

FROM GUT TO GALLERY

Bacteria on the move

Honingleder,
by Julia Kraymer



Honingleder (detail),
by Julia Kraymer

Some 40 trillion invisible organisms cover every surface of our body, inside and out. This microbiome of bacteria, yeast, viruses, and fungi that we have accumulated throughout our life, since birth, is especially concentrated in our gut. The role *E. coli* plays in digestion is well known, and sometimes our candida or staph levels will get a bit boisterous and we'll have a yeast infection or a sty. But up until recently, these mysterious personal squatters have not been given much attention, based solely on the assumption that the microscopic organisms live in neutral harmony with each other and with us. But what if our bodies are, in fact, made up of more microbiome cells than human cells?

It's a real turn-up for the books. To consider the bacteria that inhabit every fragment of our being as friends to cherish rather than to abolish is the pole opposite of all we had perceived to be true hitherto. Thanks to a few insightful scientists and designers, our eyes have been supremely opened not only to this real and lovely fact, but also to the plethora of possibilities for the development of innovative and ecological materials, and by extension, items both functional and ornamental. With diverse examples being 'grown' by a handful of designers and an increasing number of students, this evolution, we feel, is cause to celebrate.

TEXT Nadine Botha

Since we are truly more microbiome than human, what does it even mean to be a person anymore? As opposed to our obsession with everyone being an individual, are we actually ecosystems or superorganisms or conglomerate ecological corporations? This is the inspiration behind Austrian designer Sonja Baumel's current project, which involves researching the social interactions of bacteria and of other microorganisms, in collaboration with a scientist and a cultural historian. Research has linked depression, mood-swings, stress, cravings, diabetes, heart disease, and weight management with our invisible cohabitants, meaning that they could very well be contributing to our consciousness and decision-



Expanded Self, 2012
© Sonja Bäümel

Expanded Self II, 2015, © Sonja Bäümel
Photo: Cassander Eeftinck Schattenkerk

making. Scientists at Virginia Tech have announced that they may soon be controlling a robot brain using *E. coli*. Bäümel has been working with bacteria for over seven years, since graduating from Design Academy Eindhoven with a project exploring bacteria's relation to fashion, which earned her top honours. Since then, others have developed bacterial fabrication techniques, such as New York fashion designer Suzanne Lee, who produced a Biocouture range of leather jackets.

In the same vein, German design student Julia Krayer recently showed Honingleder at Cologne Design Week. Translated as honey leather, it's a skin-like material produced by bacteria that, during the fermentation process (of the same sort used in the beverage industry), metabolise sugar and secondary plant compounds into cellulose fibres. The result, says Krayer, is "a range of materials that can be slotted somewhere between textile, leather, and paper." By incorporating the positive associations of honey and leather, she also hopes to challenge people's perceptions of bacteria as 'disgusting' and 'dangerous'.

HOW DO YOU DO?

It is this question of our relationship to and perception of bacteria that has also taken over Bäümel's original fashion-based practice: "Now I'm figur-

ing out that it's more about finding alternatives for the platforms surrounding the body, not necessarily about finding solutions for the existing fashion system." Recent works have included an agar cast of herself imprinted with her own microbiome and allowed to grow during an exhibition at the Waag Society in Amsterdam last year, and continuous explorations into visualising the bacteria on our body through dyes in petri dishes. Destigmatising bacteria is an important component, and for her on-going Metabodies project she obtained the handprints of a couple after exercise, after sex, and after showering, collecting these in petri dishes. People were surprised to discover that the most bacteria were present after showering, challenging our perception of what 'dirty' means. Bäümel explains that our skin's pores release a new layer of bacterial protection each time we wash.

The importance of preserving our bacterial pals in order to maintain healthy immune systems and prevent the increasing threat of antimicrobial resistance and superbugs, is the message behind a fun, pop-up Pet Shop by the Waag Society – an institute that has been facilitating trans-disciplinary experimentation and research in the fields of art, science, and technology for over 20 years. Friendly, adorable microorganisms with names like night-owl photobacteria, cool-cat spirulina, and fluffy fungi, as well as a range

of DIY hardware that includes a microscope and an incubator, aim to appeal to kids, creatives, and hackers alike. By anthropomorphising microorganisms, the hope is that we'll resist the temptation to use antibacterial household cleaners and toiletries.

WHO'S WATCHING YOU?

Not destroying our microbiome is a good thing, unless you're trying to hide from Big Brother, as designer Emma Dorothy Conley explored in her Microbiome Security Agency project. Conley latched onto the discovery that each person's microbiome is completely unique, like a fingerprint. In theory, it can provide information about our lifestyle, the people we're living with, and where we've been – this is how shoplifter spray works, by intentionally adding trace-DNA to the suspect's microbiome. "As soon as something is touted as being so specific to an individual that it can identify us, we need to ask how this will infringe on our personal privacy", says the Ireland-based American. Winner of the 2015 Bio Art

and Design Award in the Netherlands, she had collaborated with scientist Guus Roeselers to work out how one might camouflage the bacterial traces one leaves everywhere. The result is a range of pseudo cosmetics that adds so much raw DNA data to your microbiome that it would overload an identification test with too much information. An installation at the MU Artspace in Eindhoven allowed people to contribute bacteria – the more bacterial-DNA data included in the cosmetics, the more effective they were – and to apply it to themselves in powder form.



COMMUNITY BACTERIA BANK

INVESTING IN YOUR MICROBIOLOGICAL PRIVACY

HOW IT WORKS

THE MSA'S COMMUNITY BACTERIA BANK ENABLES CITIZENS TO INVEST IN THE PROTECTION OF THEIR MICROBIOLOGICAL PRIVACY.

Citizens donate samples of bacteria-filled items and MSA agents blend them into a unique synthetic

ecosystem of bacteria. The DNA from this mix is extracted and amplified, creating a DNA solution that can be applied to the skin.

These DNA "Obscuration Solutions" are dispensed through Automated Obscuration

Machines (AOMs), enabling investors to select their own microbiological privacy settings. Investors can deposit random samples of bacteria into the distributed AOMs around their city. MSA Agents collect the samples and drop them

through the large funnel in the top of the Community Bacteria Bank. The accumulated samples can be seen and measured through the Bacteriometer. Eventually they are accessed by the MSA and made into a new Obscuration Solution.

BANK ELEMENTS

DONATION STATION
BACTERIOMETER
AOMS
GEL AOM
MIST AOM
POWDER AOM
UV CHECK STATION

Microbiome Security Agency (MSA) project, 2015
© Emma Dorothy Conley and Guus Roeselers



Living Language, 2015
Bacterium modelling of Hebrew characters
© Ori Eliasar



For Bäümel however, bacteria and microorganisms are not simply inert DNA; she is therefore pushing to adopt the methodology of metagenomics in her practice. This means that rather than looking at a single species in isolation and from the perspective of DNA, the emphasis is on trans-species social interaction and communication. In short: bacterial intelligence. “Only because they’re smaller – scale is a very interesting aspect in this project – are they seen to have less value than us”, says Bäümel.

GROWING CONCERN

A typography project by Ori Eliasar called Living Language unpeels some of the philosophical layers embedded in the notion of humans having an intelligent

microbiome. Eliasar created ancient Palaeo-Hebrew letters in petri dishes using bacteria, and then added algal proteins in the shape of the modern Hebrew alphabet. As the bacteria grow, the initial shapes change into the new letters. “Using my research, experiments, and results, I am hoping to infuse nature, culture, character, and language with some new theories of my own”, says the Israeli about his graduation project.

Working in a school comes with certain liberties; however, for galleries and institutes moving into the realm of art and design utilising the medium of bacteria, from inert DNA to actual living matter, things are less obvious. This is uncharted terrain and it raises an entirely unexplored field of ethical and technical presentation issues. Bäümel experienced this first-hand when her installation at the Waag Society last year was removed prematurely because the results had not been anticipated by the organisation. Although disappointed, Bäümel is anything but put off; instead she appears incentivised by the challenges posed by being a pioneer. It would take such a spirit to be drawn into the field to begin with, but it’s Bäümel’s slow, methodological approach and her evolving personal attachment to microorganisms which indicate that her work is not gimmicky. “Caring about them is caring about us”, she smiles. •

sonjabaeümel.at
biocouture.co.uk
julia-krauer.de
emmadorothyconley.com
ideaslab.ro/living-language



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