

LIFELINE



design by Susan Zimmerman

Lifeline 57
Year 14 Edition 1

GLV Idun

Alien

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PREFACE

Dear reader,

With a lot of joy, I present the first Lifeline of the academic year to you! For this edition, we wanted the new first-year students to design a poster, like we do every year at the Introduction Day. The hardest part is coming up with a theme in which it is easy to quickly paint something, since there is not a lot of time. That's how we came up with the current theme: 'Alien'. Everyone painted aliens, spaceships, stars and moons, and slowly it became a chaotic masterpiece. But the word alien not only refers to the weird extra-terrestrial creature from another planet, it also means foreign or strange. Topics in these categories are not hard to find in biology. In this edition you can read about the foreign body reaction, extra-terrestrial life, astrobiology and much more! Lastly, I would like to thank Devi for being our chairman last year and making sure that four amazing Lifelines were made. Enjoy reading and try to find your own creation on the poster on page 23!

Hugs and kisses,

Nadia van Eekelen

Lifeline editor in chief 2019-2020



Dear reader,

Congratulations! In front of you lies the first edition of the Lifeline of this academic year and my first Lifeline piece to write to you. After a well deserving summer break, the editors of the Lifeline worked hard to make sure that the 57th edition of our association's magazine would be ready for you. To many of you this will be the first encounter with the magazine made by the artistic and creative minds of the editor committee. The Lifeline will be published four times a year with a new theme every edition filled with all types of facts around Idun and the scientific world!

The theme of this Lifeline, "Alien", is especially interesting in the scientific world, but also in day to day life. As first year student introduced to the Groningen student life, you might feel like an alien sometimes. Being new in a foreign city, not knowing many people, a new house, or even a new language and culture can make you feel this way. But no worries, the board is at your service. Enjoy reading more Alien-themed articles in this Lifeline

On behalf of the fourteenth board,

Sami Balahsioni

Chairman of GLV Idun 2019-2020

The Lifeline is the independent textual organ of the Groninger Levenswetenschappen Vereniging (GLV) Idun and is released quarterly.

Number of copies: 350

Printed by Orangebook, Rijen, November 2019

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SCIENTIFIC NEWS

Nobel Prizes 2019

By Lars de Ridder

Nobel Prize in Physiology or Medicine

“The Nobel Prize for Physiology or Medicine 2019 is awarded to William G. Kaelin Jr., Sir Peter J. Ratcliffe and Gregg L. Semenza. They received the award for their discoveries of how cells sense and adapt to oxygen availability. They discovered how cells can sense and adapt to changing oxygen availability. They identified molecular machinery that regulates the activity of genes in response to varying levels of oxygen.

The seminal discoveries by this year’s Nobel Laureates revealed the mechanism for one of life’s most essential adaptive processes. They established the basis for our understanding of how oxygen levels affect cellular metabolism and physiological function. Their discoveries have also paved the way for promising new strategies to fight anemia, cancer and many other diseases.” (Nobel Prize Organisation, 2019).



William Kaelin, Peter Ratcliffe, Gregg Semenza

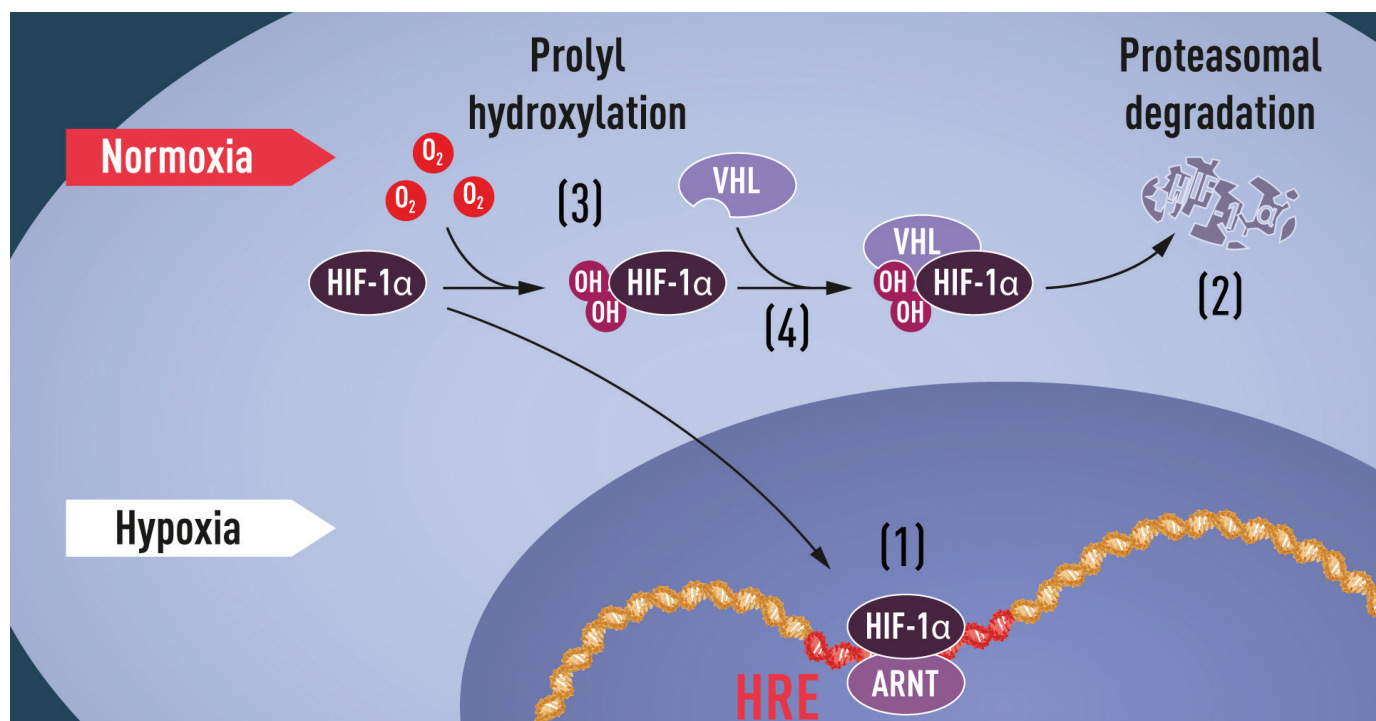


Figure 1. When oxygen levels are low (hypoxia), HIF-1 α is protected from degradation and accumulates in the nucleus, where it associates with ARNT and binds to specific DNA sequences (HRE) in hypoxia-regulated genes (1). At normal oxygen levels, HIF-1 α is rapidly degraded by the proteasome (2). Oxygen regulates the degradation process by the addition of hydroxyl groups (OH) to HIF-1 α (3). The VHL protein can then recognize and form a complex with HIF-1 α leading to its degradation in an oxygen-dependent manner (4). (Nobel Prize Organisation, 2019).

Nobel Prize in Chemistry 2019

“The Nobel Prize in Chemistry 2019 rewards the development of the lithium-ion battery. This light-weight, rechargeable and powerful battery is now used in everything from mobile phones to laptops and electric vehicles. It can also store significant amounts of energy from solar and wind power, making possible a fossil fuel-free society. Lithium-ion batteries are used globally to power the portable electronics that we use to communicate, work, study, listen to music and search for knowledge. Lithium-ion batteries have also enabled the development of long-range electric cars and the storage of energy from renewable sources, such as solar and wind power.” (Nobel Prize Organisation, 2019).



Akira Yoshino, M. Stanley Whittingham, John B. Goodenough.

Nobel Prize in Physics 2019

“This year’s Nobel Prize in Physics rewards new understanding of the universe’s structure and history, and the first discovery of a planet orbiting a solar-type star outside our solar system. James Peebles’ insights into physical cosmology have enriched the entire field of research and laid a foundation for the transformation of cosmology over the last fifty years, from speculation to science. His theoretical framework, developed since the mid-1960s, is the basis of our contemporary ideas about the universe. The Big Bang model describes the universe from its very first moments, almost 14 billion years ago, when it was extremely hot and dense. Since then, the universe has been expanding, becoming larger and colder. Barely 400,000 years after the Big Bang, the universe became transparent and light rays were able to travel through space. Even today, this ancient radiation is all around us and, coded into it, many of the universe’s secrets

are hiding. Using his theoretical tools and calculations, James Peebles was able to interpret these traces from the infancy of the universe and discover new physical processes. The results showed us a universe in which just five per cent of its content is known, the matter which constitutes stars, planets, trees – and us. The rest, 95 per cent, is unknown dark matter and dark energy. This is a mystery and a challenge to modern physics.” (Nobel Prize Organisation, 2019).



James Peebles, Michel Mayor, Didier Queloz

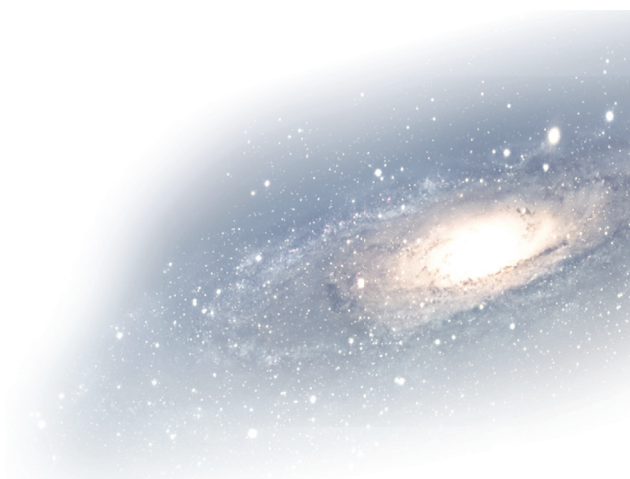
CONVERGENT EVOLUTION

A tool for extraterrestrial speculation

By Dana Frank

What is the probability of life? How likely is it that Earth is just one in a sea of life-bearing planets? And if life is not a unique manifestation, how probable is it that fellow life forms, residing in our universe, look like us?

Critics tend to argue that the Hollywood portrayal of the humanoid alien is somewhat unimaginative. Indeed, taking into account the array of possibilities through which bodies could come about, a Spock-like creature seems almost lazy. How much inspiration could have gone into the conjuring of a bipedal, intelligent being with two arms and forward-looking eyes? After all, evolution doesn't have a limit. Natural selection isn't inevitable.



But what if there's a good reason we look the way we do that extends beyond only chance. It may be that the inhabitants of our own planet constitute a model of what we might expect to see elsewhere in outer space. Notably, the instances in which a trait has appeared more than once independently. In this case, convergent evolution could be invaluable to the endeavour of astrobiology.

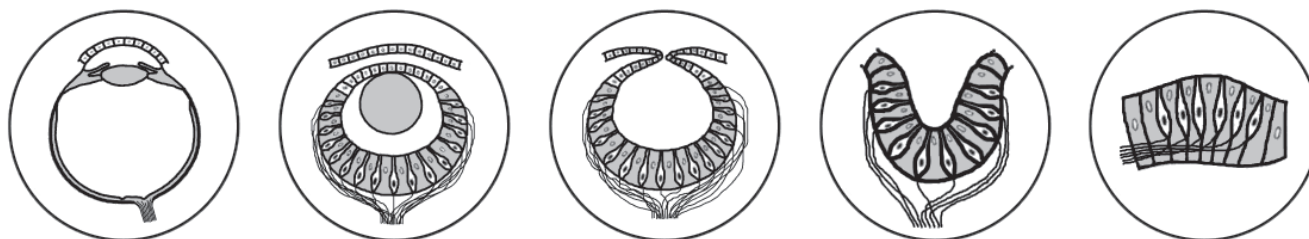
There is something special about unoriginal phenotypes. If you decided to spend some time perusing the entire known catalogue of natural history, you would find that eyes have evolved

about fifty times, echolocation four times and ears at least twice, separately for reptiles and mammals. This is very revealing. We can speculate that the more times something has been selected for, the more confident we can be about its 'usefulness'. We can then let our planet be our sample of possibilities for life, and go about quantifying the arisings of a bunch of distinct traits. From this, we can get what will at least be a pretty decent guess of what to expect in extraterrestrial biology. After that, Spock doesn't seem entirely ridiculous.

But perhaps even more spectacular than the sheer number of convergences is the similarities between the physiology of the convergent organs themselves. You could argue that the reason for the similarities on Earth is the homogenous environment. Of course, different planets are likely to have other selection pressures. But Earth-like planets are not as rare as we once thought. Given the presumption that life was not a singular event, the chance that it would exist on another 'Earth-y' planet is plausible.

It may seem stupid to presuppose a chemical homology between life as we know it and any other kind. It may be the case that life emerged differently, through a non-carbon system somewhere else in the universe. But if we consider elements it takes to build an organism and then think about the relative abundance of those elements, we notice something striking. Excluding helium, the two sets of elements are identical; the ones required for life just so happen to be the most plentiful (except for helium but it's chemically inert, so it's useless for life anyway).

Taking everything I've just mentioned into account, this is what I can tell you: Life arose on Earth, using the most common ingredients in the universe, building the same structures over and over again. With this in mind and the knowledge that Earth is not a unique place either, the likelihood that extraterrestrials could be at least somewhat familiar is no longer inconceivable. Maybe, creativity is not as necessary as we thought.



Meet the S.L.A.K.



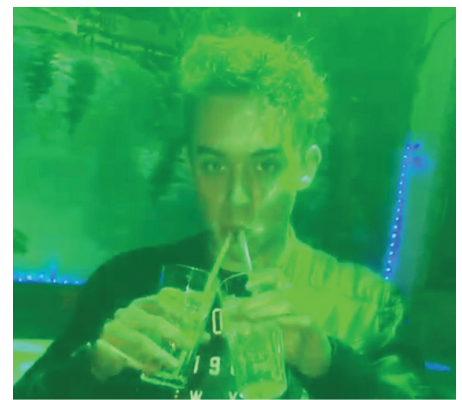
Jesse

1.95, looking for someone tall and blonde, 'If drugs were bad for you, they'd be illegal.'



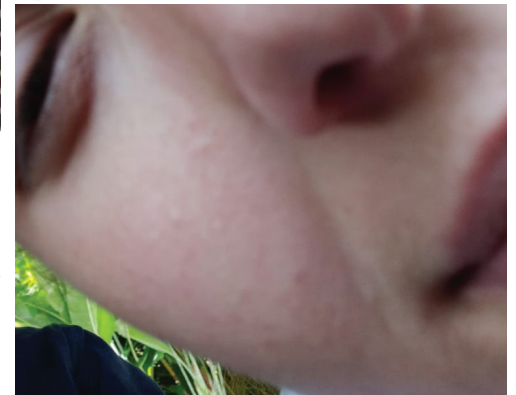
Vranka

Takes too much time, meow, is tall and blonde, 'We laughed, we cried, we frenched.'



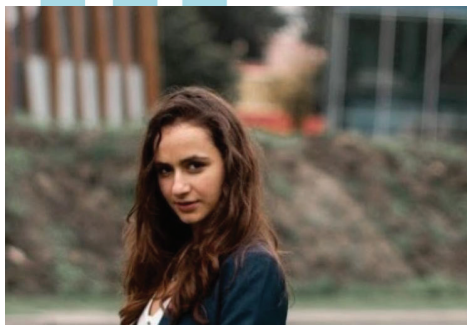
Bram

Son of god, benced 20kg, will you be my #263? 'My body is a temple.'



Noortje

Don't like me, only here to check if my boyfriend is on Tinder.



Emma

I'm in a board #publictransport 'Is it the color of my skin?'



Anouk

'I was hired by SLAK because I'm tall and blonde.'



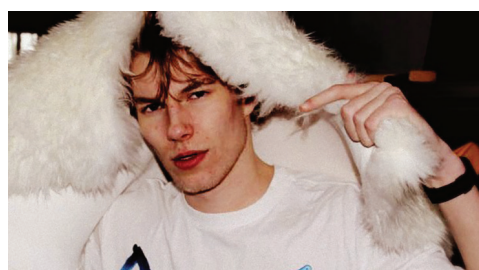
Lidwien

Is this ebay? Who would like to buy a water boiler for 10 euros? Free shipping!



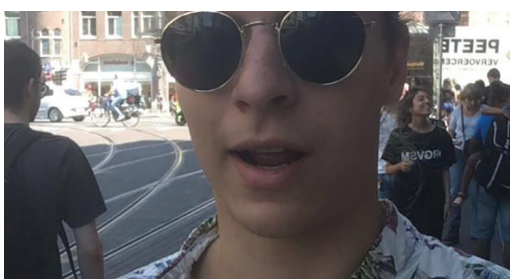
Beauner

Looking for a sugardaddy to pay for tuition. My heart is in Africa, your dick too?



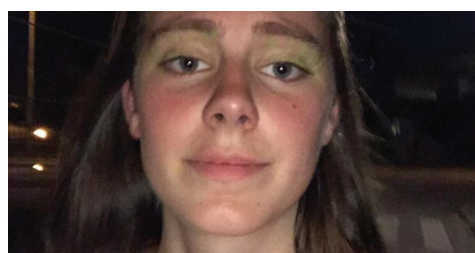
Ruben

Joined SLAK because I'm tall and blonde. Length: 120 cm, 'Get money fuck bitches'



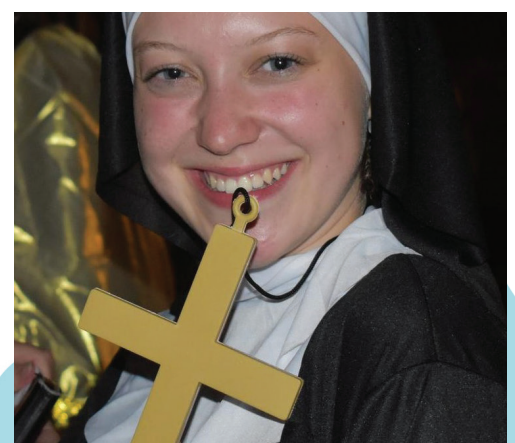
Dirk

It's really over between me and my ex now. 'I want to misbehave in a place meant for children'



Marjorie

Still waters run... 'I don't have anything to confess right now, but I'm gonna get some tomorrow!'



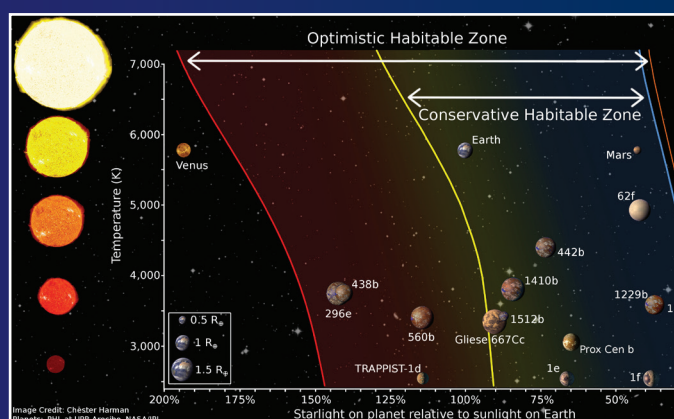
Flo

Not fat, but diabetic. You are allowed to look at my crotch. 'I want to do something illegal this year.'

Studying the E.T.

By Jente Zeubring

The question if E.T. (extra-terrestrial) life exists dates back to the Middle Ages. Even now many movies and series are based on the question: 'are we not alone?' Astrobiology, formerly known as exobiology, is a field of expertise which tries to find answer to that question. Astrobiology is an interdisciplinary scientific field and is made up of molecular biology, biophysics, biochemistry (BOC is good for something), chemistry and astronomy. Main topics are the origin of life, early evolution, distribution and future of life in the universe. A lot of research right now is about planetary habitability and biosignatures for life. Even looking for possible evidence of ancient life on mars.



A habitable planet or a natural satellite (difficult name for a moon) needs to fit special criteria like a long-term stable star. It needs a lot of years (like 1 billion years) to start developing life and even more to get multicellular organisms. All stars have an expiration date, depending on the mass of the star. Also the mass will determine the star's destiny. Our star, the sun, will eventually turn into a red giant. That will take at least another 5 billion years from now. And later on into a white dwarf. So life on earth is safe for now. Bigger stars (at least 5 times heavier than the sun) will form a red supergiant. The red supergiant will explode into a supernova and giving this really nice remnant. The supernova remnant photos are really pretty. If the mass is big enough then the supernova will collapse under its own gravitational force into a black hole. This process overall only takes a few million years.

If you find a promising star, you can look for some planets. They need to be in a nice distance from the star. This differs for each star. Factors to keep in mind are the heat of the star and the quantity of solar radiation. The sweet spot is called the circumstellar habitable zone. In our own solar system Earth, Mars and Europe (the moon of Jupiter) lie in this zone. Also these planets need a coat like an atmosphere or a big layer of ice for protects form UV-radiation. Next to that you need some essential molecules like liquid water, nitrogen, oxygen, hydrogen, sulphur and carbon. But also phosphor, because it is already such an important molecule in our life. Without phosphor we can't build DNA and make ATP. But this is all theory mostly made by the NASA.

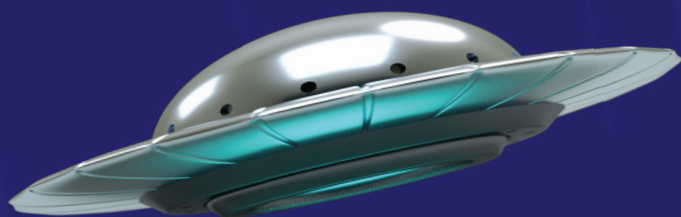


Right now they are working really hard to detect forms of life, biosignatures. A lot of research money is put into that project. NASA is trying to make a spectrometer that can detect extra-terrestrial life. Next to that, there is also the SETI program (search for extra-terrestrial intelligence). The main goal of the SETI program is to collect signals that could be made from an alien civilization. By using massive radio telescopes often focused on circumstellar habitable zone of a star. These signals could be made on accident or on purpose. If they are on purpose, that would mean there are aliens looking for aliens or us! So time to sit back, relax and wait for E.T. to contact us.

HUMPBACK WHALES AS ALIEN WHISPERERS

Do you believe there is life out there in the universe?

By Nadia van Eekelen



I honestly wouldn't know what to believe. But for the rest of this article put your doubts away and imagine that life exists outside of the Earth, because there might be a way to communicate with extra-terrestrial life.

A team from the US-based Search for Extraterrestrial Intelligence (SETI) Institute believes that humpback whales hold the key to communicating with life in outer space. There are no alien languages available to study, so using an intelligent animal language as a guidepost is probably as close as we can get to imagining how aliens might communicate. Don't worry, I will explain the logic behind this idea.

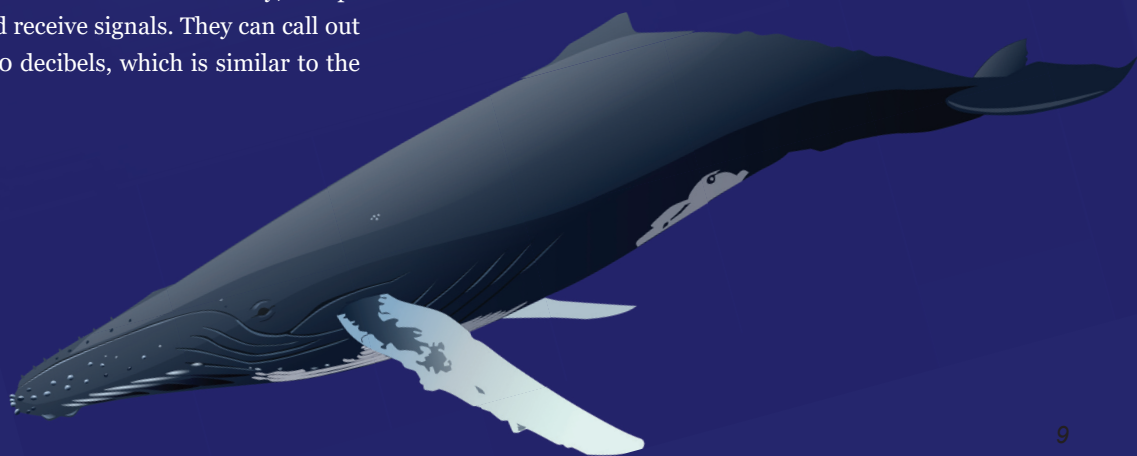
First of all, humpback whales have an extremely complex acoustic vocalization. They use hundreds of complex signals to communicate with each other in hunting, mating, and herding. The brains of these marine mammals contain many spindle neurons, which in humans are associated with higher cognitive functions, such as language acquisition, compassion, facial recognition and social intelligence. Humpback whales are indeed extremely intelligent creatures, and unlike other intelligent animals, they depend on acoustic signals only, whereas other animals also rely on body language. Therefore, the team can classify all the units of the whales' communication system and be sure they're not missing something.

Another reason is the speed of sound in the ocean, which is 5 times faster than in the air! From 1000 kilometres away, humpback whales can transmit and receive signals. They can call out to each other as loudly as 190 decibels, which is similar to the

sound of a jet engine. Water is a great conductor of sound, but it still takes hours for these long-distance signals to be received. So how do the whales modify their communication system for contact that is hours away? And how do they get together when it can take months to be in contact? These are the questions that the SETI team asked itself, because if we would ever be in contact with extra-terrestrial life, we would experience the same thing as the humpback whales.

The idea that is introduced is to look at the messages the whales send each other and see if they're intelligent. To do this, the team developed an intelligence-filter using information theory. Information theory is a mathematics that was developed to measure the amount of information being sent through telephone lines, but it can also be used with non-human communication systems. The team quantified the amount of information that the whales were sending to each other, and under what circumstances they did. They found that the whales developed a rule-structure in their communication, which in human language we call syntax. The whales' songs follow repetitive patterns of which the units seem to be fixed but can be reordered to express different meanings, like humans build up a sentence. Just like human babies, baby humpback whales "babble" and have to learn their language. Eventually, they learn what is meaningful and what not, which is important in their long-distance communication.

By understanding the humpback whales' complex communication system, the team hopes to understand a message from extra-terrestrial life. If eventually a signal would be picked up from another planet, its structure can be recognized with information theory and the filter can be used to see if the signal is coming from intelligent life. With these techniques we know what to listen for and can recognize something as a language and not just some random noise, without having an idea of what an alien may sound like.



WEIRD THINGS ON MOTHER EARTH

By Roos Slijfer

There are some things on our beautiful mother Earth, that are not quite explainable. The big question we all ask ourselves is: Is there a thing like aliens, or are people just that amazing that they can do more than we know? In this article I will talk about some things here on earth that are a mystery to mankind. Although it is well visited by tourists and, therefore, are beautiful buildings or statues or whatever, it is a bit spooky to think about where these things actually came from.



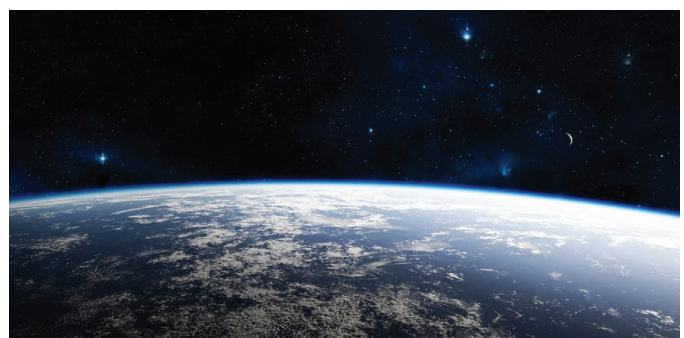
Yonaguni is a monument in Japan that is rather unlikely. It is a rock formation near the shore of the Ryuku Islands. The monument exists of a series of rock formations, massive platforms, stairs and giant pillars. The construction is about 40 meters under water! One of the most known elements is a triangle like rock, that because of its form, is called 'the turtle'. The big question about this monument is: Is this nature or culture? Scientists say that it could be formed through the strong streams and erosion, because the monument exists of one massive solid rock is. But on the other hand, the many right sides and corners may say otherwise. The four cross points in the formation and something that looks like a human face, also suggests that this monument was built by humans, or something else.

The Nazca lines are a series of pictograms that are carved in the Nazca dessert in Peru. The lines cover a surface of 80 kilometres and are created by the Nazca Indians. This was between 200 years B.C. and 700 years after Christ. De Nazca lines are created by scratching the ground. Because of the climate in this region, almost no wind or rain, the lines are still intact and are about 183 metres long. The lines form simple patterns like shapes, plants, insects and other animals. Scientists know who drew the Nazca lines and how, but why stays a mystery. De most popular hypothesis is that the lines are drawn because of religious reasons. Like a sacrifice to the gods, so that they, from heaven, can see these drawings. Other scientists, however, think that the lines symbolize massive looms, that were used to make textile.

I think this is one of the most known monuments on earth, the Moai of Rapa Nui. They are standing on an island in the Pacific. They look like really big, out of shape, humans. This island is also known as Easter-Island. The Moai are made between 1250 and 1500 by the first habitants of the island. It is speculated that the statues symbolize the ancestors of the islanders. In some cultures, the ancestors are seen as gods, hence the statues. The Moai are made out of tuff, a kind of volcano stone that is common on the island. Scientist think there were about 887 statues build, and they think that because of the war between the different island clans, a lot of statues were destroyed. Today there are 'only' 394 Moai left and the tallest is about 9 metres high and weighs more then 70 ton. The big question around the Moai is, how the islanders moved the statues to different places on the island. A theory is that they used wooden sleds, moved by rolling tree trunks. But this cannot be confirmed. So, if you think this is impossible, because of the weight of a statue, you could say aliens have done it (wink, wink).

Stonehenge is the most mysterious monument on earth. You know the weird circle of massive rocks on a countryside of England. They were probably built around 2500 years before Christ. The rocks look like a random constellation and are even on top of each other. They are surrounded by a canal and tumulus. The Stonehenge we know today is probably not even half of what it was. It must have costed around 1500 to 7000 years to build this construction. No one knows why or how it was built Some people obviously speculate that aliens left the stones like that, others say it was built by advanced superhumans with great knowledge of technology. It probably served as a memorial site for spiritual healing and worship.

If these buildings and statues are built by humans or not, they are still as mysterious and beautiful. There are of course a lot of conspiracy theories about these unexplainable phenomena. Did you ever think about these things? Don't go to far, because ones you are caught by these conspiracy theories, there is no way back.



MUSIC SECTION

@ Rock Werchter 2019



By Devi Seijkens

If you follow along with the music section you've probably noticed I essentially always write about bands or artists I absolutely love. This edition will be no different in that regard, but I will try something new. For this edition, I will share my experience at a live concert. In this case, as you might have noticed by the title, I will be discussing the performance I saw by Muse at Rock Werchter 2019. It was part of their Simulation world tour, which started February 22nd and is slated to end October 15th. The show I was fortunate enough to see was on June 30th.

While it is much more common for bands to shorten their setlists when they visit music festivals, Muse was given all the time needed to complete their normal concert set. And oh how they delivered.

Being known for big shows and impressive decor, their set started with a shortened version of 'Algorithm'. It set the tone for most of the show, with impressive animations being shown on the big screens and while the band appeared from darkness, so do two android-like figures

while the instruments start to play. But as it turned out the fun was only just beginning. After 'Algorithm', they immediately started the biggest hit on their newest album 'Pressure'. For me this was the song that set the tone musically, as lead singer and guitarist Matthew Bellamy shows his prowess, singing almost every note perfectly, all while perfectly supporting himself and the rest of the band with strong lead guitar tones. The rest of the set is a nice balance between older records and newer songs, with songs like 'Supermassive Black Hole', 'Hysteria' and 'Time Is Running Out' being great examples of the former, while 'Psycho', 'Thought Contagion' and an acoustic/gospel version of 'Dig Down' being great examples of the latter.

With the massive amount of hits Muse has had over the years, you could easily fill the entire show with just that, hits. But they decide to have a more balanced list based on all their records, which works really well for the pacing of the show. A great example is Bellamy using one of his personal songs ('Pray') to slow down after the crowd completely lost their minds over 'Plug In Baby' a favorite which is still found in almost every set Muse plays, since its release in 2001. Other good examples of songs that help pacing are 'Madness' and 'Mercy', which allow the crowd to have just a moment before moving on to the final parts of the show and the encore, which included hits like 'Starlight' and a nice medley that included 'Stockholm Syndrome', 'Assassin' and 'Reapers'. While those final songs start, a giant animatronic Alien-like figure appears from behind the band and honestly

freaked me out because of how convincing it looked.

The show concludes in a way that it has for many of the more recent tours Muse have done. The bassist grabs his harmonica to play the well-known 'Man with a harmonica', from the soundtrack of the world-famous

western movie 'Once Upon a Time in the West'. As soon as the first note is played the crowd goes berserk because they know what this means: 'Knights of Cydonia'. The perfect combination of aggressive guitar and typical well thought out Muse melody make this easily the best song to end with, although after a show like this, it is impossible not to want more. Leaving me feeling like I once again witnessed one of the greatest bands ever to play live and patiently waiting until they decide to return for the next tour.







IDENTITY CRISIS: FEELING ALIEN

By Diana Nacy

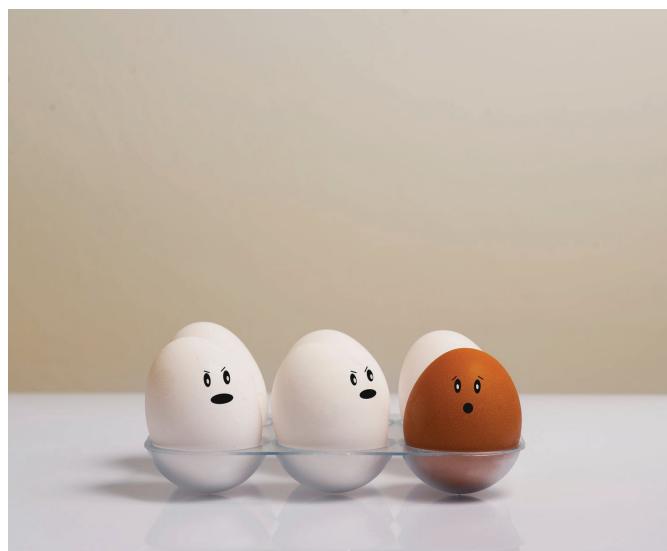


With English being the primary language of biology and life science and technology, it's no wonder that those two bachelors are now accessible to non-Dutch speaking folks. Internationals, as we call them. Welcome to Groningen. Before you know it, things will change: you're a foreign now and chances you'll feel awkward or maybe even stupid the next couple of weeks, just because you're not familiar with this country. No worries you'll feel at home in no time. In fact you might even feel foreign next time you're home.

Living abroad wrecks and messes you up mentally at first. It makes you feel like an outcast and lowers your self-esteem. But it is also the most life-changing, and the greatest experience that will ever occur to you. Living abroad challenges you 24/7: you're abroad, you're foreign and you have to learn everything from scratch. That bit is probably the most difficult part because you're resetting yourself. Everything you've ever known is not applicable and other rules are applied here. You're constantly forced to think outside of that defined box. At the same time you (have to) learn to be tenacious and strong. But even after living abroad for a couple of years, you'll still feel like a stranger every now and then. Which doesn't necessarily have to be a bad thing, I mean, you're no longer a foreigner but you have another cultural background. And coming from an experienced expat, you really should embrace that.

Being abroad boosts your self-confidence. This sounds very contradictory because I've just mentioned that it makes you self-conscious. Believe me if I say that both scenarios are true. You absolutely will feel self-conscious at times, but facing challenges, overcoming them and witnessing what you're capable of is the best self-confidence boosting method.

In no time, abroad will feel more like home to you than home itself. "What? Foreign at home? No way!". Yes way, because yours truly has been there and done felt that. While I've spent a great deal of my life here in the Netherlands and I do many things the Dutch way, I'm not 100% Dutch. It's not what I feel or say; these are the facts. Also, people sometimes just assume that I don't speak Dutch, so they start a whole conversation with me in English. That's when I say something in Dutch, simply to make them feel awkward. Yes, I enjoy doing that. But last summer when I visited my family, that I don't see that much, for two whole weeks, I felt like an outsider as well. Even though, I was surrounded by familiar faces who spoke my language and I didn't have to explain to them why I thought some thoughts, or did some deeds, I felt foreign. Because they didn't get the Dutch part of me. That's what happens to you when you live abroad: you no longer have one identity, one set of social norms and one way of thinking. You're a collection of all the things and experiences you've been through. Living in different environment will make that collection so diverse. When I was doing some research about this article, I came across many people who experienced feeling like an outsider in their own homes. It turns out to be a very normal phenomenon. I guess it's normal to feel like that. Because all societies have their flaws and defects and living abroad shows you that things can be done in another way than how it's done home.



For the longest time I've struggled with being all over the place with my thoughts, norms and my mentality. Because it's confusing, not just for you but for everyone around you. But really you should just accept it as it is. You're different. You're mixed. You're all over the place. But remember different is good. It's interesting!

THE ALIENS AMONG US

By Soheila Jalali

CEPHALOPODS, TARDIGRADES AND VIRUSES

If there's anything we have learnt from the study of biology, it's that there are tonnes of bizarre creatures out there. Of course, we've categorised all living organisms into a complex but useful system of organisation which we like to call taxonomy. But I'm here to tell you that even with all our attempts to put things into standardised compartments, some creatures are just, plain ALIEN!

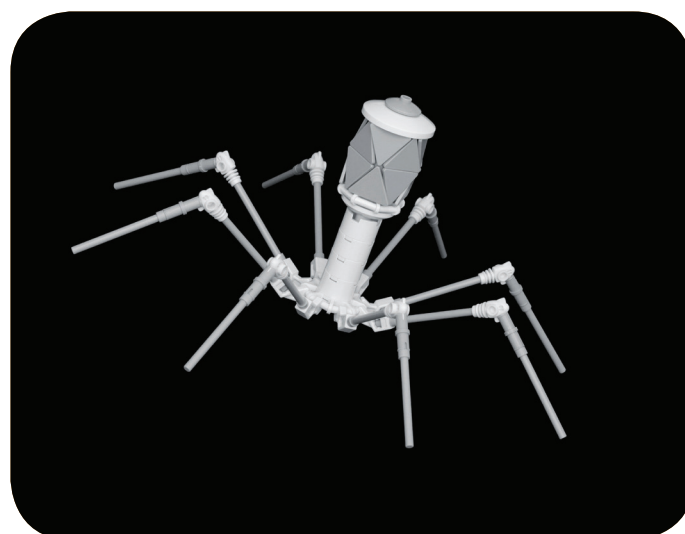


Take the wonderful category of cephalopods, for example. This includes our favourite shapeshifters like cuttlefish, squids and octopuses. First of all, there are few creatures that look more quintessentially alien-esque than octopuses. They have a massive head, eight tentacles and practically nine brains (one for each limb and one for the head)! The best part is you can literally “see” them thinking when they alter their colour and texture to blend in to their environments. They have about 25 million chromatophores that can make them almost invisible. When scientists sequenced the octopus' genome, they were stumped and even used the word “alien” to describe it. One of the reasons for this is that while most other organisms follow the central dogma of molecular biology that is, DNA → RNA → Proteins, cephalopods in fact, can edit their RNA rapidly to produce proteins not encoded by their DNA!

Another quirky little critter that seems too cool to be true can literally survive in space! Tardigrades, also known as “water bears”, are microscopic animals that inhabit all the nooks and crannies of the Earth, usually waterbodies. However, for a creature that lives mostly in water, they have an unusual superpower wherein they can survive complete dehydration. In fact, this was the state in which they were introduced to outer space and from

which a large percentage of them were able to bounce back once rehydrated. What was found to be super weird in their genome was that they seem to have taken up a lot more foreign DNA from other species like bacteria and fungi than any other organism (whose genomes have been sequenced). It is hypothesised that during their “bouncing” back phase after dehydration, when they have to put all their DNA pieces back together, they also absorb other DNA more easily. They are an awesome testament to the fact that putting the best bits of DNA from multiple origins together can be the key to surviving the harshest of conditions.

Arguably, however, the true aliens among us, and officially the most successful at taking over the planet are VIRUSES. Not only are they the most abundant type of nucleic acid-containing “life forms”, they also “look” a bit like UFOs. Just as UFOs beam down the alien commander, viruses attach to cells and “beam down” their genetic material. Then, they successfully integrate their DNA right into their unsuspecting hosts and voila! They take over the cell and sometimes the entire organism. Viruses infect everything, and the artefacts of their genetic manipulations transcend generations and time. They've played an integral role throughout evolution and perhaps have orchestrated all the diversity we see. It has even been shown that some viral infections induced higher levels of monogamy in mice. So, they obviously know how to make sure their genetic material is passed on. Finally, if we think about it, the most elusive and incurable diseases are caused by viruses. I mean, we still don't have a cure for the flu! These guys definitely don't come in peace, so stay safe.



FOREIGN BODY REACTIONS

How our bodies react to 'alien' invasions

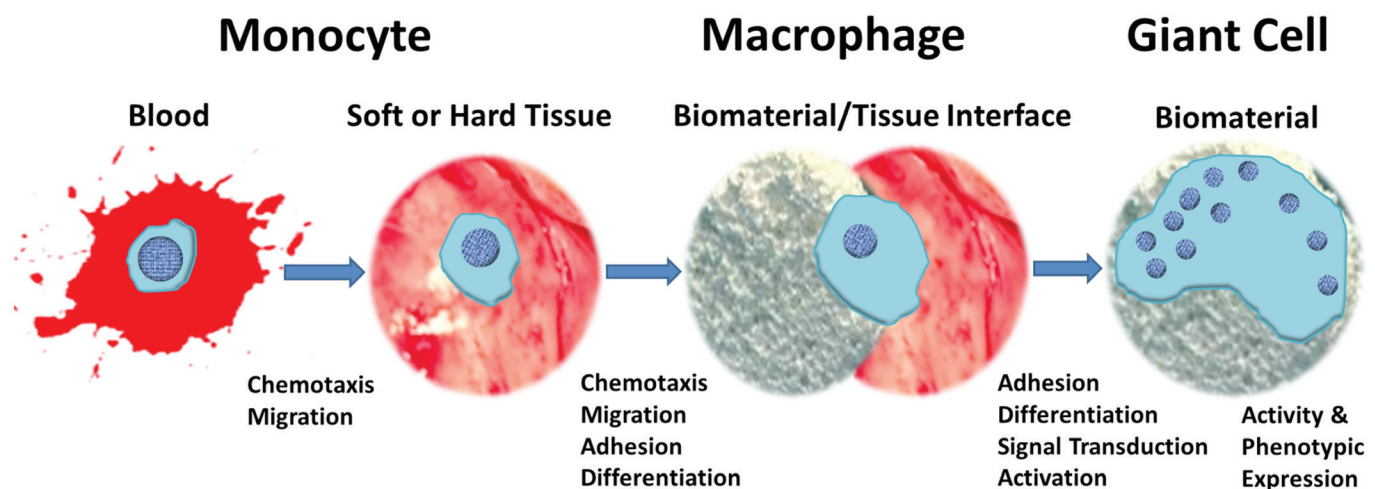
By Devi Seijkens

If your TV was currently showing live footage of our first contact with alien life, how would you respond? I think I speak for most if I say that I think I would hold my breath and pray that everything goes smoothly. We hope those invaders come in peace and could be potentially share some knowledge with us. But how does our body react to an invasion? And more specifically, in the case of implantations, like pacemakers or joint replacements.

When a joint replacement is performed, a hip prosthesis for example, a defective joint is replaced by a prosthetic 'counterfeit'. Usually the joint is replaced by a similarly shaped joint made of metals (most commonly surgical steel and/or titanium) and some kind of biomaterial. But as you can imagine, our immune system is unable to recognize these materials as being part of our body. As a result, the inflammation response is started. During this process the cells start to deposit extracellular matrix on the foreign materials. This matrix in combination with the activation of several immune cells such as mast cells and neutrophils initiate recruitment of an even larger body of immune cells. This causes the inflammation to become chronic. Through the recruitment of monocytes and other lymphocytes granulation tissue is formed. In this tissue fibroblasts proliferate quite rapidly and start differentiating. As a result, a large fibrotic tissue is formed, that will eventually encapsulate the prosthetic. On the other side, the recruitment of macrophages continues and eventually these cells start to fuse. As a result, foreign body giant cells are formed. This reaction is called the Foreign Body Reaction (FBR).

As you can imagine, FBR proposes a big challenge for medical implants. The FBR leads to material degradation and as a result can lead to device failure or loss of prosthetic function. Because of this, a lot of research is being done in the prevention of FBR. Currently, many scientists believe the solution lies in proper implementation of additions to the biomaterials used. By using cells, proteins or other bioactive agents, it is believed FBR could be slowed or prevented. This would increase the lifespans of implants drastically, if not indefinitely. It would improve the quality of life of prosthetic patients drastically, as early implants often need to be replaced later in life as a result of FBR. Currently, delivery of dexamethasone is most commonly used through the implantation period to prevent inflammation and subsequent fibrosis. It is believed that combination approaches are most effective, combining the delivery of dexamethasone with hydrophilic coatings that reduce protein adsorption to the implant.

Of course, it would be nice if nobody ever needed any implants. If we can figure out how to prevent heart failure, we would no longer need pacemakers. If we can reduce wear and tear on joints, joint replacement surgery could be prevented. But in the meantime, it is nice to see our understanding of FBR and its mechanisms is improving. So that on the off chance you still develop one of these diseases when we can prevent them, we will be able to provide you with an even better treatment in the future.





Arrival

By *Jonah Fedde Renting*

Before I start talking about the movie “Arrival” let me share a story with you. I have a nephew who’s two years old now, and one thing I find very fascinating is his journey in speech improvement. Because how do you explain what words mean to someone that doesn’t know anything about speech or the meaning of those words. I wouldn’t know how to explain something simple as yes or no, but somehow a baby learns those words and after a while it understands its meaning. My nephew can now say certain simple sentences (which is adorable) but how did he learn this with zero prior knowledge? There is probably an answer that has to do with emotions and non-verbal language but let’s just put that aside, because it ruins my introduction. What I’m trying to say is: how can you understand a language without any knowledge on other languages on earth? This is not only the question that I asked when it comes to my nephew learning Dutch (and Bosnian), but also the question that is asked in Arrival.

Story time! At a certain point in time twelve extra-terrestrial spacecraft enter into earth’s atmosphere and hover above different locations across the globe. The intentions of the aliens onboard are unknown nor do they leave their spaceships. Various nations send their armies and scientific staff to secure the area and investigate the aliens on board. Of course everyone wants to know the reason why they are there, but how do you communicate with an alien? You don’t understand their language, writing system or just about anything they do. You can’t just decipher their language with the help of some ancient stone a French general found in Egypt. For all you know they don’t have something we call language and use something else to communicate with each other.

One of these twelve spaceships hover above Montana and U.S. Army Colonel G.T. Weber (Forest Whitaker) recruits linguistic expert Louise Banks (Amy Adams) and physicist Ian Donnelly (Jeremy Renner) to study the alien language. When they arrive on the spaceship, they see two aliens behind a glass panel with a room filled with mist. They begin to study the alien language and writing system. This is where the real plot of the movie starts, so I will stop explaining the story.

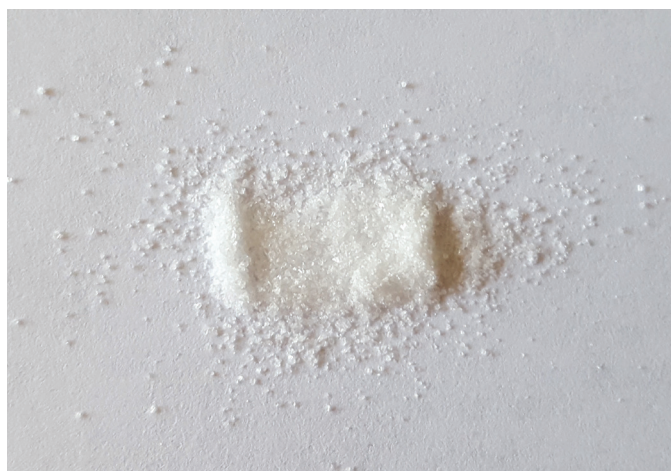
Arrival is a crappy movie with a stupid story and acting so bad you will find yourself in disbelief how such a shit show could ever be green lit. Of course, this is not true, I know you weren’t fooled by that sentence because I would never write a review about a movie, I find to be crappy. Arrival is a science fiction movie that transcend the boundaries of normal science fiction movies. Most science fiction movies just focus on the alien part and how amazing all the fictional battles and weapons are and all that jazz. The aliens in most science fiction movies are uninspired with humanoid aliens with two eyes, ears, legs and arms. What makes them different most of the times is that they have a tail and are orange or something and most of the time I find myself irritated by this: They speak English even though it is first contact. That is just fucking stupid and is a direct reason why I love Arrival, because the story itself is not really about the aliens. It is about linguistics and the problems that needs to be faced in order to communicate with each other. The story isn’t about some world ending war with aliens it is simply a movie where humanity tries to talk to extra-terrestrial life and are trying to cope with the difficulties of deciphering a language that comes from a place far far away.

KETAMINE AS TREATMENT FOR DEPRESSION

NEW PURPOSE FOR SPECIAL K

By Meiske Pieters

Way back in the previous century (1962 to be exact) ketamine was first synthesized. Although it was initially approved by the Food and Drug Administration (FDA) as an anaesthetic, you probably know it as a hallucinogenic party drug. It was first used in the Vietnam war because of its stability and the fact that it doesn't suppress the heart rate or respiration. Later it was used in veterinary medicine and eventually in people. However, the hallucinogenic side-effects made it popular for recreation in the 80s, giving people feelings of euphoria. In the 2000s, research began investigating the use of ketamine in treating depression. In the US, anaesthesiologists, are now opening clinics where patients can get ketamine injections to treat their depression. But how can a party drug be used in such a different, alien way as a mental health medication?



Up until now, the standard treatments for depression have been psychotherapy, drugs and electroconvulsive therapy (ECT). We'll discuss these treatments in more depth before going to ketamine. There are different kinds of psychotherapy, and not just the "laying on a couch" and "how do you feel" therapy. Often psychologists don't just use one type but instead tend to blend parts of different therapies together to fit the patient's needs, for example, behavior, cognitive and schema therapy. In case of one traumatic experience, with clear fears, EMDR is often used, which stands for Eye Movement Desensitization and Reprocessing. I could fill a whole page with just explanations of each therapy, but we don't have room for that so I'm moving on.

Another treatment for depression is, of course, drugs of which there are also various kinds. Selective serotonin re-uptake inhibitors (SSRIs) are preferred since the side-effects aren't as harmful. However, when these don't work for a patient, Tricyclic Antidepressants (TCAs) are also an option. Lithium is often used in mania, but also in depression. The fourth type are monoamine oxidase inhibitors, which increases serotonin by slowing down the breakdown of serotonin. To put it simply: these three types all increase serotonin and thus make the patient less sad. It is important to note however, that it is still unclear how antidepressants work exactly. But what if all of this still doesn't help your depression? Ketamine might be the answer for these treatment-resistant depressions.

Ketamine has an influence on glutamate, a stimulating neurotransmitter. Glutamate works in diverse ways in the brain, each with distinctive effects. One of the effects is making new connections between brain cells. In depression parts of the brain, where stress and fear are located, are overactive. While on the other hand, cognitive control over emotions and how we react is less active. By making new connections, you can repair the areas affected by depression. Research in mice confirms this and shows restored connections between neurons in the prefrontal cortex. The PFC is needed for cognitive control and is negatively affected by stress, which of course, is a big part of depression. An injection of ketamine can have an effect on a patient's behaviour and mood within a couple of hours. Restoring of the connections starts after 12 hours, although this has only been tested in mice. Scientists are still unsure if this happens in humans as well, but research is promising.

There are still a lot of factors regarding ketamine that are unclear. In particular, the long-term effects of using ketamine, or the side-effects including hallucinations and interfering with connections in the PFC. Nevertheless, patients together with scientists are hopeful that this drug could be an option for treatment-resistant depressions.



INTRODUCING...

NEW MEMBERS OF THE LIFELINE!

Gabriel Nicholas

Hi! I'm Gabriel Nicholas from Indonesia, I came to the Netherlands to do my Bachelors in Life Science and Technology in the University of Groningen. The Lifeline caught my attention with its creatively designed and informative magazines. I have decided to join The Lifeline with hopes to further develop my editing and illustration skills as well as to be a part of the community. I have been doing digital art as a part of my hobby for about a year and now I feel like I'm ready to explore further into that hobby of mine. I am interested in being able to be a helpful member of Lifeline and support Lifeline's development all the way until the day I graduate from the University of Groningen!

Yours,
Nico

Marit Bonne

Hiya! My name is Marit Bonne and I am 18 years old. The island Texel used to be my home but since I am in my first year of Life Science & Technology, I am currently living in Groningen. When chilling around at the committee market, the Lifeline seemed amazing (spoiler alert: it is), so I sent an application as soon as possible. I am looking forward to create stuff for the Lifeline with a bunch of crazy and very fun people! There is actually not so much I have to say about myself, except that I am a cat person, I am slightly addicted to mergpijpjes (internationals: if you haven't tried it, please do) and I would totally do 'Hold the line' by Toto at a karaoke session. You'll probably see more of me in the future!

Hugs and kisses,
Marit



/jultje e:nijlk/

Hey there! Most introductions start with a name, but that seems a little boring so you're going to have to read this whole piece to find out what mine is. No cheating! Let's start with some facts about me: I'm female, 22 years old and a fourth-year biology student who's hoping to receive her bachelors this winter. One of my most recurring traits my entire life has been my inability to make up my mind. As a kid I didn't know if I wanted to become either a princess, hairdresser, teacher or own an ice cream shop (so you only have to work during the summers). As an "adult" I'm still not sure. A good reason to study biology, since it's very broad. A good reason to work on this beautiful magazine too, since I can either write, lay-out, get creative with the Iduzzle or do it all. Again, I'm not sure. But whatever I end up doing, I hope you enjoy it! Now, for my name, good luck to the internationals trying to pronounce this!

Yours,
Juultje Eenink



GLV Idun

MAYONNAISE REVIEW



Ahh mayonnaise. A simple, creamy and perfect condiment, that is my unnuanced opinion. I think it is safe to say that mayonnaise is my favourite sauce, and no one can change my mind about that. But of course, not everybody on this beautiful planet shares the same opinions that I have and in fact, there are some people that don't like the taste of mayonnaise. I always say that mayos are just like humans, not all the same. But unlike humans some mayonnaises are better than other ones. So, for this Lifeline review we will be reviewing mayonnaise!

1

Truffle mayonnaise

Truffle mayo a delicacy most enjoyed by our good friends the pigs, but this mayo is unfortunately for them just for humans. Opinions on this mayonnaise are not divided at all. Truffle mayonnaise is just delicious, and everyone agrees. This mayo finishes with an average score of 8,5



3

Brander mayonnaise

Ahhh brander mayo, without a doubt my favourite mayo. This mayonnaise, now found throughout the snack bars in Groningen, has a special history. You won't spot this one outside the city (probably), because this mayo is 100% Grunnings. Brander mayo finds its origins in café the Brander, where it was created and enjoyed by many. This café had to close its doors, unfortunately with its original recipe lost to the ages. Luckily, Oliehoorn found the wife of Brander's creator and an old employee and tried to recreate the condiment that I love the most. Brander mayo is just nice, there is no doubt about it and you can see this back in the average score, which is 9,45.

2



Vegan mayonnaise

Alright, I don't want to hate on vegans or vegan products. If you make the decisions to not eat animal products, respect. But if you want to eat a condiment with your food, just pick another sauce like ketchup or something. Just not mayonnaise, because even though this mayo wasn't that bad it just pales in comparison to normal mayo. Vegan mayonnaise tastes like a mayonnaise with a lot of added water. Although, I say Vegan mayonnaise it isn't even allowed to call itself mayonnaise, because mayonnaise is a protected word in the Netherlands (and in Belgium). If a product wants to call itself mayonnaise it needs to contain at least 70% fat and 5% egg yolk. So, it wasn't a surprise for me that the vegan "mayo" ended up with an average score of 5,3.

BESTEL UW FRITES
MET DE BEFAAMDE



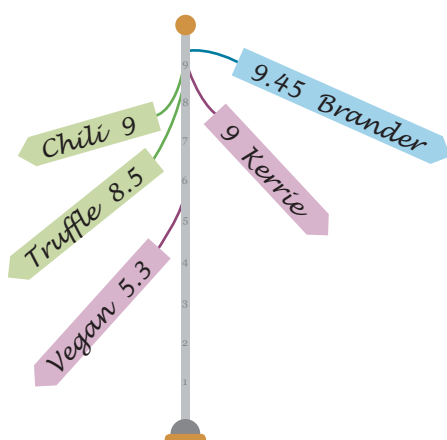


Before I continue with the rest of the review there is something important that I need to share in this piece. During our review one of our youngest (and possibly most naïve) members had the blasphemous opinion that all mayos taste the same. Now I know that is not true, you know that is not true but how could we convince her that she is wrong. Well luckily our good chap Devi volunteered for a blind taste test to prove to her that you can easily distinguish. I was in full confidence that he would ace this test, and he did of course. From the nine different mayo's Devi could distinguish seven of them, proving ones and for all that not all mayo's are equal.

4

Chili mayonnaise

Nobody had this mayonnaise before (except me of course). The opinions on this one were divided and it all came down to one typical problem: the spiciness of it. Those who like spicy food were all enthusiastic about this one, with scores rivalling brander mayonnaise. Those who never eat spicy things hated it, with scores like four and six. I say too bad for you spice haters, because I write this review and I like spicy things. So, I give this mayonnaise a final score of 9.



5

Kerrie mayonnaise

So, I don't know what the English word is for Kerrie and I don't feel like googling it right now. Never mind while I was typing this sentence, I remembered it is curry. Brain farts aside, if we would describe the curry mayo in one word it would be very nice. It stimulates the tongue and soothes the mouth. We, from the lifeline, were very pleased with this mayonnaise and will there for honour it with a solid 9.



I think I will end this review here because it is getting kind of long and there are still some more mayos to go. That's why I included a tier list of all the mayos and their final score. Before I end the review here, I have to add that we did not literally eat these mayo's, because even though mayonnaise is very delicious you should eat it with something. For this mayo tasting event we went with the obvious choice, fries. Ah yes salty delicious fries, best eaten with that creamy delicious condiment. In Pulp Fiction there is this scene where Vincent talks about his days in Europe and he tells Jules that he finds it weird that people in the Netherlands eat fries with mayonnaise. Which makes me think that the mayonnaise in the US probably is very different than our mayonnaise, because let's face it, mayo on fries is way better than ketchup on fries. Just a thought, but anyway big shout out to Plat. Almost all of the sauces we got were from there. We aren't sponsored by Plat but boy I wish we were. So if you want nice mayo (and very good fries) go to Plat!

BAS EN Z'N BEESTJES

Beasts by Bas



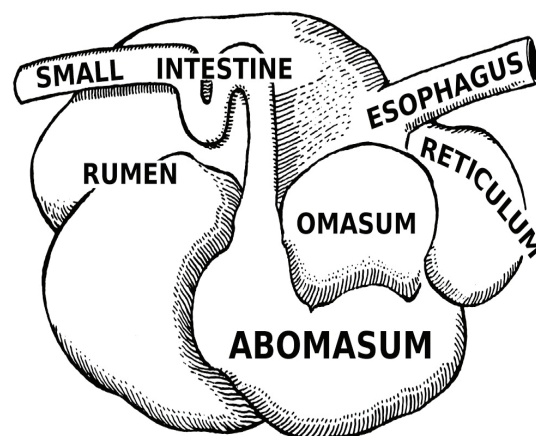
By Bas van Boekholt

A new year has begun, with new minds, challenges, highs and lows. However, some traditions need no change. One of these traditions is the addition of four animals into the expanding hall of fame I started 6 years ago. So far we've explored most of this planet. From the depths of the ocean to the boundless heights of the sky. We examined the world of micropia, dove into mythological zoology, discussed some role models and ended in the order of primates. For this edition of Bas en zijn beestjes we will stay closer to home. This unrelenting force is responsible for more annual deaths than sharks. It was feared by the great emperor Julius Caesar himself, who exclaimed that they possessed immense force and velocity and saved neither human nor wildebeest. Of course I am talking about the cow.

Cows or cattle (*Bos Taurus*) are the most common type of ungulates. Cows were domesticated about 10,000 years ago and form a cornerstone in the agricultural evolution of humankind. By domesticating cows, humans did not only acquire a source of meat but also milk and hide. The possible products of a cow don't end there. Cows were first used for the production of vaccines (*vacca* is Latin for cow) and the septum of a cow is used for a medicine against arthritis. Cow's blood can be found in glue, fertilizer or even the foam used in fire extinguishers. Even in the olden days cow's healing factors were known; according to roman historian Plinius the elder, bile of an bull combined with leek juice and human breast milk form an excellent remedy for ear pain.



Instead of ordinarily thought, cows do not possess four different stomachs. They have one stomach consisting of four different chambers. In this stomach they are able to digest tough plant material. However, most cows regularly accidentally eat wire, nails or other iron bits that can cause a lot of harm. In order

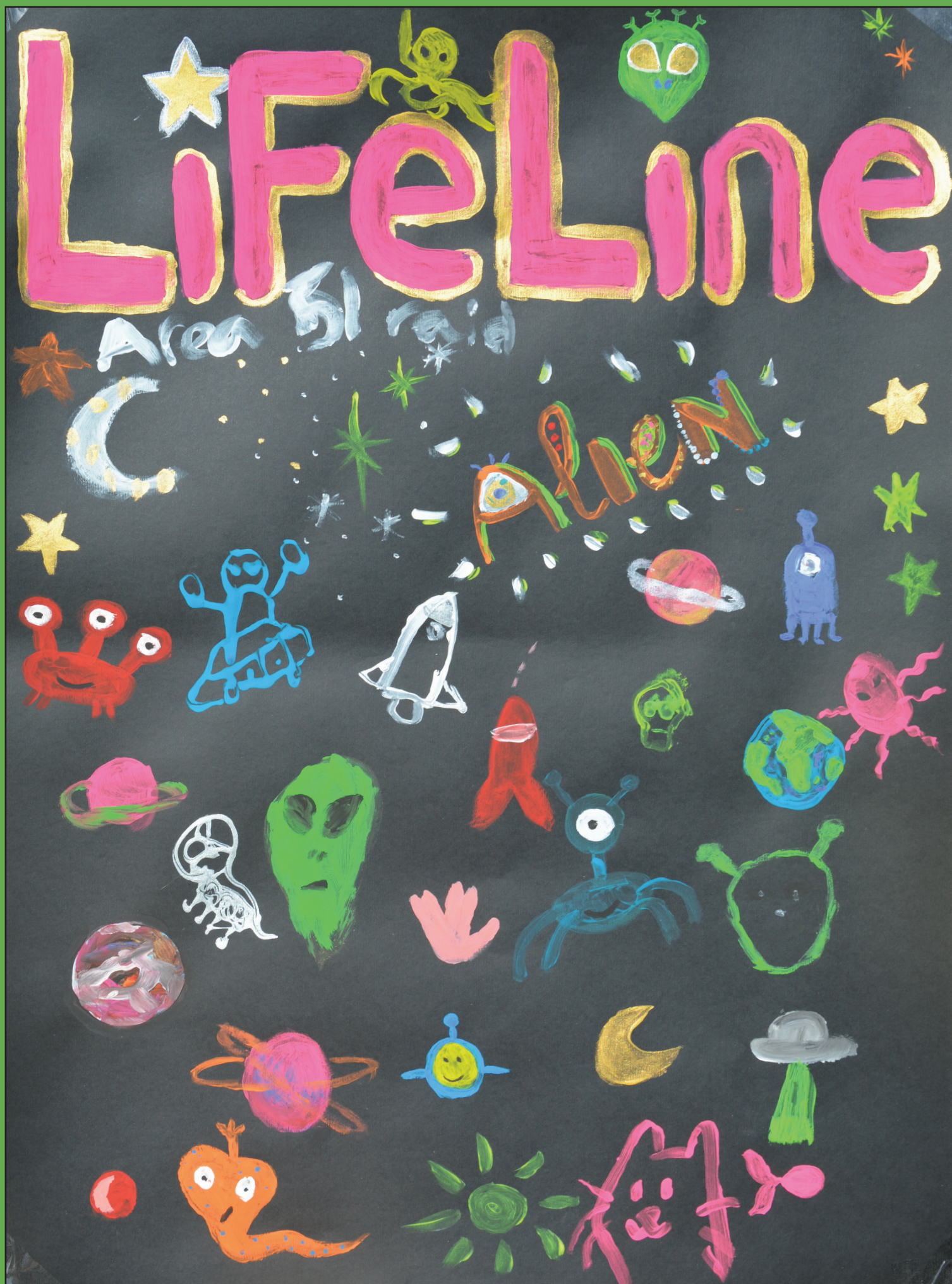


to avoid this, cows can be fed real magnets which will settle in the first chamber of the stomach and stay there their whole lives. While cow farts are sometimes mentioned as a cause for climate change this is untrue. It is the cow burbs that really do the damage. A cow can burb around 300 litres of methane gas on a daily basis causing 4% of the global emission of greenhouse gasses. The whole livestock business is responsible for 18% of all emissions. More than all cars and other modes of transportation. In Sweden they turned this emission around by having a train running on the methane produced by burning organs of cows. One cow can supply enough energy for a journey of at least three kilometres.

While there are many things that cows can do, there are a few mentionable things cows can't do. Bulls are colour-blind and are unable to see red. The reason they still chase the red cape is because of its movement and not the colour. Be careful to invite a cow at your home. Especially if you live on the first floor, because whereas cows are able to climb the stairs they are not able to descend them. Their knees just don't bend the right way. At last I want to end with a brilliant study by a Dutch statistician, Bert Tolkamp, exploring the lying behaviour of cows, earning him a IG noble prize. After observing more than 50,000 lying episodes he made the following discovery: The longer a cow is lying, the higher the chance it will stand up, but, once it is standing up it is hard to predict when it will go lie down again.

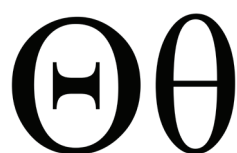
As you can see cows are fascinating. We owe so much to them while not honouring them enough. But that ends now. Cows deserve their spot in the hall of fame. So the next time you drink that glass of milk, take a flu shot or insert your anti-arthritis pill, think of the animal that made all this possible. The amazing spotted furry friend that will never let you down. It is time to take bow, a bow for the cow.

Painted by first year students



IDUZZLE...

By Juultje Eenink



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-mozz -lla



-gg



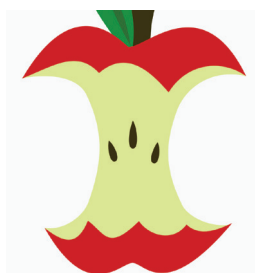
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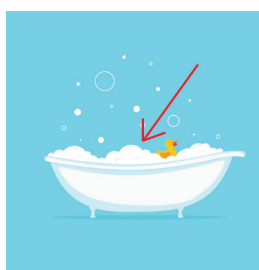
-c -e

Au Hg Pt
Zn Ag
Pb Fe

-met -s



-olk



-fo



Hint: first letter



-a



The previous Iduzzle was won by **Jorick Hiemstra**. 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 8th.

Answer to iduzzle 56: When Jörmungandr, archnemesis of Thor, releases its tail, Ragnarök will begin.