy-Face Spider perhaps. Or the daisy, as we named our island biogeography R package after it (DAISIE, acronym for Dynamic Assembly of Island biota through Speciation, Immigration, and Extinction).

What advice would you give undergraduates interested in pursuing a career in academia? Follow your heart. I actually wrote a song with that same title, not directly aimed at undergraduates, but to people in general, but young people have the most opportunity to do so!



LIFELINE REVIEWS

Guys, it has happened. Unfortunately at the time I'm writing this, the Dutch government has just announced a new set of measures to combat the spread of Sars-CoV-2, also known as the coronavirus, the 'rona, Covid-19 or just corona. Although there's no complete lockdown (yet?), we will inevitably spend more time at home. And like most of you, my room is quite depressing. We here at lifeline think it is important we help our readers improve their overall mood and because of that, we will provide you with essential knowledge in this review. Today, we review plants, in an effort to help you cheer up your room/home/living space underneath a bridge somewhere.

First off, you should know that for most of these, there are several types of specific plants. So if after this review you think you should get a cactus, you can still pick which one you think is the cutest! Now, to the important part: We reviewed 6 (groups of) plants. Monstera deliciosa, succulents, cacti, pancake plant, grass plants and ferns. To get to a somewhat coherent review, our lord and savior Dana developed a rubric scale to which the plants could be ranked, based on liveliness, ease of care, beauty, pot, growth speed and any other business. Through this rubric, 10 of our members gave every plant a grade, which we will then average to draw the most epic lifeline review conclusions you have ever read.

Grass plants – 7.22

Fans of this section know I like to work from the bottom up when I write these. So you might be surprised to find that the first plant we review has a 7.22 average score. No, we're not switching it up, this is actually the lowest graded plant! Our plant expert Jasper said: 'High on beauty, also easy. Everything is good about it actually.' While Roos' low grade might be attributed to her grass allergy. All and all grass plants can be considered very nice and easy to take care of, but maybe not very special.

Ferns – 7.75

Next up we have the ferns. Overall very nice plants that you can find in all kinds of varieties. How nice they are is reflected by their overall score of 7.75. Anette said: Jurassic Park! I love it, makes you feel like you are the dinosaur! While Marit is afraid this one is not for her, as she struggles to keep plants alive to begin with, and ferns are notoriously hard to tend to. I would like to call this a high risk high reward level plant, only suitable for natural talents or very experienced plant parents.



HOUSE PLANTS



By Devi Seijkens



Pancake plant – 7.9

Up next we have the pancake plant. Personally, I am a huge fan of pancakes (My mom makes the best ones don't even start with me) so this plant has always excited me. Can be a bit of a diva, but is a favorite among a lot of our panel. Fotini mentioned: 'It's too... round. It looks like it tried so hard to be the perfect plant, but something went wrong somewhere. Gets points for effort though.' And I think this is a decent summation of the critical side to this wonderful plant. Also, this plant makes more babies than most rabbits, so prepare to get a nice big family of them if you decide to get one!

Cacti – 8.07

Oh boy, did things get close here! Between numbers 2 and 3 we only found a difference of 0.01, and unfortunately the cacti were on the wrong end of the stick. Pros: Impossible to kill. Cons: Might kill you. Because of this, our plant expert Jasper thinks they are too boring, but Marit actually shares cacti with her friends as a token of their friendship, which I think is a very nice way to remember your friends in these trying times.



Succulents – 8.08

Like I said before, edging out the cacti are the succulents. These are an absolute favorite among our panel. They are cute, they are squishy and they will love you just as much as we love them. Very hard to kill, although Renate, Marit and Meiske have managed to do so. Kudos ladies! Nadia says: 'Big fan of succulents, they are little fatties and easy to care for.' While Juultje mentioned: 'Cute, versatile and easy plants! Love them!'

Monstera deliciosa – 8.2

Last but not least, the Swiss cheese plant. You can put things through their holes. This plant gives you nice jungle vibes, while most of our panel that possess one are able to keep them alive. They can provide you with a very healthy dose of oxygen, while spicing up your room like a boss. Our most critical member said that the air roots freak her out. Well, if that's the only critique, this plant is our absolute winner!



Overall conclusion

Right of the bat, we can conclude that lifeline members LOVE PLANTS. In all my years as editor for our lovely magazine, never have I seen high scores across the board. The average scores given by our individual panel members were even higher than those of the amazing plants. So, sure, you should probably get the Swiss cheese plant as soon as possible, but really, just make sure you get plants for your home. Get them now while we are still allowed to leave our houses!

BAS EN Z'N BEESTJES

Beasts by Bas



By Bas van Boekholt

The corona crisis has delayed or ended a lot of things and managed to dislocate our precious society. However, luckily there are a few constant factors to stabilize us in these troubling times. One of them is that this year four new animals will be added to the Bas en zijn Beestjes hall of fame. Four new weird and wonderful creatures that I will tell you about in all their glory. Every dirty little secret and glamorous ability will be brought to light. While the whole world was being pushed inside by this invisible enemy, I spent my time going through the ancient scrolls to give you my favourite four beasts. What normally happens is that I get contacted by the chair of the lifeline and they give me a theme and a deadline. Usually I throw the theme out of the window and kind of forget about the deadline. But this time, the theme of scales finally seemed like an interesting one to follow-up on. A normal person would think in the directions of reptiles and fish, but not me. I am looking for scales where they are not common. Normally I would have gone for the pangolin as one of the few scaled mammals. But with their recent attention I am favoured to their similar formed cousins. In addition, scales made of keratin are overrated, this badass grows them from bone, making them part of their skeleton. As you might have guessed, this edition Bas en zijn beestjes introduces to you the amazing Armadillo.

Armadillos are part of the order of Cingulata, which consists of two families the Dasypodidae and the Chlamyphoridae. The name armadillo comes from Spanish where it literally means: “little armoured ones”. While this is a great name, the Aztecs had even a better name: āyōtōchtli, which means turtle-rabbit. That is exactly what armadillos are, because even though they wear their heavy plated armour they can easily reach speeds up to 48 kilometres per hour! That is even faster than Usain Bolt’s top speed during his world record 100 meter race. There are 21 species of Armadillos that all live in the Americas. The smallest armadillo is appropriately named the pink fairy armadillo (*Chlamyphorus truncatus*), has the size of a squirrel and weighs less than 100 grams. On the other side of the spectrum is the giant armadillo (*Prionomys maximus*) which can be up to one and a half metres high and weigh almost 60 kilos. This colossal is not only impressive but also holds the doubtful record of the mammal with the most teeth, it has somewhere between 70 and 100 of them.

While armadillos are often associated with the ability to roll themselves up, actually only the three-banded armadillo (*Tolypeutes tricinctus*) is able to do that. Other armadillos came up with other defence mechanisms like the screaming hairy armadillo (*Chaetophractus vellerosus*) which does what is it

named after and screams like a pig when it is disturbed. The nine-banded armadillo takes another approach and can jump up to over one meter when it is scared. Unfortunately, this does not save him from traffic as they jump into the underside of moving vehicles, which is why they are nicknamed “speedbumps” in the state of Texas where they reside. The armour that protects them from predators can also be a hinder as its weight avoids them to float. Luckily armadillos can hold their breath for six minutes, so for small rivers they just walk across the bottom. For larger rivers or lakes the armadillo has come up with some clever tactics. It pumps air in its stomach and intestines which then take the role of a lifejacket so the little creature stays afloat.

While there are still some awesome facts left (like the fact that they are the only animals, with the exclusion of humans, that can carry and spread leprosy or the fact that a female armadillo can hold their eggs for two years but also give birth to four identical babies from one egg), it is time to end the chapter about my friend the armadillo. While their outfit alone deserves them a place in the hall of fame, armadillos are so much more. They show that, even if from afar they might seem like a one-trick pony, there is more to discover if you just give them a better look. So go out in the world (but keep a distance) and give the mundane another look. Maybe there is something else underneath that armour that is worth to be discovered.



INTRODUCING...

Laurens

What's up, fellow Idunaren! My name is Laurens and I'm glad to tell you that I got the chance to make the Lifeline hopefully a bit better and interesting with my presence. I am 20 years of age, first-year biology student and was born and raised in the most beautiful city of the Netherlands called Nijmegen. As a proud Nijmegenaar I own a few traits, which are impossible to miss. Three of those are that I always want to win at everything I do, I am always up for a party and I am a bit of a perfectionist. But now that I live in Groningen I have to share my love between both cities. Besides being a true patriot, I enjoy cooking, going out into the wilderness (like a real biologist) and fancy a drink with the boys at least once a week. Apart from the things I do in my spare time, I'm currently training for the competitive rowing team of Gyas and working in the kitchen of a restaurant as "chef de garde manger". I hope you will like what I am going to write and do for this beautiful magazine and hopefully I will see more of you guys soon, when Covid is no more.



Anette



Anette, that's me, is totally in awe to introduce herself as a new member of the coolest magazine in the city - Lifeline! My origin is in Estonia, a small (as large as the Netherlands but has 18 times fewer people) country in the North-East of Europe. How did I end up on the other side of the continent? Well, I am a first-year student of Life Science and Technology, hence a science enthusiast, but that is not all that is to me. I also am a proud nerd, will argue over which is superior: Star Wars or Star Trek, a night-time artist, professional Netflix binger, and under-my-desk-yoga-guru. If anyone ever needs to get me excited and happy, a Shiba inu picture or a bookstore date will do it immediately. I can't wait to explore beautiful Groningen and give my contribution to this amazing magazine!

Fotini

Greetings my dudes, I'm Fotini, Fofo or even fotfot, as you wish. I'm Greek, but came from the majestic Grand Duchy of Luxembourg to study Biomedical Engineering :) Some facts about me, more or less interesting, or even useful: the human body has fascinated me since I was a kid, but didn't want to become a doctor, hence my choice of studies; I can lick my elbow; I love niche "fun" facts, unearthed from the deep end of Wikipedia; I very much love to draw. In fact, what first drew me to the Lifeline (haha) was a cover I spotted during the intro day (kudos to Jasper, his work is awesome); as soon as I opened the copy, I thought "wow, not only is this aesthetic, it's also hilarious and extremely interesting, I need to join". So here I am! I hope you'll see more of me soon, maybe through some drawings, some weird facts, who knows? Anyhow, bisous bisous,



IDUZZLE...



By Juultje



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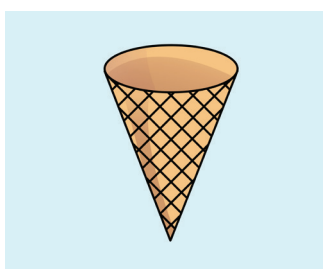
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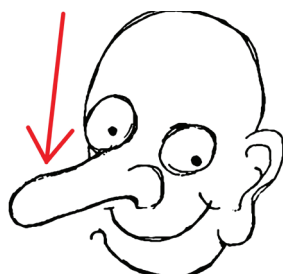


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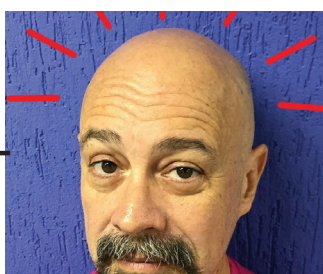
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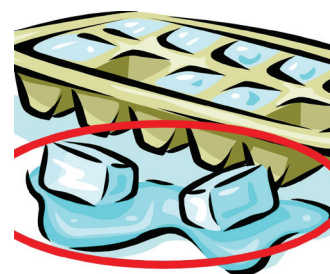
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-f, -r

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The previous Iduzzle was won by **Kas Bijker**. Congratulations! He has won a marvelous prize, which he 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 January 5th.

Answer to iduzzle 60: The most beautiful letter in the alphabet is the sixth.