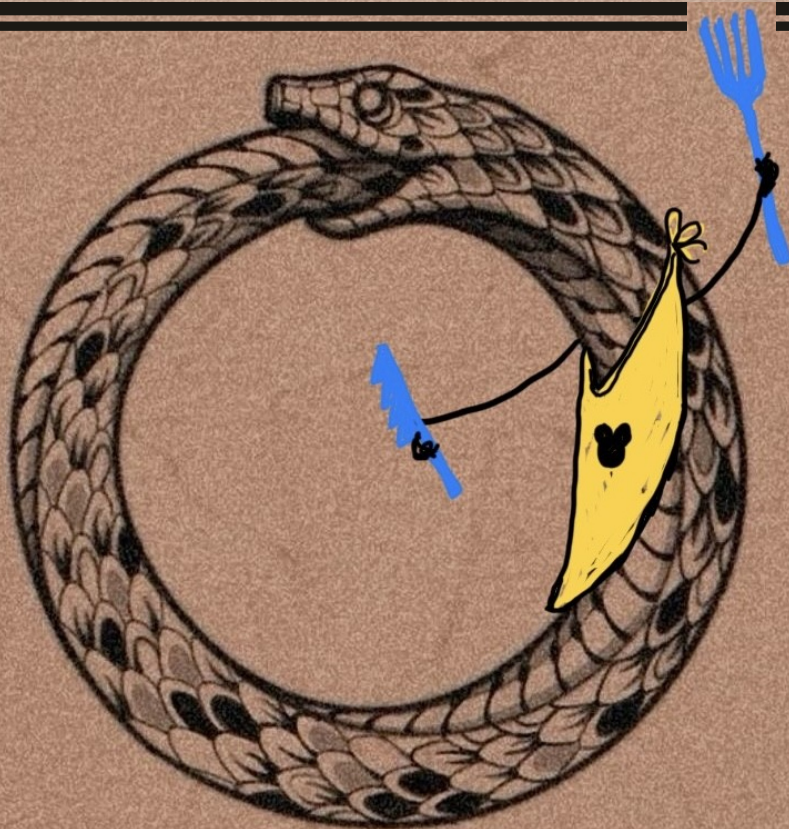


Ouroboros



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Editorial

Hello Readers,

As the lecture phase of the semester starts to roll to an end, and we slowly break out of this cycle that has been our lives for the last few months (sleep, study, snack, repeat), we at the Biotikum have decided to capture the spirit of the moment with this, our latest issue: Ouroboros.

On a more personal note, it is also my first issue as Editor in Chief. It has been an incredible honour, and privilege to oversee the creation of this issue, and I hope to continue to help our dear newspaper prosper during my tenure. On that note, this issue marks the first published under the guidelines laid out in our new editorial standards, which have made it far more streamlined to open the Biotikum up to submissions from you, the readership! Do you have memes? Article ideas? Do you too believe Carthage must be destroyed? We want to hear from you!



In any case, I hope reading this issue may be as rewarding an experience as it has been to oversee the process by which it was created. Our editorial staff, guest writers, and meme scrapers, have all done an incredible job to make this Biotikum a good one, now then, enough yapping, ONWARDS!

- Andrin Bär

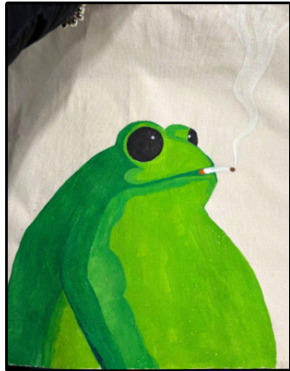
A handwritten signature in black ink, appearing to be 'Andrin Bär'.

Dear VeBiS members,

This semester has been quite hectic but very rewarding for me. I would say some days I felt like I was losing my sanity, but so far it is unclear if it's connected to VeBiS or not...

Regardless, we kicked off the semester with our general assembly, where we discussed last semester's achievements and elected a new board. Soon after, we had an Open Office day for the first time, giving our members a chance to get to know the board better and understand more what VeBiS does. I hope you showed up for pancakes!

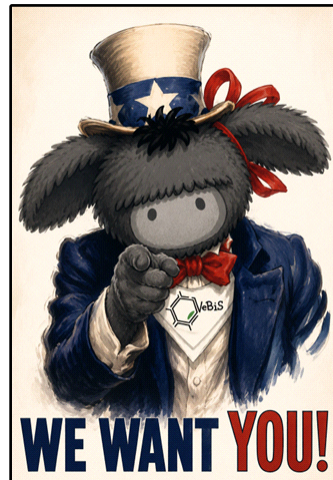
Before we all suffer through the next Lernphase, I want to first reminisce about the fun events we had this semester. Our Kulturis organized a Totebag painting event, where I saw some incredible creations from all of you! (I want to flex my own skills a bit in the picture on the left)



We visited the Dinomuseum in Aathal, which was incredible fun (my back still hurts from lying on the thin mat on the floor). This semester we also had multiple collabs, like the Escape Room Night with BioAlumni, the Game Night with BiUZ and the Europapark event with VIS (I couldn't join, *sniff*). If you're now thinking: "wow, that

all sounds very cool, but I think XY event is missing" then we want you! In case you did not know, we have a Kulturkommission, where we like to welcome new members with fresh ideas, so don't be shy and join by writing to kultur@vebis.ch! :D

For our more serious events, we again had an Industry x Academia talk, which hopefully gave some of you more insight into what your future could look like. To that effect, we invited one of the founders of Neurimmune to tell us how to start a business, which was very inspiring!



Behind the scenes, the board has been busy improving internal infrastructure and ensuring that student voices are represented in department meetings. We've been actively involved in several working groups regarding changes to the curriculum with PAKETH, but if you want to hear more about that, I suggest you read Raoul's very interesting HoPo (Hochschulpolitik) article! It will also give you a bit more insight into what being on the board means (maybe you'll even get influenced to join in the future! *wink wink*)

As we're reaching the end of this article (or collection of thoughts rather), it's my duty to convince you to come to our next general assembly, which will be held on the 21st September. You'll get to vote on the new board (spoiler, I'll be saying bye bye) and see all the cursed pictures we took while getting *hammered* tipsy at our events. I think that is already quite enticing, but if not, there will also be free (!) Pizza. For now, I want to wish you all good luck with your exams!

Hope to see you guys soon,

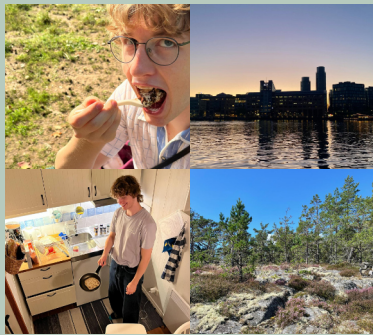
Jasmina <3

Get to know our board members!

Jasmina Blank - Präsidium

Als Präsidentin bin ich für das Leiten der Vorstandssitzungen (VS) verantwortlich und stelle sicher, dass der Vorstand gut zusammenarbeitet. Ausserdem verrete ich die Stimme der Studierenden in der Departementskonferenz (DK), der Unterrichtskommission (UK), im Fachvereinsrat (FR) und im Mitgliederrat (MR). Sonst bin ich die erste Anlaufstelle für alle anderen Anliegen, die keinem bestimmten Ressort zufallen.





Raoul Klein - Vizepräsident / Hochschulpolitik

Ich vertrete die Interessen der Biologiestudierenden bei unserem Dachverband, dem VSETH, im Fachvereinsrat (FR).

Zusammen mit unserer Delegation gehe ich an den Mitgliederrat (MR), wo der VSETH-Vorstand gewählt wird und das Budget sowie die Rechnung des VSETH und der Kommissionen abgesegnet und geprüft werden.

Leandra Blaser - Quästur

Ich kümmere mich um die Verwaltung der Finanzen des VeBiS. Dazu gehört unter anderem das Erstellen und Kontrollieren des Budgets, das Bezahlen eingehender Rechnungen sowie das Ausstellen von Rechnungen an andere Fachvereine. Zudem unterstütze ich den restlichen Vorstand bei finanziellen Fragen und berate bei der Planung und Durchführung von Veranstaltungen, insbesondere in Bezug auf Budgetierung und Abrechnung.



Ke Ni - Studentisches

Zusammen mit Emma organisiere ich verschiedene Angebote rund ums Studium – vom Semester- und Blockkursfeedback über PVKs, den Semesterendapéro und das Industry x Academia Event bis hin zum Götliabend sowie zu Oster- und Weihnachtsaktionen.

Emma Costan - Studentisches

Zusammen mit Niki mache ich das Studium lebendig: Wir organisieren PVKs, managen Kursfeedback und bieten mit Events wie „Industry x Academia“ berufliche Orientierung. Zudem fördern wir den sozialen Zusammenhalt durch Apéros, Götliabende und saisonale Schoggi-Aktionen.



Ewa Sokolowska - Hochschulpolitik

Ich vertrete die Biologiestudierenden gegenüber dem Department Biologie. Dazu gehört die Teilnahme an Sitzungen der Unterrichtskommission sowie an den Departmentkonferenzen.

Sean Fraile - Industrie

Mit diesem neuen Ressort, möchte ich unseren Studis einen besseren Zugang zur Industrie geben. Dazu befasse ich mich mit Career- und Networking Events (z.B. Polymesse) und pflege den Kontakt mit bestehenden sowie neuen Sponsoren.

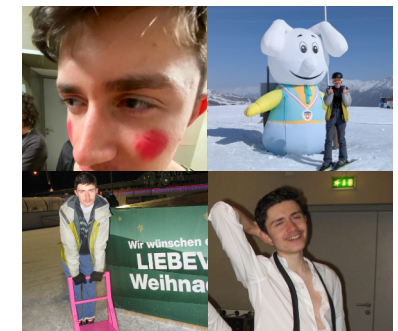


Julia Huang - Kultur

Als Kulturi organisiere ich zusammen mit Antonia und James Events und Partys im Semester, ihr könnt euch also auf viele spannende bondings und get-togethers freuen 🤪

James Lobont - Kultur

Ich organisiere mit Julia und Antonia Events, die das Leben unserer ETH-Mitstudierenden aufpeppen!





Antonia Blatter - Kultur

Als Kulturi plane und organisiere ich abwechslungsreiche Events, um den Studienalltag aufzulockern. So entstehen Momente, in denen wir zusammenkommen, abschalten und einfach eine gute Zeit haben können.

Candace Kim - Merch/Kommunikation

I try to connect our students with industrial interests and keep the vibes on the board high. Students can always approach me with questions about life in the D-BIOL as I have been suffering in it for a while now. But also with ideas for possible networking events or companies they would like to see more present :)



Enea Sonognini - IT

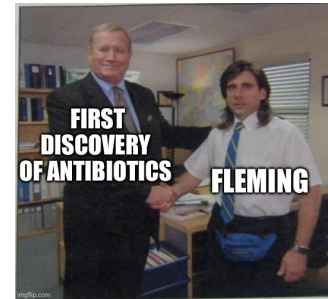
Als IT-Vorstand stelle ich sicher, dass die Website aktuell und funktionsfähig ist, und kümmere mich um Accounts, Berechtigungen und technische Probleme.

Andrin Bär - Biotikum

Als Chefredaktor des Biotikums übersehe ich in Zusammenarbeit mit meiner Kommission das Schreiben und Publizieren unseres beliebten Magazins. Zudem repräsentiere ich die Interessen des Biotikums im VeBiS Vorstand.

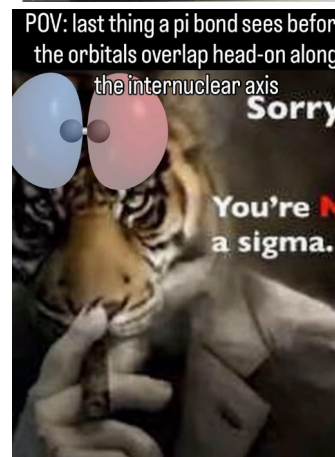


MEMES SENT IN BY THE COMMUNITY

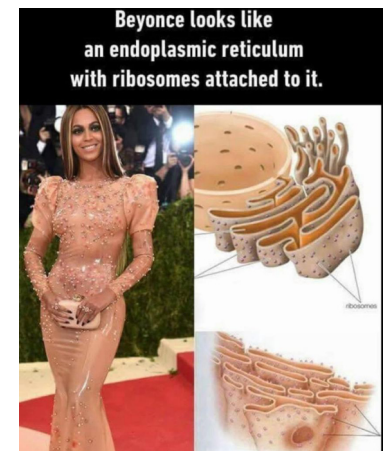
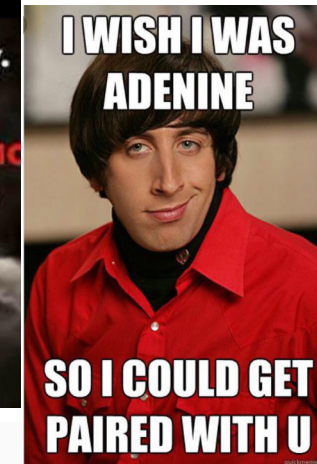


"Dad why is my sisters name Rose?"
"Because your Mother loves roses"
"Thanks Dad"
"No Problem" **THREONINE**

MY CULTURE GROWS NICELY



When you find out approximately 95% of all ocean critters remain undiscovered.



Tunicates



body plan: 2 holes



Vertebrates



body plan:



500 miles - The Cyclical Lives of Salmon

Aiyi Lyu



Salmon spend the majority of their lives in the ocean, only ever entering fresh water during spawning seasons for the purposes of breeding. What is particularly remarkable, is that they die in the very place where they were born in - a detail that feels almost poetic. Particularly given that they usually return to the exact river, and sometimes even the exact spawning ground where they were hatched, with an exceptional precision.

This famous migration of salmon is commonly known as the salmon run, because in order to return to

their freshwater birthing grounds, they need to “run up” rivers. A process that often involves having to jump up a fall. This task requires immense physical strength. There have been records of salmon making vertical jumps as high as 3,65 meters. But if the verticality is not not enough of an obstacle, the distances certainly may be, with some salmon travelling distances of more than 1,400 kilometers to reach their spawning grounds.

The journey is fraught with danger. Predators, including bears, eagles,

and seals, prey heavily on salmon. In fact, some species have developed distinct hunting strategies around this migration. Black bears, for instance, tend to fish at night to avoid competition with the more dominant brown bears, while the white-coated Kermode bears hunt during the day, when their light fur is less conspicuous. But the question remains: why, and how, do salmon undertake such a perilous journey back to their birth-place?

The freshwater environment is optimal for salmon to develop, as it's safer for juveniles since there are more hiding places and more resources for them to grow. Already in the 19th century, there were speculations about a salmon's remarkable ability to “smell” their way home. In 1978, the prominent American limnologist Arthur Hasler, along with a team of students, discovered that salmon use the distinct chemical signatures of their natal streams as homing cues.

Once they arrive in their natal streams, salmon mate and then die, completing their whole lifecycle. Having expended enormous energy during their migration all the way from the ocean, often without sufficient food, their physical condition deteriorates rapidly upon reentering fresh water. While this may seem like a tragic end, their sacrifice is of enormous benefit to the ecosystem and serves a crucial reproduction purpose. The decomposing bodies of salmon enrich the stream's nutrients, supporting insects and other organisms that,

in turn, provide food for newly hatched Salmon fry. Streams that lack dead salmon have fewer insects, therefore less nutrition for the newly hatched fish to feed on.

From a philosophical perspective, it is difficult to ascribe intention or awareness to this behavior. We cannot say whether salmon consciously sacrifice themselves for their offspring. Yet evolution has imprinted in them an unerring instinct to return “home.” The place where they were born has proven suitable for survival, and in some sense, they “trust” it will be the same for their descendants. We may never be able to fully understand what exactly drives them to travel back home, but at some point in our lives and theirs, both our species can relate to that quiet, persistent pull toward home, whether biological or intentional, to the feeling captured in the lyric: “Lord, I’m five hundred miles from my home.”

If you miss the train I'm on, you will know that I am gone

You can hear the whistle blow a hundred miles,

A hundred miles, a hundred miles, a hundred miles, a hundred miles,

You can hear the whistle blow a hundred miles...

FISHES

By Bennet Burmeister

*Blubbing below the surface,
a fish in mid's the lake.
Creating such small circles,
It might've been by mistake.*

*Still round and round their going,
with no set end in sight.
Oh such continuous working,
is anyone's delight.*

*And even if they're breaking,
crashing, bursting out.
The fish it still just blubbers,
With no internal doubt.*

Why We Keep Making the Same Mistakes

The loop inside our minds

Keyi Fang

You told yourself it would be different this time. You'd go to bed earlier, start studying on time, be more disciplined, maybe even become one of those people who always seem to have everything under control. And yet, a few days later, you find yourself in the exact same situation again. Same habits, same decisions, same outcome. It feels frustrating. And strangely familiar.

We often explain this pattern as a lack of discipline or motivation, as if the solution were simply to try harder next time. But what if the problem isn't a failure of will power? What if it's something more fundamental, something built into the way our brains work?

At its core, the human brain is a pattern-recognition machine. It constantly searches for regularities in our behavior and environment, and once it finds something that seems to work, even temporarily, it stores it. The next time a similar situation appears, the brain doesn't start from

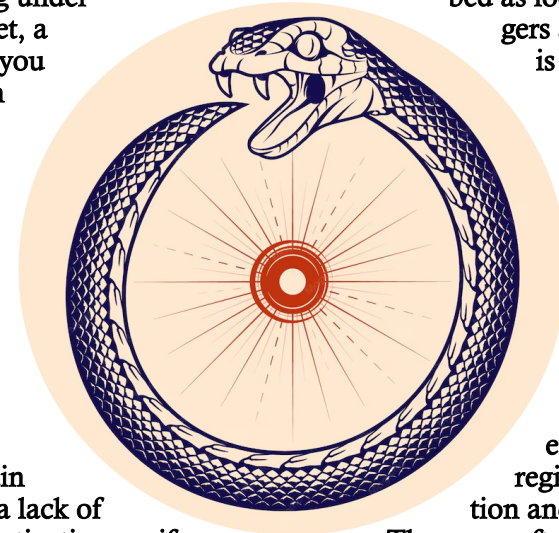
scratch. It reuses what it already knows.

This is how habits are formed. In neuroscience, they are often described as loops: a cue triggers a behavior, which is followed by a reward. The reward doesn't have to be large. Sometimes it's simply relief, the disappearance of stress, uncertainty, or discomfort. But that's enough. The brain registers the connection and strengthens it.

The more often this loop is repeated, the more automatic it becomes, until the behavior feels almost inevitable.

The problem is that this system doesn't distinguish between what is beneficial in the long term and what simply feels better in the moment. It optimizes for familiarity and immediate reward. What is known feels safer than what is uncertain, even if the outcome is objectively worse.

Take procrastination. Faced with a demanding task, the brain anticipates



tes effort, possible failure, and discomfort. Instead, you choose something easier, scrolling, watching something, doing anything that postpones the task. The discomfort disappears. That relief becomes the reward. From the brain's perspective, the loop worked. So it repeats it. But these loops are not limited to productivity or study habits. They extend into the way we structure our lives, the environments we choose, and even the relationships we form.

We tend to gravitate toward what feels familiar. People often find themselves in similar

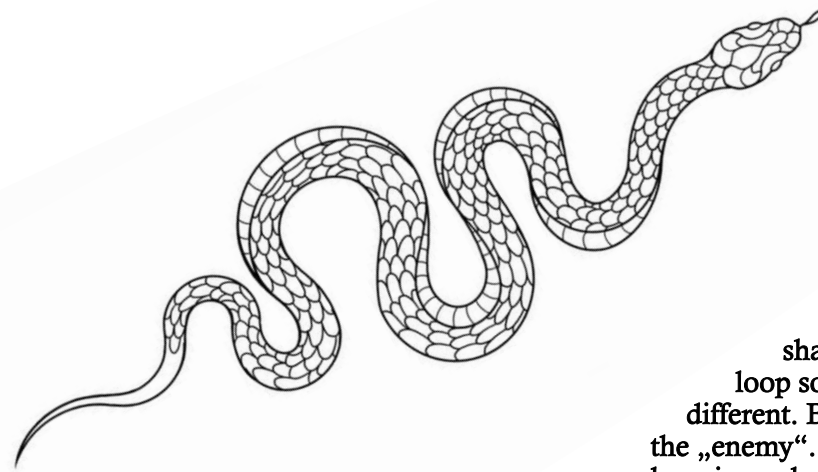
The same pattern appears in smaller, everyday decisions. We return to the same routines, choose similar paths, listen to the same types of music, consume similar content. Even our

emotional reactions can follow loops: how we respond to stress, criticism, or pressure is often less spontaneous than we think, and more a reflection of patterns we have learned over time.

types of relationships, repeating emotional dynamics they have experienced before. Not necessarily because they want to, but because familiarity creates a sense of predictability. And predictability, even when imperfect, feels safer than the unknown. In that sense, we don't just repeat behaviors, we repeat experiences.

Many of these patterns begin early. They are shaped by upbringing, environment, and past experiences. Once established, they rarely disappear. Instead, they persist quietly in the background, guiding decisions in ways that feel natural but are often automatic.

In this sense, repetition is not just something we do. It becomes the struc-



ture we operate within. Over time, this creates a self-reinforcing system. Our behavior shapes our expectations, and our expectations shape our behavior. The loop closes. Like an Ouroboros, it feeds on itself, continuously recreating the same patterns, the same outcomes, the same versions of ourselves.

But if our behavior is shaped by these loops, does that mean we are stuck with them?

Not necessarily. The same mechanisms that create patterns also allow them to change. However, change rarely happens through a single decision or a sudden burst of motivation. It begins with awareness, recognizing the loop itself. Once we identify the cue and understand the reward, we can start to introduce small variations: a different response, a slightly altered routine, a conscious interruption of the automatic.

This doesn't mean breaking the cycle

entirely. In most cases, that's neither realistic nor necessary. Instead, it means reshaping it. Redirecting the loop so that it leads somewhere different. Because repetition is not the „enemy“. It is the foundation of learning, adaptation, and identity. The question is not whether we repeat, we always will, but what exactly we are repeating.

And this is where things become interesting. Because once a pattern becomes visible, it also becomes flexible. What once felt inevitable becomes something we can question. What once felt automatic becomes something we can influence. Change, then, is not a dramatic break from the past, but a gradual shift within it. A slow rewriting of patterns that have been built over time.

Maybe the real question isn't why we keep making the same mistakes. Maybe it's how we decide which patterns are worth repeating and which ones we are ready to leave behind.

And perhaps that is the most important realization: We are not just repeating our behavior. We are constantly rewriting it.

Behind the Curtain: How VeBiS Represents You

By Raoul Klein

Inside the Board

The VeBiS board meets every two weeks to discuss every day decisions, like what colour our board hoodies should be, or whether to offer a new PVK for Systems Biology, and to make sure each board member stays up to date on what's happening across all of our commissions. These meetings also offer valuable opportunities to get feedback or ideas from the other board members. For instance, an example question could be what the other board members think could be improved on the Ve-BiS website or wishes regarding our merchandise.

The detailed work however, largely happens within the individual commissions: the culture commission holds their own separate meetings to come up with event ideas and everything about then planning them. Whilst the Biotikum staff convene to plan out topics for articles and establish publishing deadlines.

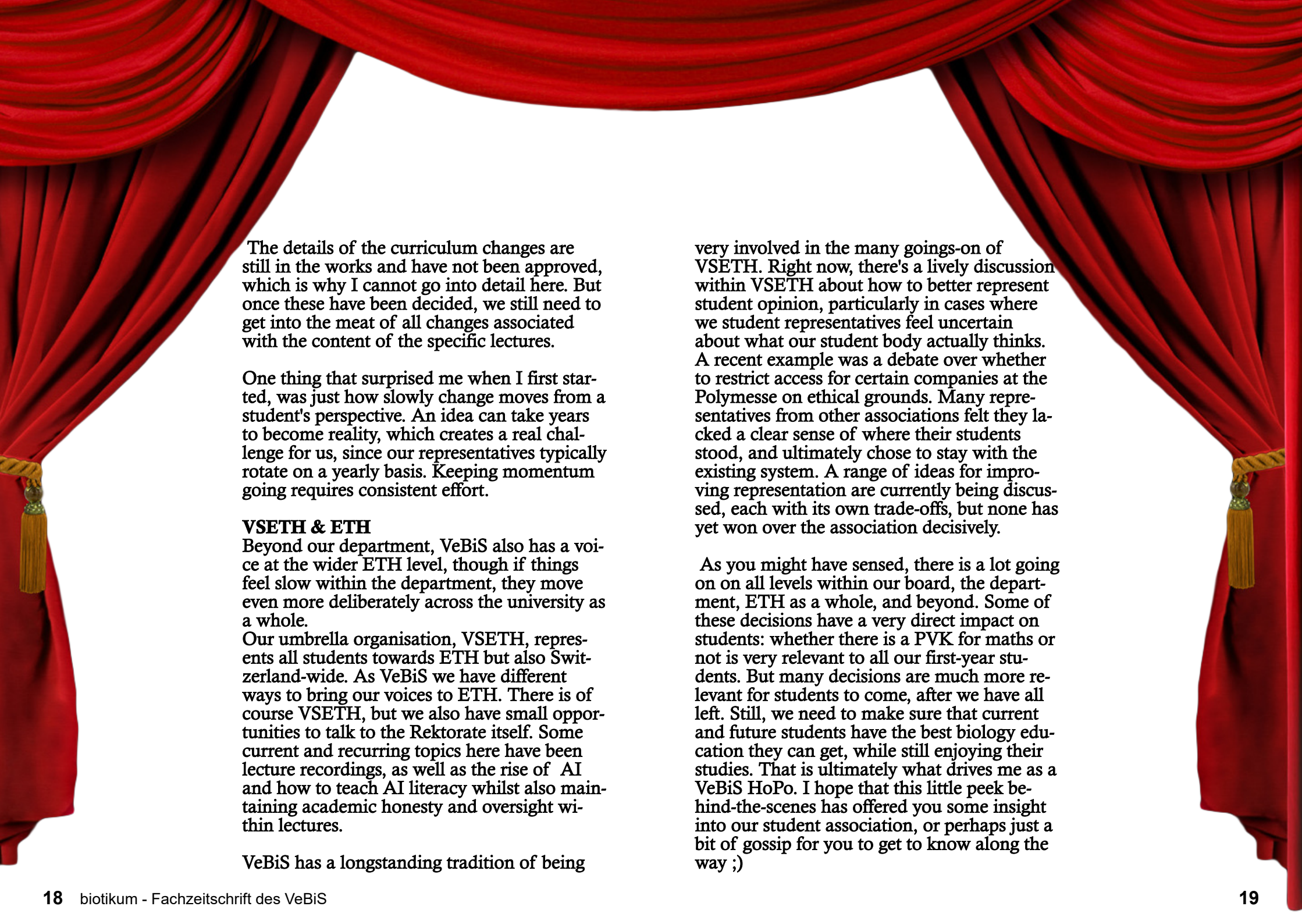
Despite this, our board meeting agenda often fills up quickly. Currently, a primary focus has been the recent PAKETH changes that are being planned for implementation in 2028. With so many changes planned, settling on a position and with only 13 active board mem-

bers whilst still representing the full student body isn't always straightforward. That's why you will occasionally receive surveys from us, as you did with the recent curriculum name change.

PAKETH & the Department

PAKETH, the upcoming shift in ETH's academic calendar, has been pushed to HS28, giving the department a little more breathing room. Still, the detailed regulations governing how the department will adapt its curriculum need to be finalised as early as this September. That's a tight timeline, made more demanding by a recent change in leadership: we said farewell to Prof. Sam Zeemen and welcomed Prof. Kirsten Bomblies as our new Head of Studies earlier this year.

Major decisions such as appointing a Head of Studies or revising the regulations go through the Departementskonferenz (DK), where all professors meet alongside representatives like us. The finer details of curriculum changes are hammered out in the Unterrichtskonferenz (UK), a smaller body of professors, student representatives, and key departmental staff. The UK also handles less sweeping matters, such as approving new courses.



The details of the curriculum changes are still in the works and have not been approved, which is why I cannot go into detail here. But once these have been decided, we still need to get into the meat of all changes associated with the content of the specific lectures.

One thing that surprised me when I first started, was just how slowly change moves from a student's perspective. An idea can take years to become reality, which creates a real challenge for us, since our representatives typically rotate on a yearly basis. Keeping momentum going requires consistent effort.

VSETH & ETH

Beyond our department, VeBiS also has a voice at the wider ETH level, though if things feel slow within the department, they move even more deliberately across the university as a whole.

Our umbrella organisation, VSETH, represents all students towards ETH but also Switzerland-wide. As VeBiS we have different ways to bring our voices to ETH. There is of course VSETH, but we also have small opportunities to talk to the Rektorat itself. Some current and recurring topics here have been lecture recordings, as well as the rise of AI and how to teach AI literacy whilst also maintaining academic honesty and oversight within lectures.

VeBiS has a longstanding tradition of being

very involved in the many goings-on of VSETH. Right now, there's a lively discussion within VSETH about how to better represent student opinion, particularly in cases where we student representatives feel uncertain about what our student body actually thinks. A recent example was a debate over whether to restrict access for certain companies at the Polymesse on ethical grounds. Many representatives from other associations felt they lacked a clear sense of where their students stood, and ultimately chose to stay with the existing system. A range of ideas for improving representation are currently being discussed, each with its own trade-offs, but none has yet won over the association decisively.

As you might have sensed, there is a lot going on on all levels within our board, the department, ETH as a whole, and beyond. Some of these decisions have a very direct impact on students: whether there is a PVK for maths or not is very relevant to all our first-year students. But many decisions are much more relevant for students to come, after we have all left. Still, we need to make sure that current and future students have the best biology education they can get, while still enjoying their studies. That is ultimately what drives me as a VeBiS HoPo. I hope that this little peek behind-the-scenes has offered you some insight into our student association, or perhaps just a bit of gossip for you to get to know along the way ;)

Stop me if this sounds familiar. You are bored. Your mind wanders aimlessly from one thought to the next, drifting between them as though you are floating through a bizarre art gallery, searching for something to disassociate to. But before you can find a suitable inner machination of your mind, you are snapped back to reality by a hissed warning from a parent or colleague not to bite your nails. You hadn't even realised you were. The warning lingers in your mind for a while, keeping your hands far away from your mouth, until you begin to disassociate again, and the cycle repeats.

If the above description is at all relatable to you, you may be among the 20-30% (1) of our population that regularly engages in this form of mild autocannibalism adjacent behaviour, also known as onychophagia. Onychophagia is not the only form of habitual self consumption humans engage in, though other forms, such as dermatophagia (compulsive biting and eating of skin, often around the fingers) or trichophagia (ingestion of one's own hair, often associated with hair-pulling disorder) are far less prevalent. In medicine these different phenomena are all clasped under the umbrella term Body-Fo-

cused Repetitive Behaviours (BFRBs). BFRBs do not always involve autocannibalistic symptoms, but all of them share one thing in common: repeated habitual manipulation of one's own body, often to the point of damage. Despite these behaviours being of no benefit to the organism per se, they are associated with relief or reward-like signals within the brain, reducing internal tension and making the habit incredibly hard to break once it forms.

Humans are not the only species to exhibit BFRB-like compulsions. What seems to be fairly unique to humans, however, is such behaviours resulting in consumption of pieces of oneself. The closest example, found in fellow mammals are self-injuring behaviours in rodents, wherein stress caused by laboratory settings may cause excessive grooming or biting of limbs or tails to the point of creating lesions (2). Though not quite the same, captive pigs are likewise known to exhibit tail biting when stressed (3), though this behaviour more often results in cannibalism occurring between pigs, rather than a pig eating a piece of itself. There is really only one animal that it can be said engages in a truer form of autocannibalism than humans, but interestingly,

that animal is quite a bit further away on the evolutionary tree. Ouroboros Syndrome, as it is sometimes colloquially referred to, is the phenomenon by which a snake consumes its own tail. Whilst generally rare, given there is little evolutionary advantage for a snake consuming itself to the point of death, the phenomenon is surprisingly well documented. Some particularly disturbed snakes have even been known to bite themselves repeatedly, and cyclically (4). Incidents of these autocannibalistic behaviours are generally attributed to stress, overheating, or



neurological dysfunction, paired with the misfiring of predatory strike responses toward the animal's own tail (5). Yet when faced with such a biological oddity, humans of the past saw far more than merely a distressed snake's abnormal reaction to abnormal circumstances, but a symbol. Though the name Ouroboros meaning "tail-eater" would only be bestowed upon such symbols by the Ancient Greek and Hellenistic world, the association of self devouring serpents

with life, death, and rebirth, would already be cemented from their earliest depictions. The earliest depictions of ouroboric serpents appear around the 14th century BCE, in Egyptian funerary and religious texts. Within one such text, The Enigmatic Book of the Netherworld, two serpents are depicted encircling the sun god Ra, accompanying him in his journey through the underworld every night, and echoing the resurrection of the god Osiris. Here, the snakes hold over life and death, mirror their venom holding both the power to inflict death, and the power to bestow it through the creation of medicines and antivenoms. The symbol would continue to be adopted and expanded upon, featuring in alchemical practices of Islam, as well as Renaissance Europe, wherein it represents a cosmic unity: A cycle of simultaneous creation, destruction and eternal self transformation, befitting of snakes, who so regularly shed their skins.

Yet the concepts of eternal serpents are not unique to these Egyptian roots. In Norse Mythology the world serpent



Jörmungandr, encircles the world, and rises at the time of Ragnarök, thereby destroying the world and ushering in its rebirth. Here, the snake serves as a sort of barrier between the known and unknowable, a boundary to the world itself. The Aztecs had the feathered serpent Quetzalcoatl, not only associated with wisdom and knowledge, but also described in some tellings as having travelled to the underworld to collect the bones of past humans from past ages, mixing them with its own blood to create the current human race. In fact, one of the oldest religious symbols of all time is a snake. Stories of the “Rainbow Serpent” of Aboriginal Australian heritage are believed to originate from almost 40,000 years ago, though cave paintings depicting the deity are somewhat more recent, at only 6,000 to 8,000 years old. But all these ancient serpent stories bring one question to mind, why snakes?

Evidence of snake and human interaction goes far beyond mere speculation, it appears to perhaps even have had evolutionary consequences. Studies have found that humans and non-experts can often detect snakes faster than many other objects in visual search tasks (6). This perceptual bias suggests that snakes are not only culturally significant, but cognitively prioritized—more likely to be encoded, remembered, and subsequently mythologized. The snakes, for their part, have also adapted to us. Current evidence suggests that the convergent evolution of spitting cobra venom and delivery mechanism coincides with the rise of early hominins, suggesting that interactions with visually oriented, tool-using primates may have been an important selective pressure (7).

The question emerges, why snakes? Is it their inherent danger that makes them so easily remembered? Or perhaps, is it something deeper? When faced with the boundaries of knowledge, the ouroboros, and other serpentine symbols like it, seem to emerge throughout history not because they explain the world accurately, but because they mirror something far more human: an organism attempting to make meaning of its own existence. Trapped in an endless cycle of existence, unable to fully grasp the confines of its own unknowing, it turns inward, seeking the certainty of itself, the same way that a body regulates itself through small, compulsive acts. The wandering mind returns, the hand lifts, once again, to the mouth, and so the cycle repeats...hey! Stop biting your nails!

Sources for further reading:

- (1) The 20-30% incidence of onychophagia in our population is the most frequently cited number in most sources discussing the habit. Among these sources I would recommend: Baghchechi, M., Pelletier, J. L., & Jacob, S. E. (2020). Art of prevention: The importance of tackling the nail biting habit. *International Journal of Women's Dermatology*, 7(3), 309-313.
- (2) Jafari, M. (2008). Using rodents for modeling self-injurious behaviour. *Annals of General Psychiatry*, 7(Suppl 1), S290.
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We were all born from the waters,
basking in the shallows under a young Sun

RETURN TO SEA

By ENEA SONOGNINI & LUCA RIVERA



But the love of Brothers

So you banished us



is a love of Knives

...unto Land

Where our line would be extinct



But We...

Have Returned

UUUUU:UUUUUUOOOIIUUUU

THE ICN)SIDE STORY

“ISIDE, or the In Silico Immune Defence Evaluator, is a student project at ETH that aims to create a mathematical model of the human immune system for hypothesis generation and experimental design. In this issue, the Biotikum has invited Bowen Zeng to write a little bit about the project, and what it hopes to achieve.”

Just like the ancient, self-devouring serpent, the human body eats itself alive every day. This often involves death and sacrifice of our cells. Across millions of years of evolution, “the few must die so that the many may live” seems to be life’s favourite motto. And honestly? We owe a lot to this motto. It is the reason we are able to survive today, pursuing dreams and (hopefully) meeting deadlines. All this would not have been possible, if we had had to instead spend our waking days worrying about the invisible hostilities of the world - prickly attacks from microbes, viruses and even our own cells going rogue. Thankfully for all of us, the fruits of evolutionary labour have bestowed upon us an absolutely wonderful immune system.

Be it a harmless sneeze from a pollen allergy or a rare autoimmune disease, the immune system has shown itself

to be both a key guardian of health and its troublemaker. As a group of Erstis in Bio and Pharma first sat down to brainstorm a Maths Meets Biology idea, the true complexity of this system seemed like the obvious starting point. Pondering over the brightly coloured textbook cartoons of receptors and immune cells, we thought to ourselves: “wouldn’t it be so cool if we could find a way to try and understand all of this complicated biology, with the clean, crisp language of Mathematics?” And that was where it began.

With like around 10% of the required expertise but 90% of curiosity, we set out, and after a lot of trial-and-erroring, were able to create a prototype model of the innate immune system, merging knowledge from our first year Biology, Mathematics and Informatics courses. By the end of that

spring, the model consisted of a feedback loop, uniting a biological map of key immune pathways and a system of differential equations. Was it stressful? Absolutely. Did we lose sleep over papers and parameters? You bet. Yet somehow, finding ways to apply things taught during lectures to our own project actually turned out to be an incredibly rewarding experience.

That’s not the end of the story, though. Sure, we gave ourselves some pats on the back for a couple of Erstis who had never even sat in a Systems Biology lecture. But then more thoughts crept in. After all, now that we have a proof of concept, couldn’t there be many more exciting questions out there, waiting to be answered? What would our model look like if we included the adaptive pathways? Can it truly cater to the vast varieties of pathogens our immune system encounters? Could it be used to simulate diseases or vaccinations? That’s when it hit us: we couldn’t possibly stop here. Developing independently from the initial Math Meets Biology framework, the In Silico Immune Defence Evaluator (ISIDE) was born. We are under no illusion that the path forwards is riddled with

challenges. For instance, online resources for similar pathways are often context-dependent and difficult to compare. Yet it is precisely these challenges that make ISIDE so worth pursuing. Rather than attempting to model every individual immune pathway in its full complexity, we instead want to construct a modular system that can be assembled, much like Lego bricks, to help answer a broad variety of questions.

To tie it all back to Ouroboros, ISIDE, too, is renewing itself everyday. We tweak it, test it, add to it, learn from it, and with each iteration, we hope it becomes a little more useful (or at least more inspirational) for more curious souls to iterate upon further. Speaking of renewal, we have recently welcomed a new team member to our preexisting group of 5. So if anyone is interested in hearing more from us, do feel free to contact me via bo-zeng@ethz.ch, or reach out to any of our group members: Andrin Bär, Lilia Eisenmann, Patrick Märki, Ewa Sokolowska and Enea Sonognini. We are always happy for feedback or suggestions on what problems -äh ähm- “Lego bricks” to lose sleep over next!

Social Jetlag

Wenn unsere innere Uhr nicht zur Welt passt

KEYI FANG

Warum fällt es so vielen Studierenden schwer, morgens aufzustehen, selbst wenn sie genug geschlafen haben? Und warum fühlen sich viele am Wochenende plötzlich energiegeladener, obwohl sie eigentlich nichts „anders“ machen? Die Antwort liegt oft nicht in Disziplin oder Motivation, sondern in einem biologischen Phänomen: dem sogenannten Social Jetlag.

Unser Körper folgt einer inneren Uhr, dem sogenannten circadianen Rhythmus. Dieser steuert zahlreiche Prozesse im Körper, darunter Schlaf, Hormonproduktion, Körpertemperatur und Stoffwechsel. Gesteuert wird diese Uhr von einer Struktur im Gehirn, dem suprachiasmatischen Nukleus (SCN), der auf Lichtsignale reagiert. Licht am Morgen signalisiert dem Körper: Der Tag beginnt. Dunkelheit hingegen fördert die Ausschüttung von Melatonin und bereitet uns auf den Schlaf vor.

Doch nicht alle Menschen ticken gleich. Es gibt sogenannte Chronotypen: Während „Lerchen“ früh wach und früh aktiv sind, fühlen sich „Eulen“ erst spät am Abend wirklich leistungsfähig. Diese Unterschiede sind teilweise genetisch bedingt und lassen sich nur begrenzt verändern. Genau hier beginnt das Problem: Unsere Gesellschaft ist stark auf Frühaufsteher ausgerichtet, Vorlesungen, Arbeitstage und Termine beginnen oft früh am Morgen. Für viele Nachtmenschen bedeutet das, gegen ihre biologische Uhr zu leben.

Dieses Missverhältnis zwischen innerer Uhr und sozialem Zeitplan bezeichnet man als Social Jetlag. Anders als beim klassischen Jetlag durch Reisen verschiebt sich hier nicht die Zeitzone, sondern die Anforderungen des Alltags stehen im Konflikt mit unserem natürlichen Rhythmus. Ein typisches Beispiel: Unter der Woche müssen Studierende früh aufstehen, obwohl ihr Körper eigentlich länger schlafen möchte. Am Wochenende holen sie den Schlaf nach und gehen deutlich später ins Bett. Das Ergebnis ist ein ständiger Wechsel des Schlafrhythmus, ähnlich wie bei einem Flug über mehrere Zeitzonen hinweg, jede Woche aufs Neue.

Doch ist ein später Schlafrhythmus automatisch ungesund? Die Forschung

deutet darauf hin, dass nicht unbedingt die Uhrzeit entscheidend ist, sondern die Stabilität des Rhythmus. Menschen, die regelmäßig zu denselben Zeiten schlafen und aufwachen, auch wenn diese Zeiten später liegen, können durchaus einen gesunden Schlaf haben. Problematisch wird es vor allem dann, wenn der Rhythmus ständig wechselt oder nicht mit externen Anforderungen synchronisiert ist.

Eine naheliegende Frage ist daher: Könnte man nicht einfach seinen eigenen Rhythmus leben? Theoretisch ja. Da Licht der wichtigste Zeitgeber für unsere innere Uhr ist, kann ein veränderter Licht-Dunkel-Zyklus den Schlafrhythmus verschieben. Wer nachts helles Licht nutzt und tagsüber konsequent Dunkelheit simuliert, kann seine biologische Uhr teilweise anpassen, ähnlich wie bei einem Aufenthalt in einer anderen Zeitzone.

In der Praxis ist das jedoch schwierig. Natürliches Tageslicht ist sehr intensiv und beeinflusst den Körper stark. Gleichzeitig spielen auch soziale Faktoren eine Rolle: Essenszeiten, soziale Kontakte und Verpflichtungen wirken ebenfalls als Zeitgeber. Selbst wenn man seinen Schlafrhythmus technisch verschieben könnte, bleibt die Herausforderung, diese dauerhaft stabil zu halten.

Langfristig kann ein anhaltender Social Jetlag mit verschiedenen gesundheitlichen Problemen in Verbindung stehen. Studien zeigen Zusammenhänge mit erhöhtem Risiko für Stoffwechselstörungen, schlechtere Schlafqualität und verringerte kognitive Leistungsfähigkeit. Besonders relevant ist dies für Studierende, die häufig zwischen unterschiedlichen Schlafrhythmen wechseln und gleichzeitig hohe mentale Anforderungen bewältigen müssen.

Social Jetlag zeigt somit ein grundlegendes Spannungsfeld zwischen Biologie und Gesellschaft. Während unser Körper evolutionär an natürliche Lichtzyklen angepasst ist, folgt unser Alltag festen Zeitstrukturen, die nicht für alle gleich gut funktionieren. Die Frage ist also weniger, ob ein später Schlafrhythmus „falsch“ ist, sondern vielmehr, wie gut er mit den Anforderungen unserer Umwelt harmonisiert.

Am Ende bleibt eine einfache, aber tiefgehende Erkenntnis: Vielleicht sind nicht wir aus dem Takt, sondern die Welt um uns herum...?





ETH Campus Bees - VeBees

Laurent Fäseke ist Leiter des VeBees Campus Bee Project an der ETH Zürich. Für diese Biotikum-Ausgabe haben wir ihn gebeten, uns einige interessante Details über unsere schwarz-gelb gestreiften Freunde zu erzählen.

An alle Leser, die VeBees vielleicht nicht kennen: Wie würden Sie beschreiben, was Sie tun?

Wir betreiben hier auf dem Hönggerberg Campus einen Lehrbienenstand, der allen ETH-Angehörigen offensteht, die das Imkern von Grund auf lernen möchten. Dabei praktizieren wir klassische Methoden und halten die Abläufe so einfach und effizient wie möglich. Gleichzeitig sind wir experimentierfreudig und integrieren neue Ansätze, um stets auf dem neuesten Stand zu bleiben. Zudem wollen wir als Plattform für wissenschaftliche Projekte der ETH-Bienenforschung dienen.



Unser Thema für diese Ausgabe ist "Ouroboros" und Zyklen. Inwiefern beeinflussen natürliche Zyklen wie Jahreszeiten/Tag und Nacht usw. die Bienenzucht?

Ein Bienenvolk ist im Grunde die lebendige Verkörperung des Ouroboros: Ein ewiger Kreislauf aus Werden und Vergehen.

Man muss sich das in verschiedenen Größenordnungen vorstellen:



Der Jahreszyklus: Das ist der große Taktgeber. Das Bienenvolk reagiert auf die Tageslichtlänge und die Außentemperatur. Im Winter lebt das Volk im Energiesparmodus (Winterruhe), um im Frühjahr passend zur ersten Blüte explosionsartig zu wachsen. Dieser Aufbau, die maximale Volksstärke um die Sommersonnenwende und das geplante Schrumpfen im Herbst ist ein perfekter Kreis.

Tag/Nacht-Zyklus: Bienen lieben die Sonne. Sie ist sozusagen ihr Kompass und ihre Uhr. Ohne den Sonnenstand gäbe es keinen Schwänzeltanz und keine Orientierung im Feld. Während sie tagsüber Nektar, Pollen und Harz sammeln, nutzen sie die Nacht für andere Arbeiten im Bienenstock: Nektar wird zu Honig verwandelt, die Brut wird gepflegt und die Waben werden ausgebaut.

Der Lebenszyklus: Auch auf individueller Ebene sehen wir das Ouroboros-Prinzip. Eine Sommerbiene arbeitet sich in wenigen Wochen sprichwörtlich für das Überleben des Ganzen auf, damit das Volk als «Superorganismus» potenziell ewig leben kann.

Als Imker versuchen wir nicht, diese Zyklen zu brechen, sondern unsere Arbeit an sie anzupassen und zu unterstützen.



Was sind einige der Herausforderungen und Chancen, die sich in der Bienenzucht ergeben?

Die größte Herausforderung in der modernen Imkerei ist die Varroa Milbe (Varroa destructor). Sie ist ein gutes Beispiel für einen Parasiten, der seinen eigenen Fortpflanzungszyklus perfekt mit dem seines Wirtes synchronisiert hat. Die Milbe vermehrt sich in der verdeckelten Brutzelle der Bienen. Je mehr das Bienenvolk im Frühjahr expandiert, desto schneller wächst auch die Milben-



population. Ohne das Eingreifen des Imkers kann dieser parallele Zyklus zum Kollaps eines Volkes im Herbst führen. Es ist ein Wettlauf gegen die Zeit, bei dem wir versuchen, die Milbenlast so zu kontrollieren, dass die Winterbienen gesund schlüpfen können. Die Herausforderung besteht darin, Behandlungen mit organischen Säuren (Ameisensäure/Oxalsäure) so präzise in den Jahreszyklus einzutakten, dass sie wirken, ohne die Bienen zu schwächen. Allerdings sehen wir eine große Chance in der Selektion und Zucht auf natürliche Varroa-Resistenz. Das Ziel ist es, Völker zu identifizieren, die den Zyklus der Milbe selbstständig unterbrechen können, ohne den Einsatz von organischen Säuren.



Wie sieht der durchschnittliche Tag in den Bienenstöcken aus?

Je nach Biene läuft der Tag unterschiedlich ab. Junge Ammenbienen sind den ganzen Tag im Stock und pflegen die Brut. Ältere erfahrene Flugbienen sind im Feld. Zudem wird der Tagesrhythmus durch das Licht und die Temperatur bestimmt.

Sobald die Sonne aufgeht und die Temperaturen über ca. 10–12 °C steigen, fliegen die ersten Flugbienen aus und suchen nach den besten Trachtquellen (Nektar und Pollen). Die Rückkehrerinnen vermitteln ihre Funde mit dem bekannten Schwänzeltanz an die anderen Flugbienen, die dann ebenfalls ausfliegen. Während die Flugbienen enorme Mengen an Ressourcen heran-

schleppen, nehmen die jüngeren Bienen im Bienenstock den Nektar ab, verarbeiten ihn und füttern die Larven. In der Dämmerung kehren alle Sammlerinnen zurück und der Nektar wird zu Honig veredelt. In der Nacht fächeln die Bienen mit den Flügeln, um überschüssiges Wasser aus dem frischen Nektar zu verdunsten und ihn zu Honig zu konzentrieren. Das ist das konstante Brausen,



das man hört, wenn man abends am Bienenstock vorbeiläuft. Auch die Königin macht keine Pause. Sie legt in der Hochsaison bis zu 2.000 Eier pro Tag. Soweit ich weiss, hat man mittlerweile auch herausgefunden, dass Bienen in einen schlaf ähnlichen Zustand fallen können, bei dem sie ihr Gedächtnis festigen. Der ganze «Superorganismus» schläft aber nie komplett.



Wie steht es gerade mit den Bienen? Gibt es interessante Projekte?

Im Moment haben wir neun gesunde Völker, von denen wir diesen Frühling und Sommer Honig ernten können. Sie haben auch schon reichlich gesammelt. Diese Woche hat allerdings ein Volk geschwärmt. Wir haben womöglich bei der letzten Kontrolle eine Schwarmzelle übersehen.

Wie schon erwähnt, bietet sich in der Bienenzucht die Chance auf eine Selektion Varroa-resistenter Völker. Wir haben letzten Winter zum ersten Mal die Oxalsäure-Behandlung weggelassen, um den Selektionsdruck zu erhöhen. Ab März haben wir dann angefangen, auf bestimmte Verhaltensmerkmale zu achten: Varroa-resistente Bienenvölker suchen aktiv nach befallenen Brutzellen, entdecken diese und fressen die infizierte Larve auf (oder räumen sie aus). Übrig bleibt dann oft ein durchsichtiges Exoskelett am Boden des Bienenkastens, welches man dann beobachten kann. Das ist unser aktuelles Experiment. Sollten die Völker den hohen Varroa-Druck überstehen, werden wir das Projekt in den nächsten Jahren weiterführen und hoffentlich resistente Bienen züchten können.



Wie kann jeder, der daran interessiert ist, VeBees beizutreten oder mehr zu erfahren, Sie kontaktieren?

Am besten schreibt man uns eine Mail an diese Adresse:

campusbienen@biol.ethz.ch Ihr seid herzlich willkommen! :)



Debrief: EVOCATION - Log 8 (Godseye)

To the offices of our Numen, Percival.

Galiberterras will remain nonviable for habitation for no less than one thousand Earthen years. The loss of the Salvation deep space carrier Ardentirubi is confirmed, alongside 87% crew mortality. Further losses are within acceptable parameters. Victory was decisive. Negotiations concluded rapidly.

With former AIS systems absorbed, our borders are now secured. All remaining AIS deep space shipyards were scuttled following confirmation of their defeat. This outcome was anticipated, though regrettable. Their continued existence would have reduced the duration and human cost of the rearmament phase now before us. Delay is not neutral. Every rotation spent rebuilding increases the relative threat posed by the Kindler Confederation.

Our forces require recalibration. Survivors are depleted. Replacement, consolidation, and reorganisation are necessary before further large-scale engagements can be sustained. Another operation conducted at Galiberterras' intensity, without sufficient recovery and preparation, would degrade Salvation power projection below acceptable thresholds. Should defeat come under such conditions, it would not require Kindler intervention; lesser actors would suffice once living Ginohne-Lhok proliferates.

At present, we retain numerical and industrial superiority. Even accounting for recent losses, this advantage will persist in the near term as we reclaim, repair, and reforge. Optimistically, we possess approximately one Zenith rotation to stabilise. This estimate remains provisional. We have not yet observed Kindler military doctrine in live conditions. Political volatility in the outer rim and former AIS territories remains unresolved.

That volatility presents an alternative vector.

Direct action against the Kindler Confederation is premature. Indirect pressure is not. The outer rim is destabilised, its power structures hollowed out by the AIS collapse. With appropriate guidance, its unrest may be redirected outward. Conflict imposed at the periphery would consume Kindler attention, strain their logistics, and delay technological consolidation. The resulting attrition—material and human—would be borne outside our borders while yielding valuable intelligence.

Our psychological operations divisions are rested and available.

The Kindlers will observe an increase in high-grade armaments circulating in their periphery. Given recent events, such a development will not appear anomalous.

At your command, Numen, this initiative can be activated immediately. EVOCATION is no longer a passive intelligence exercise. It is now integral to long-term force preservation. The mole's priority must shift accordingly. Intelligence on the Kindler Armed Forces—composition, doctrine, deployment timelines—is no longer optional. It is decisive. For peace and prosperity in our time.

Godseye

> Log XI: Stoking the Flames - Operation Day: 376 (Cicerone)

HAVEN, instability in the outer rim continues to accelerate. As anticipated, the Kindler Confederation has responded by increasing patrol density and internal security measures throughout Confederation space. As a result, establishing undetected contact with the mole has become increasingly difficult. That said, our concealment protocols remain uncompromised.

The latest transmission is of particular relevance. It contains both cultural intelligence and indicators that may be leveraged for future psychological or indirect operations.

As scheduled, Barterrion returned planetside in time for the Festival of Ribbons, to which the mole was invited. The festival coincides with Ecvilteh's perihelion and marks the final night of the Ecviltehen year. Celebrations last until morning; the preceding and proceeding days are both

designated a city-wide holiday.

The festival's name derives from the ceremonial cloaks worn by Kindler citizens. These family heirlooms consist of a cloak adorned with long, flowing ribbons, which are woven into the fabric upon the death of a family member. A ribbon's length corresponds to the ancestor's lifespan in Earthen years. Many are embroidered with names and biographical details. Ribbons are added sequentially, starting from the center of the cloak and spiralling outward.

The Barterrian family cloak, observed directly by the mole, contains ribbons representing 427 generations. Despite having been constructed from ultralight materials, it weighs a hefty ten ten kilograms.

Festivities include communal food preparation, traditional music, dance, and competitive displays. Most notable is the ritualised duelling, in which participants, donning their ancestral garbs, attempt to score a hit on their opponent while avoiding contact with their cloak. These duels serve as acts of mutual trust and intimacy; as within the chaos of swirling, interwoven ribbons, participants are expected to focus exclusively on one another, immersed in the accumulated history represented by their garments.

These traditions appear rooted in early Kindler history, which is characterised by long-term survival amid persistent external conflict. The cultural emphasis on personal combat proficiency and defensive readiness reflects this origin. The Confederation maintains neutrality by necessity, not pacifism.

That neutrality is now under strain.

Kindler media has begun openly discussing concerns regarding the emergence of organised criminal networks in former AIS territories. Reports cite increased raiding activity along deep-space shipping lanes, though operations remain fragmented and unsophisticated. Given the Confederation's unique possession of living Ginohne-Lhok, heightened vigilance toward peripheral actors is expected.

The Kindler High Council has convened an emergency session to address security measures surrounding all known Ginohne-Lhok lineages. The seedling implanted within the Ecvilteh Deep Crust Basin is now under constant surveillance, with armed personnel permanently stationed nearby. Another

gemburst is anticipated, though no timeline has been released.

Of the remaining samples, one is confirmed aboard a high-security deep space vessel, location undisclosed. The third has vanished from the public record entirely, strongly suggesting KARD—and, by extension, the Kindler Armed Forces—are directly involved.

Rumours continue to circulate regarding an unidentified black craft observed near Kindler space. Of particular concern is the emerging pattern that a significant number of these reports originate locations previously utilised for our check ins. Some speculate that the missing strain may already be undergoing live implementation aboard this platform. The High Council has not formally acknowledged the sightings. One council member has stated only that the Armed Forces are "aware" of the reports. This degree of opacity is atypical for the Confederation.

Public response has followed. Citizens have already begun circulating petitions demanding disclosure regarding the craft; these petitions are already a quarter of the way toward the threshold required for Council consideration.

Barterrian himself has publicly expressed unease. In a recent interview, he reiterated that both his and Fidesios' intent was for the discovery to serve civilian advancement and peace, not warfare. He acknowledged awareness of military potential but expressed hope that Kindler neutrality would render such considerations unnecessary. Given his partner's position on the High Council, it is probable that his public statements underrepresent his private knowledge.

Despite the prevailing tension, Barterrian has elected to take leave. He and Verie are planning a six-week sailing journey to Dehagcao, far south of Aurrou. The mole has been invited to accompany them, along with three other sailing club staff, to crew the vessel.

The journey coincides with a local Dehagcao tradition: a non-flight pilgrimage to an ancestor's birthplace following their death. Barterrian will also be joined by Trylvian Raniauer, a journalist and lifelong associate, to whom Barterrian has promised exclusive rights to his biography, as well as Gallahad Eoalloy, Fidesios' godson.

The mole will continue collection efforts.

Key Words (for those who are just jumping in)

Do be sure to head back to our earlier issues to catch up with the whole project ;)

“Ginohne-Lhok” An organism whose remains are used in various technologies on account of its “flexible crystalline structure.” Essentially the backbone of all modern technologies in the galaxy.

“Shadowvein”: A widespread parasitic organism that infects Ginohne-Lhok. Upon death, Ginohne-Lhok embrittles, becoming less useful as a result.

Keep your sensors tuned to
B10-T1kum for further up-
dates!

(To be continued...)

- Adrian Bär

Das Letzte

So schnell ist das Biotikum auch schon durchgelesen. Aber halt, der Spass muss kein Ende haben:

Redakteur*in gesucht!

Schreibst du gern? Hast du Interesse an Journalismus? Möchtest du andere an deinem Schreibtalent und deinem Wissen teilhaben lassen? Oder einfach mal deine Schreiblust stillen?

Wenn du alle oder auch nur eine dieser Fragen mit ja beantworten würdest, dann melde dich bei redaktion@vebis.ch und unterstütze unsere Kommission!

Dankeschön

Ein grosses Dankeschön an Alice Andonovski fürs Layout sowie an die ganze Redaktion für die vielen Artikel!

Bis zur nächsten Ausgabe!



voeth



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