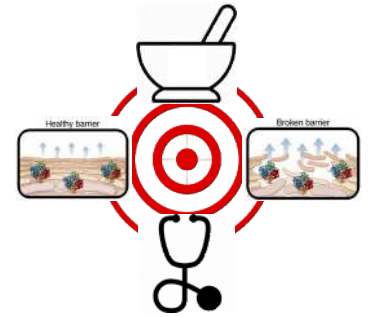




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"Biobarriers – Health, Disorders and Healing"

2019-2028



Johan Engblom, Malmö University
www.mau.se/brcb



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Vision: Shaping novel solutions for improved health through excellent science in partnership with industry

"Biofilms – Research Center for Biointerfaces"

Est. 2005, initiated based on a 6 year "profile-grant" from KKs

12 Professors

16 Assoc. Profs. / Lecturers

~44 Post-docs and PhD-students

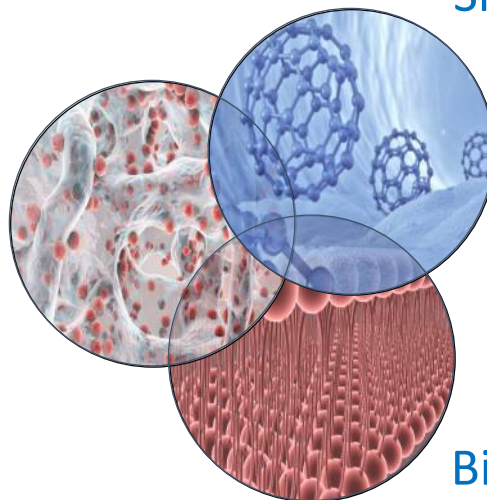
38 ongoing research projects

> 55 industry partners

~80 publications yearly

Three overlapping core areas

Biofilms
at interfaces



Smart materials
at interfaces

Biobarriers and
pharmaceutical design



Thomas
Arnebrant



Therése
Nordström





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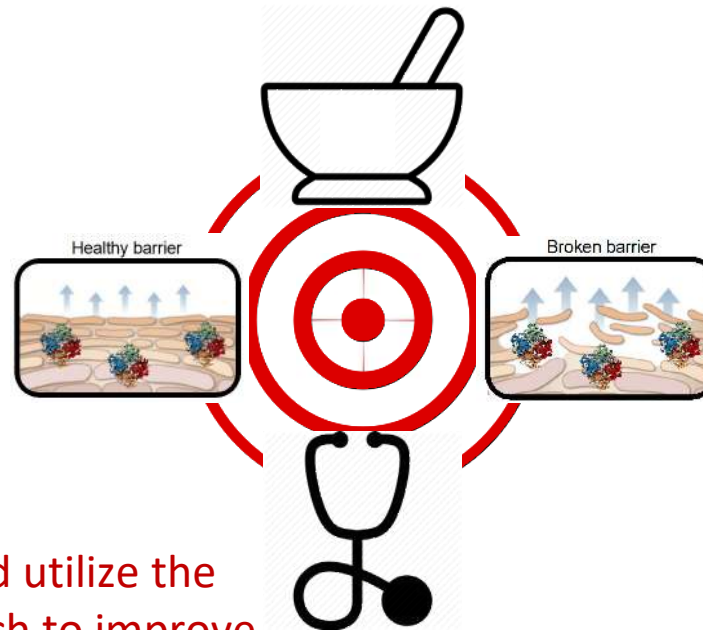
*The 3rd and largest "KKs-profile-grant" at MaU, budget 123 MSEK
Starting with 13 industry partners, and welcoming more...*

"Biobarriers – Health, Disorders and Healing"

2019-2028

Dermatological findings are often the initial manifestation of systemic disease

For mucosal conditions the scene is even more complex and not less severe



Ultimate goal:

To adopt a holistic perspective and utilize the power of multidisciplinary research to improve health and healing of biological barriers.



Johan
Engblom



Tautgirdas
Ruzgas



Therése
Nordström

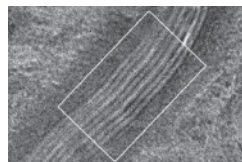
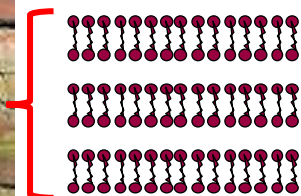
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Michaels AS et al. 1975 & Elias PM. 1983

The Brick and Mortar model

i.e. Corneocytes (keratin filament) and Lipids



Iwai et al, JID 2012

Elias again 2012, 30 years later!



"... , it is too early to conclude that we understand the structural basis of the permeability barrier completely"

Elias PM. JID 2012

A common picture is missing !

of Biobarriers – Health, disorders and Healing

... which could help us to develop good products for specific conditions





1. Sustainable topical formulations, Prof. Vitaly Kocherbitov

Film formation, their properties and their potential in cosmetic and pharmaceutical applications

2. Broken biobarriers, Doc. Sebastian Björklund

Stimulating molecular and biological processes for proper skin barrier formation and function

3. Ex vivo models, Dr. Anna Gustafsson

Ex vivo cell- and tissue-derived models for healthy and disordered skin

4. Microbiota, Dr. Zita Dinis Lopes Da Silva

Promote sustainability of commensal microbiota and limit development of pathogenic biofilms

5. Sensing, Doc. Javier Sotres

Biodegradable/flexible/textile based/high area sensing elements and electronic tongues for e.g. bacterial monitoring

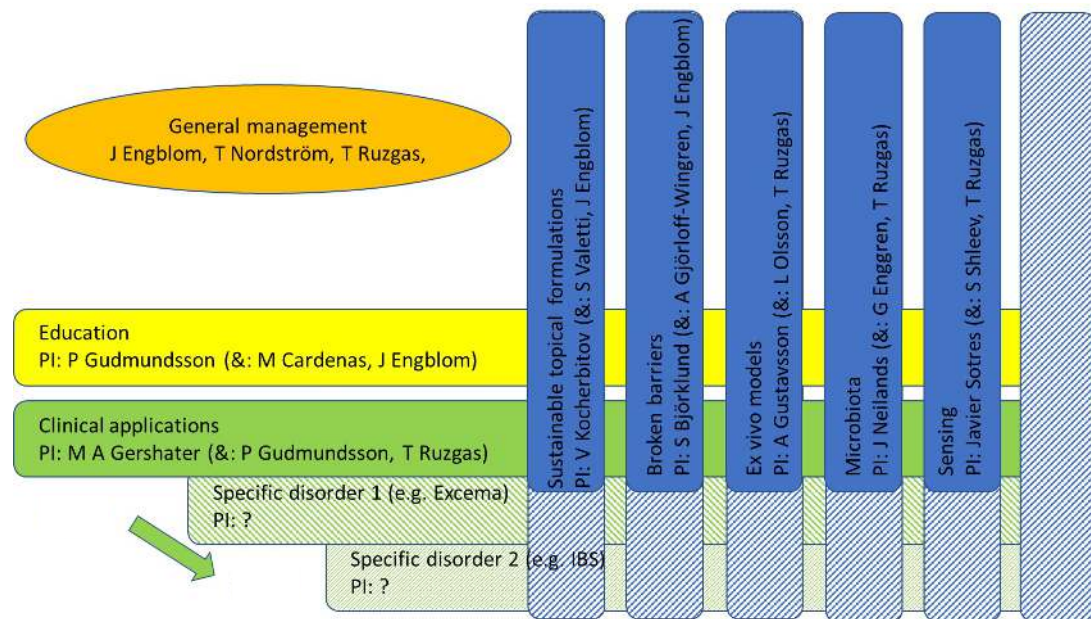
6. Education, Doc. Petri Gudmundsson

Support PI's with ideas on how to promote interactions, partnerships, information exchange and dissemination

Further integrate students as a resource in our research activities and facilitate communications between people with different backgrounds

7. Clinical applications, Dr. Magdalena Annersten Gersharter

Understanding and helping the patient – together with the Diabetes Association of Western Skåne



Operations

2-3/y

All together...

1/y

Conference/workshop ...

1-2/y

Board meeting

Chair: Dr Kosta Karabelas, Bioglan

12/y?

Sub-project meetings/project operations...

up to each team to plan / agree upon

4/y

Quarterly reports (1 slide/ sub project)

?/y

Breakfast seminars, Journal Clubs...



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Journal of Controlled Release 143 (2010) 191–200

Contents lists available at ScienceDirect

Journal of Controlled Release

journal homepage: www.elsevier.com/locate/jconrel



A water gradient can be used to regulate drug transport across skin

Sebastian Björklund^{a,b,*}, Johan Engblom^b, Krister Thuresson^c, Emma Sparr^a

International Journal of
Cosmetic Science



International Journal of Cosmetic Science, 2014, 1–7

doi: 10.1111/ics.12136

Effects of water activity and low molecular weight humectants on skin permeability and hydration dynamics – a double-blind, randomized and controlled study

C. Albèr^{*,†}, I. Buraczewska-Norin[‡], V. Kocherbitov^{*,†}, S. Saleem^{*,†}, M. Lodén[§] and J. Engblom^{*,†}



Journal of Dermatological Treatment



ISSN: 0954-6634 (Print) 1471-1753 (Online) Journal homepage: <https://www.tandfonline.com/loi/ijdt20>

Dry skin management: practical approach in light of latest research on skin structure and function

Ehrhardt Proksch, Enzo Berardesca, Laurent Misery, Johan Engblom & Joke Bouwstra

**SCIENTIFIC
REPORTS**
nature research



OPEN

Skin hydration dynamics investigated by electrical impedance techniques in vivo and in vitro

Maxim Morin^{1,2}, Tautgirdas Ruzgas^{1,2}, Per Svedenhag³, Christopher D. Anderson⁴, Stig Ollmar⁵, Johan Engblom^{1,2} & Sebastian Björklund^{1,2,§}

SCIENTIFIC REPORTS | (2020) 10:17218 |

<https://doi.org/10.1038/s41598-020-73684-y>

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Knowledge Foundation





Amperometric In Vitro Monitoring of Penetration through Skin Membrane

Hala Gari,^[a] Jadwiga Rembiesa,^[a] Ignas Masilionis,^[a] Naida Vreva,^[a] Birgitta Svensson,^[b] Torbjörn Sund,^[b] Henri Hansson,^[c] Anna Karin Morén,^[c] Malin Sjöö,^[d] Marie Wahlgren,^[c] Johan Engblom,^[a] and Tautgirdas Ruzgas^{*,[a]}

Biosensors and Bioelectronics 93 (2017) 9–13



Contents lists available at ScienceDirect

Biosensors and Bioelectronics

journal homepage: www.elsevier.com/locate/bios



Electrochemical monitoring of native catalase activity in skin using skin covered oxygen electrode

Sarah Nocchi^{a,b}, Sebastian Björklund^{a,b}, Birgitta Svensson^c, Johan Engblom^{a,b}, Tautgirdas Ruzgas^{a,b,*}

Biosensors and Bioelectronics 110 (2018) 175–179



Contents lists available at ScienceDirect

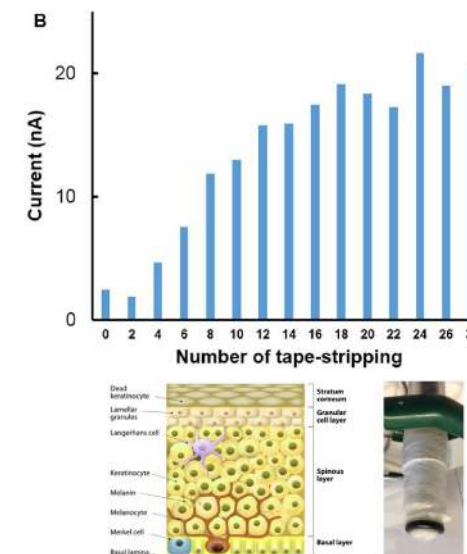
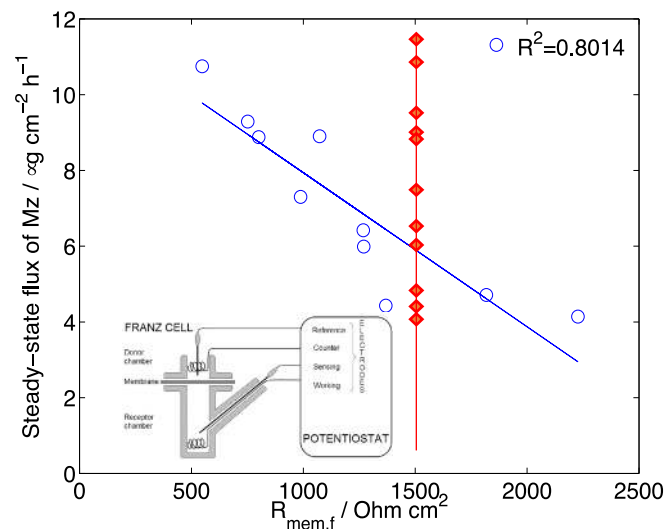
Biosensors and Bioelectronics

journal homepage: www.elsevier.com/locate/bios



In-vitro model for assessing glucose diffusion through skin

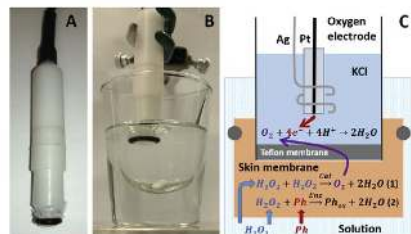
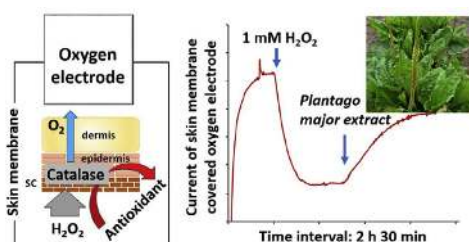
Sana Ullah^a, Fadi Hamade^{a,b}, Urte Bubniene^c, Johan Engblom^a, Arunas Ramanavicius^c, Almira Ramanaviciene^d, Tautgirdas Ruzgas^{a,*}





Polyphenol-hydrogen peroxide reactions in skin: *In vitro* model relevant to study ROS reactions at inflammation

Mahboubeh Eskandari^{a,b,c}, Jadwiga Rembiesa^{a,d,e}, Lauryna Startaitė^d, Anna Holfors^d, Audronė Valančiūtė^{a,e}, Farnoush Faridbod^b, Mohammad Reza Ganjali^{b,c}, Johan Engblom^{a,e}, Tautgirdas Ruzgas^{a,e,*}



New concepts for transdermal delivery of oxygen based on catalase biochemical reactions studied by oxygen electrode amperometry

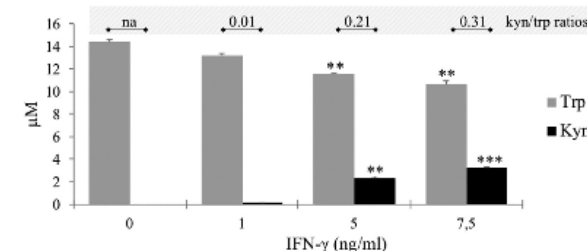
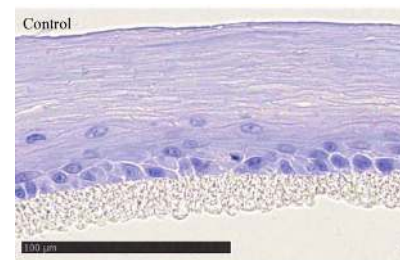
Aura Rocio Hernández^{a,b,c}, Marine Boutonnet^{a,b}, Birgitta Svensson^d, Eile Butler^e, Rolf Lood^f, Kristina Blom^g, Bibiana Vallejo^e, Chris Anderson^h, Johan Engblom^{a,b}, Tautgirdas Ruzgas^{a,b}, Sebastian Björklund^{a,b,*}



Original Article

Effect of IFN-γ on the kynurenine/tryptophan ratio in monolayer-cultured keratinocytes and a 3D reconstructed human epidermis model

Anna Gustafsson^{a,b,*}, Zdenka Prgomet^c, Skaidre Jankovskaja^{a,b}, Tautgirdas Ruzgas^{a,b}, Johan Engblom^{a,b}, Lars Ohlsson^{a,b}, Anette Gjørloff Wingren^{a,b}





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CrystEngComm



PAPER

[View Article Online](#)
[View Journal](#) | [View Issue](#)



Cite this: *CrystEngComm*, 2020, 22, 3840

Mechanisms of crystallisation in polysorbates and sorbitan esters†

Emelie J. Nilsson,^{†*} Tania K. Lind,^{‡ab} Dieter Scherer,^c Tatyana Skansberger,^{ab} Kell Mortensen,^{id} Johan Engblom^{ab} and Vitaly Kocherbitov^{*ab}

Lonza



Journal of Colloid and Interface Science 479 (2016) 207–220



ELSEVIER

Contents lists available at [ScienceDirect](#)

Journal of Colloid and Interface Science

journal homepage: www.elsevier.com/locate/jcis



Regular Article

The effects of polar excipients transcitol and dexpanthenol on molecular mobility, permeability, and electrical impedance of the skin barrier



Sebastian Björklund^{a,b,*}, Quoc Dat Pham^c, Louise Bastholm Jensen^d, Nina Østergaard Knudsen^d, Lars Dencker Nielsen^d, Katarina Ekelund^d, Tautgirdas Ruzgas^{a,b}, Johan Engblom^{a,b}, Emma Sparr^c



Journal of Pharmaceutical Sciences 109 (2020) 2180–2188



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Contents lists available at [ScienceDirect](#)

Journal of Pharmaceutical Sciences

journal homepage: www.jpharmsci.org



NOVALIQ
Transforming Ocular Therapeutics



Pharmaceutics, Drug Delivery and Pharmaceutical Technology

Interactions of Perfluorohexyloctane With Polyethylene and Polypropylene Pharmaceutical Packaging Materials

Yana Znamenskaya Falk^{a,b}, Anna Runnsjö^{a,b}, Anthony Pettigrew^c, Dieter Scherer^d, Johan Engblom^{a,b}, Vitaly Kocherbitov^{a,b,*}



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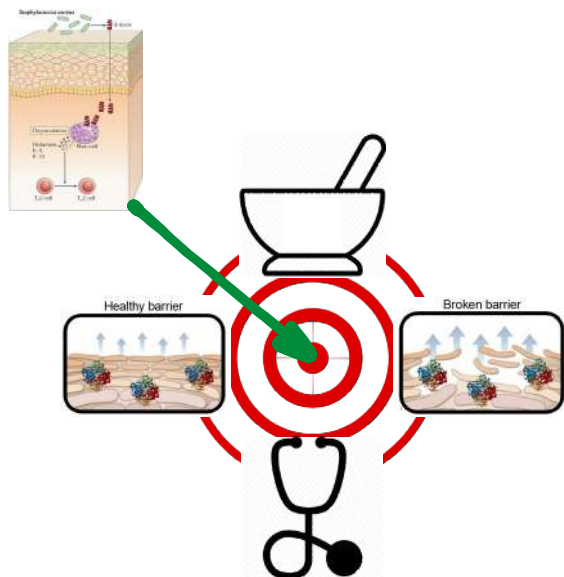




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A strong hub in Scandinavia for TDD

- with a common vision for Biobarriers – Health, Disorders and Healing
- based on University-Industry-Clinics collaboration



Collaboration is fun – join us!!

in Biobarriers

the current research profile

in Combine

industry research school
2nd intake...

in other initiatives...



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