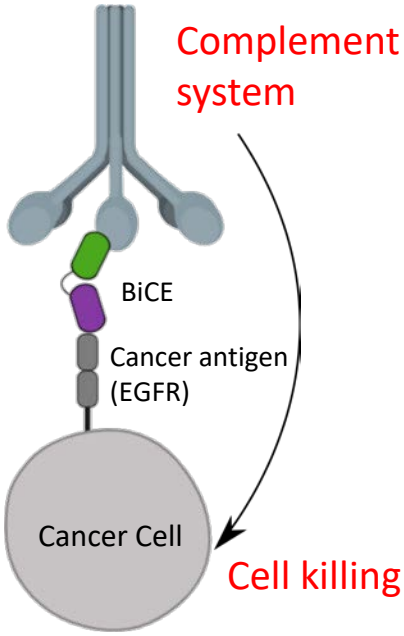
Novel immunotherapy technology

BioTech & Pharma

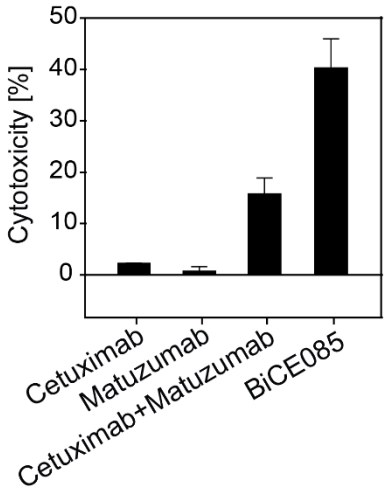
"First-in-class immunotherapy treatment for lung cancer"

Non-small cell lung cancer (NSCLC) makes up 85% of all lung malignancies with an estimated 230.000 new cases and 135.000 deaths in 2020 (US) – accounting for ~25% of all cancer deaths. We aim to develop a novel treatment for NSCLC based on our immunotherapy (BiCE) platform



- Bi-specific nanobodies can be used to recruit the complement system to the surface of cancer cells (left)
- Activation of the innate immune system by BiCE085 induces tumour cell killing (right)
- Modular platform - nanobodies can easily be exchanged and combined in multiple ways

Killing of EGFR-positive cancer cells in human blood



Technology Description

We have developed a novel technology to harness the power of the innate immune system and will use this technology to develop a new type of immunotherapy targeting EGFR for treatment of NSCLC. Our technology is based on bispecific nanobodies that effectively recruit part of the innate immune system (called the complement system) to the surface of cancer cells. We have termed these molecules Bi-specific Complement Engagers (BiCEs).

Intellectual Property Rights

WO 2019/238674 A1, PCT application filed in 2018

Team

PhD, Nick Stub Laursen
Inventor and Scientific Development

PhD, Dennis Pedersen
Drug Discovery

PhD, Heidi Gytz Olesen
In-vitro Biology

PhD, Mikael Winkler
Protein Chemistry

PhD, Peter Birk
Business Development

Current State

We have shown in vitro that our molecules are superior to approved monoclonal antibodies. We now want to show in vivo efficacy in a cancer mouse model.

Business opportunity and Call to action

We are looking for investors to help generate in-vivo proof of concept.
The current goal is to form a spin-out company by 2021

DANISH IP FAIR
Inventions from Danish Research Institutions

AARHUS UNIVERSITY

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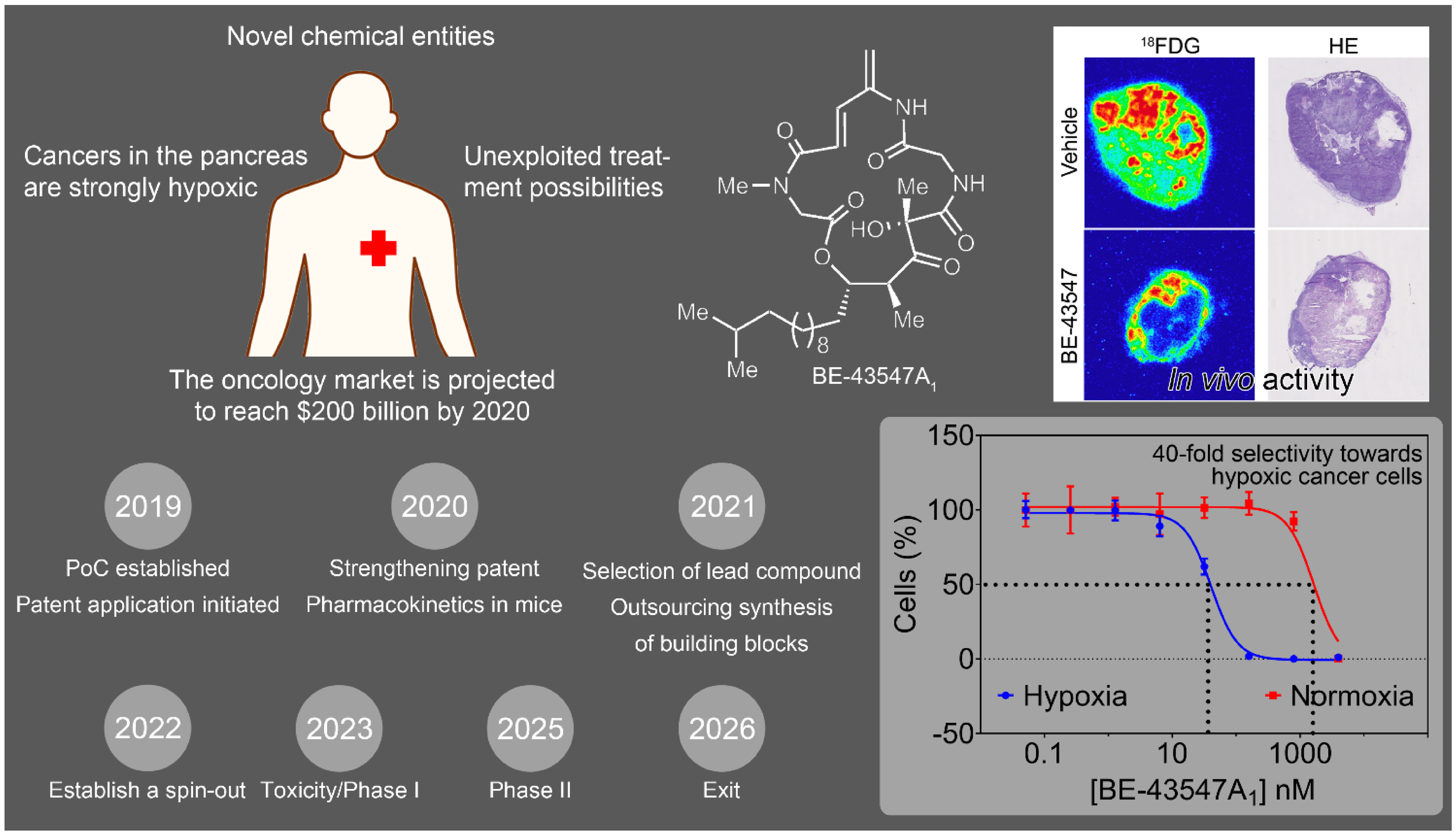
A novel treatment of hypoxic cancer

Biotech & Pharma

We kill chemo- and radioresistant cancer cells



Technology Description

Generally, solid tumors contain areas in which the oxygen supply is insufficient (hypoxia). These subgroups of cells are known to drive both metastasis as well as the occurrence of resistance towards radiation and chemotherapy. To this date, two hypoxia-selective drug candidates has been tested in phase III clinical trials. The compounds, TH-302 and tirapazamine, are activated under hypoxia and lead to DNA damage. These compounds were well tolerated in humans but failed in part due to large variations in selectivity and potency between patients.

We have developed simplified analogs of hypoxia-selective natural products that display increased potency and selectivity towards hypoxic cancer cells. This natural product-inspired compound class presents itself with a mechanism that is distinct from TH-302 and tirapazamine and has robust potencies and selectivity across all tested cell lines. We are still exploring the mechanistic underpinnings to this bioactivity.

Intellectual Property Rights

Priority application filed December 2019.

Team

Associate professor
Thomas B. Poulsen
Scientific Consultant

Assistant Professor
Thomas Tørring
Scientific Consultant

Postdoc
Kristian M. Jacobsen
Cell Biologist

Postdoc
Per Hjerrild
Chemist

Currently seeking additional team member that can help us strengthen the commercial potential of our invention and build a solid business case.

Current State

Currently, we have a broad suite of promising in vitro data as well as early in vivo data on the natural products. Furthermore, we have access to multiple synthetic analogs of the natural products. We possess new chemical entities and world leading experience with this class of natural products.

During the priority year, we aim at selecting the most promising analogs for initial pharmacokinetics in mice.

Business opportunity and Call to action

We seek investors to help generate proof of concept in the pre-clinical stage. We wish to empower our R&D efforts on both the synthetic and the biological investigations in vitro and in vivo. Practically, this involves outsourcing the synthesis of building blocks and financing strong pharmacokinetic studies of selected analogs.

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Inventions from Danish Research Institutions

AARHUS UNIVERSITY

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Innovation towards improved infertility treatments

Biotech & Pharma

We identified a drug that activate eggs in infertile women

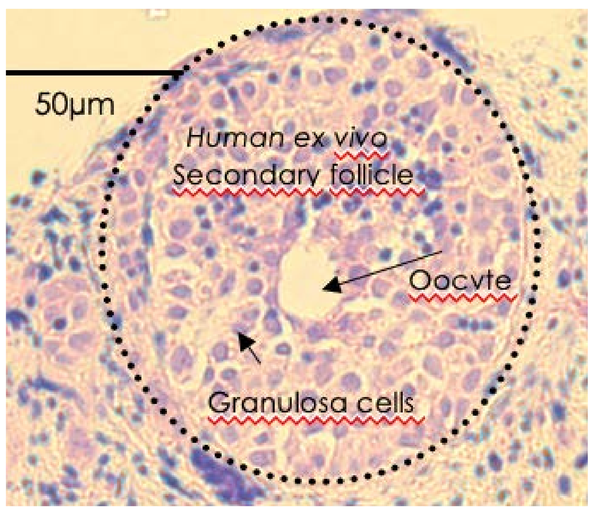
Market drivers

- Premature ovarian failure
- Aging population
- Increased awareness
- Reimbursement and insurances
- Strong reproductive instinct

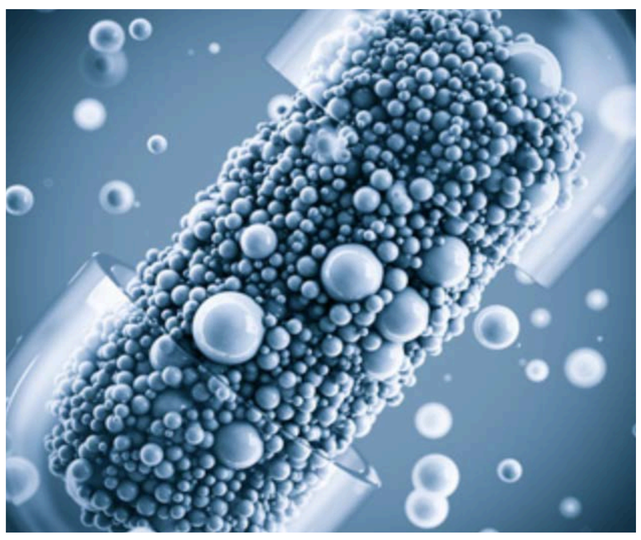
Assets

- Growing marked
- Strong scientific team
- Fertility consultants
- Experienced Business developers

In house, completed	Outsourced 2020-21	Clinical trial 2022-2023



Ex vivo proof of concept



Drug formulation

FDA approval

Technology Description

Our invention is based in specific data sets that analysed global expression of genes during the earliest stages in egg maturation. We identified a novel potential target and are currently developing a new formulation to enhance activation of dormant eggs in the ovary. The target identified is highly present in the early egg cells and through proof of concept *in vitro* and *ex vivo* studies, we showed that pharmacological treatment could promote activation of the earliest egg cells in aged mice and POI patients, respectively.

We are working towards maturing the technology in a spin-out company.

Intellectual Property Rights

Patent applications: PCT/EP2018/064359 (June 2018) and PCT/EP2018/086239 (December 2018).

Team

Management

Associate Professor
Karin Lykke-Hartmann
Scientific lead

Per Horn, PhD
Business strategy

Postdoc Mahboobeh Amoushahi,
Reproductive models

Technician Anders Heuck
Single cell techniques

Professor MD Erik Ernst
Fertility treatment

Current State

In vitro and *ex vivo* proof-of-concept has been established. The project is, at this stage, funded by soft funding.

In vivo confirmation, CMC and toxicity studies initiated. Phase I/IIa clinical trial is expected in 2022/2023.

Business opportunity and Call to action

The global fertilization market is projected to reach $ 27 Billion by 2022
(Grand View Research, Inc)

We are looking to develop collaborations and partnerships for registration studies with companies that has experience in fertility treatment.

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Inventions from Danish Research Institutions

AARHUS UNIVERSITY

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Novel therapeutics for cardiovascular complications in diabetes and aging

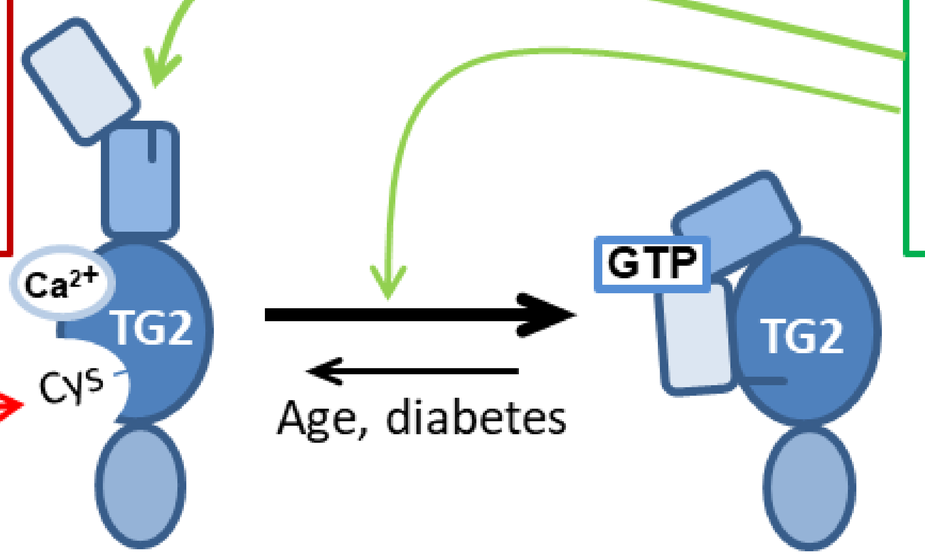
Biotech & Pharma

"Turning an overactive and harmful enzyme into an ally to improve the vascular health of patients"

Despite current treatments **68%** of diabetic patients age 65 or older **die from cardiovascular diseases.**
To meet this therapeutic need, **Tissue Transglutaminase** (TG2) has emerged as a promising **new target**

Current approaches:
- Targeted to active site
- Inhibit transamidase activity
- Lock TG2 open
- Reduce sensitivity to NO

Our solution: ESTUS-001
- Targeted to GTP-related site
- Inhibit transamidase activity
- Promote closed-TG2
- ↑ endothelial function



Vessel stiffness •
Endothelial • dysfunction
Cardiac fibrosis •
Hypertension •

TRANSAMIDASE ACTIVITY (Pro-fibrotic)

MEMBRANE SIGNALING → • Vasodilation
→ • ↑ NO sensitivity

Technology Description

Tissue Transglutaminase (TG2) is an enzyme with two faces: its open conformation has pro-fibrotic effects, being overactive in diabetes and aging, and participating in several harmful processes in the cardiovascular system, while in its closed conformation it increases cell survival and facilitates vasodilation. We have observed that the molecule ESTUS-001 can induce the closed conformation of the enzyme, preventing the deleterious effects of the open conformation while increasing the sensitivity of the vasculature to natural vasodilatory signals, particularly in aging and diabetes.

Intellectual Property Rights

PCT application filed August 6, 2019.

MD. and PhD,
Ulf Simonsen

Inventor and Scientific Development, Professor

M.Pharm. and PhD,
Estéfano Pinilla

Inventor and Scientific Development

PhD, Dan Peters

Chemical Development

M.Sc., Jón Ingi Benediktsson

Commercial Development

Current State

Proof of concept with known molecule ESTUS-001 using different bioassays that cover the cellular, the tissue and the organism levels, additionally we have preliminary data confirming the translation of these findings to human tissue. Optimization of the drug candidate and characterisation of it is currently ongoing.

Supported by the BioInnovation Institute, Copenhagen

Business opportunity and Call to action

We are looking for investors to enable us validating our vasoprotective approach on important complications such as diabetic nephropathy and kidney fibrosis. This will greatly increase the impact of our mechanism and help us move forward to Toxicology, PK/PD, etc. in order to get ready for clinical trials. The current goal is to form a spin-out company by 2021.

DANISH IP FAIR
Inventions from Danish Research Institutions

AARHUS UNIVERSITY

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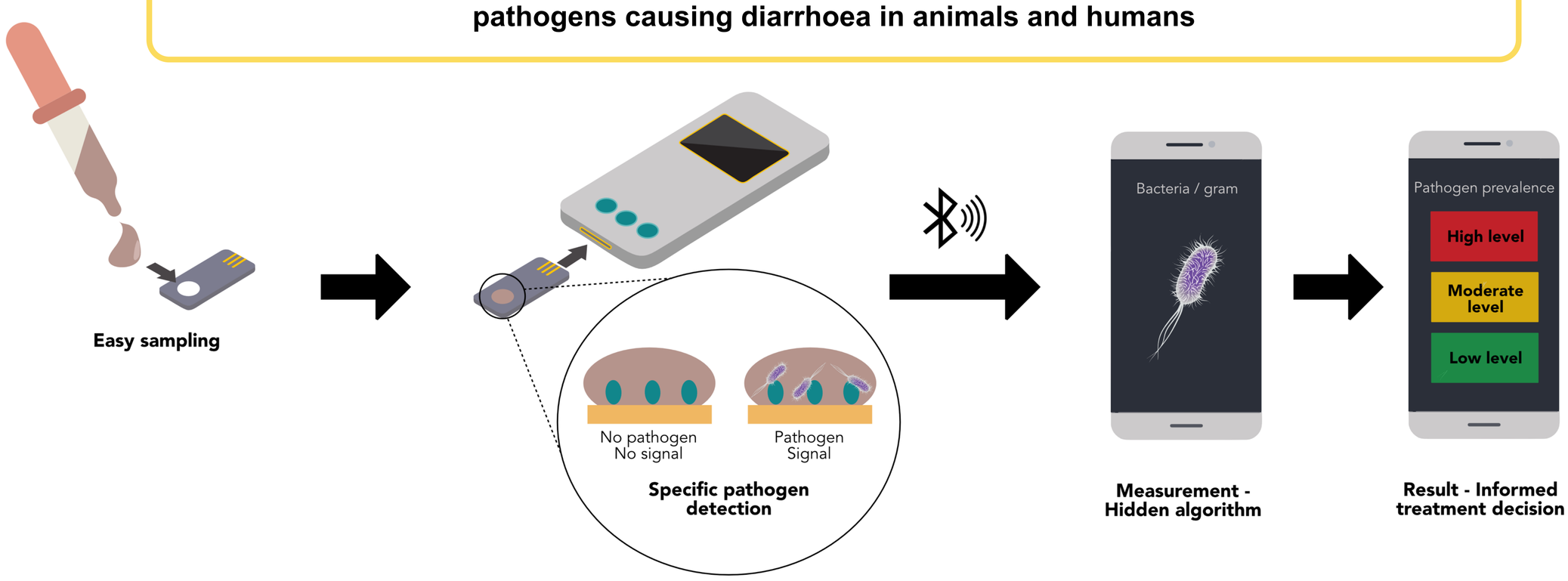
ENTEROGATE

Biotech & Pharma

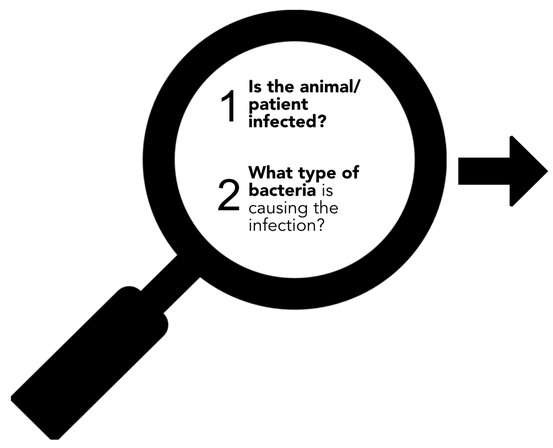
Rapid and specific detection of gastrointestinal pathogens

A new point-of-care (PoC) diagnostic platform for rapid and specific detection of pathogens causing diarrhoea in animals and humans



Preliminary data show specific detection of enterotoxigenic *E. coli* pathotypes

Transforming the fight against antimicrobial resistance by changing the way we use antibiotics



- ✓ **Enabling timely and targeted treatment**
- ✓ **Preventing and limiting spread of infections**
- ✓ **Reducing unnecessary use of antibiotics**

Current State

- First target is biomarkers of enterotoxigenic *E. coli* pathotypes causing gastrointestinal infections in piglets.
- A proof of principle of the technology has been established and current focus is on optimizing the technology in terms of robustness and feasibility for testing with clinical samples.
- All activities have been ensured via soft funding (Biotech company in preparation).

2020	2021	2022

- **Proof of Concept**
- **Prototype developmnent**
- **Commercial development**

Team

Project manager
Charlotte F. Michelsen
CEO, Enterogate

Assoc. Professor, DTU
Andreas H. Laustsen
CSO, Enterogate

Professor, DTU
Winnie E. Svendsen
CTO, Enterogate

DTU BACTOLIFE ENTEROGATE

Postdoc, DTU
Sune Z. Andreasen
Title, Enterogate

PhD student, DTU
Line L. Jensen
Title, Enterogate

Senior Scientist, DTU
Jaime Castillo-Leon
Title, Enterogate

Scientist, Bactolife ApS
Sandra W. Thrane
Title, Enterogate

Technology Description
Brief description of the background and technology.

Intellectual Property Rights
List when (if) a patent application has been filed and what type it is. Also list additional owners.

Business opportunity and Call to action

Outline the business opportunity (eg. create spin-out that will mature the technology). What are you looking for? Eg. investors to help generate proof of concept or industrial partners to perform clinical phase.

DANISH IP FAIR
Inventions from Danish Research Institutions

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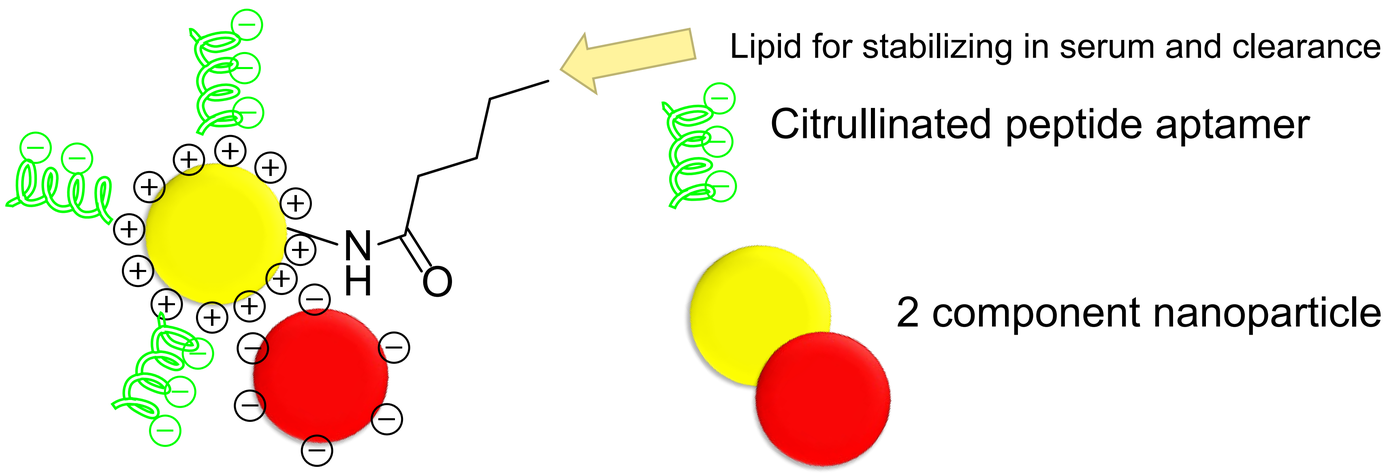
wisv@dtu.dk

iBiotech

Biotech & Pharma

UNIQUE SOLUTION FOR RHEUMATOID ARTHRITIS

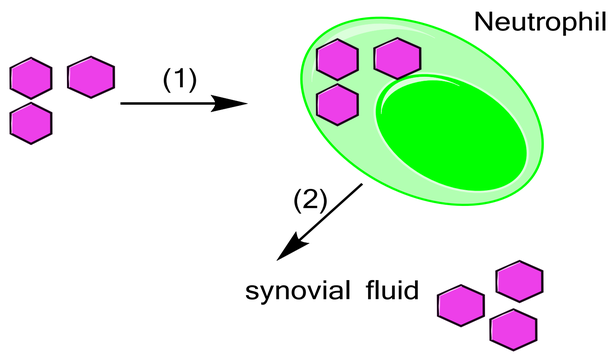
Our technology



We target **anti-citrullinated protein antibodies (ACPA)** which are abnormal

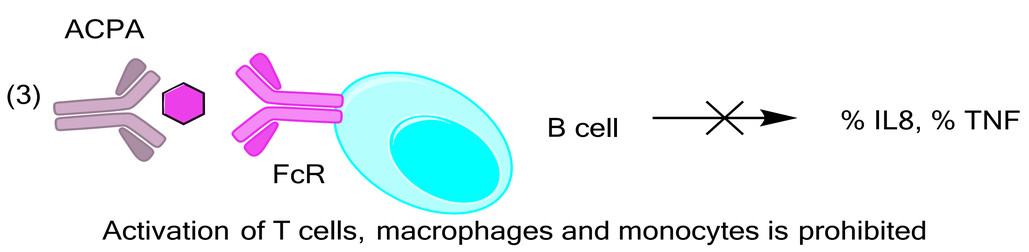
- ACPA positivity doubles the costs of RA management
- ACPA allows to monitor the disease

Our unique intelligent product is designed to specifically target inflammatory antibodies in rheumatoid arthritis



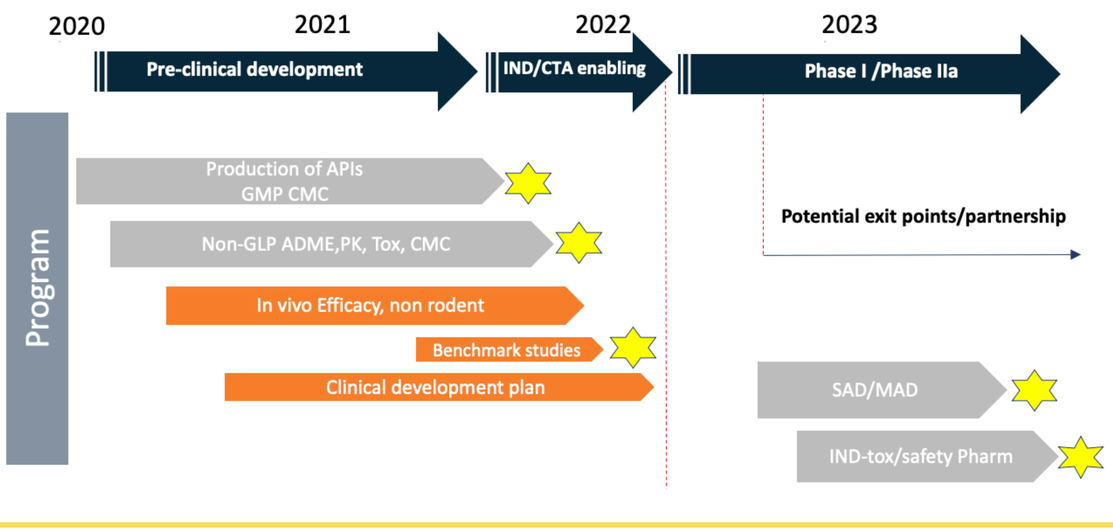
Step 1. Uptake of aptamer-nanoparticle by neutrophils

Step 2. Targeted delivery and release to inflamed synovial fluid



Step 3. Anti Citrullinated protein antibody (ACPA) is bound and inhibited by aptamer-nanoparticle

R&D development plan



Team

Kira Astakhova
Founder and CSO

Mads Clausen
Co-founder, Scientific advisor

Daniel Zalomajev
CEO, Business development

Sangita Khatri
CTO and Researcher

Tue Wenzel Kragstrup
Clinical Development

About Technology

We have tested in 100 mice that the nanoparticle is actually taking the aptamer to the inflamed joint and not to the normal tissue. As well as, it was confirmed that there are no side effects and our therapeutic effect can be at a very low dose.
Our technology is a platform and can be extended to other disease such as thrombosis and psoriasis as well.

IP is protected

Call to action

- We are looking for soft grants and VC investments
- Talents and mentorship within rheumatology
- Engaging more with potential customers (e.g. Pfizer or AbbVie)

DANISH IP FAIR
Inventions from Danish Research Institutions

DTU

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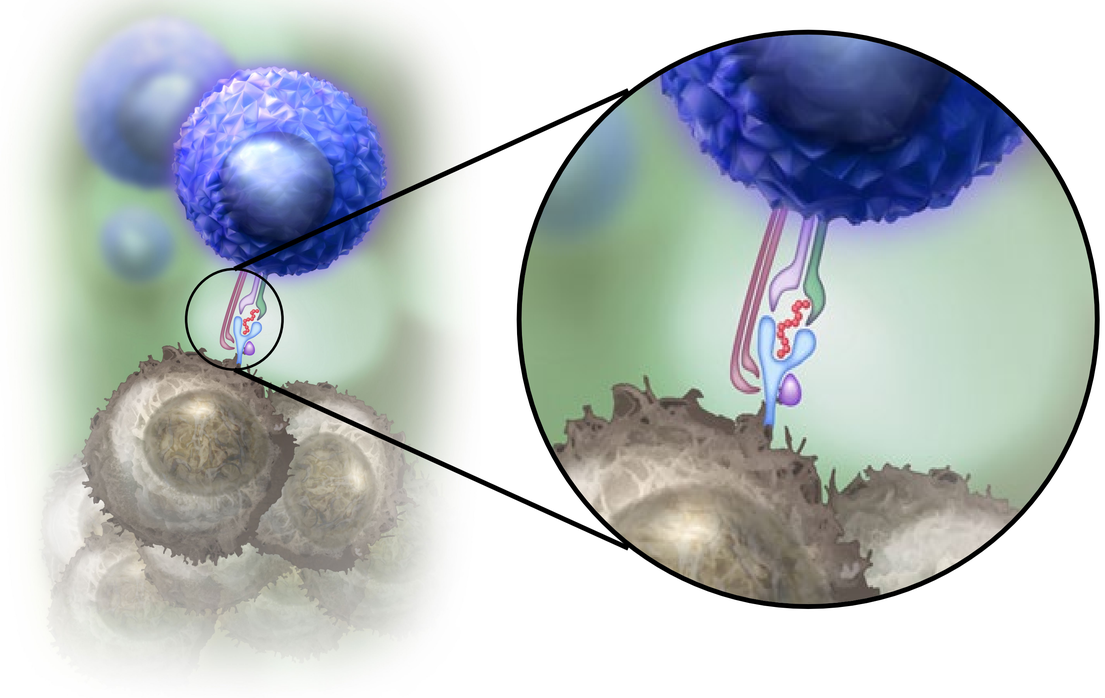
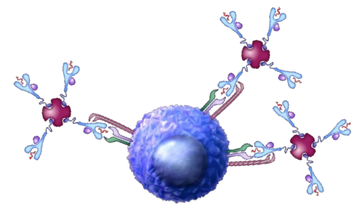
TETRAMER SHOP

Brilliantly Bright T Cell Science

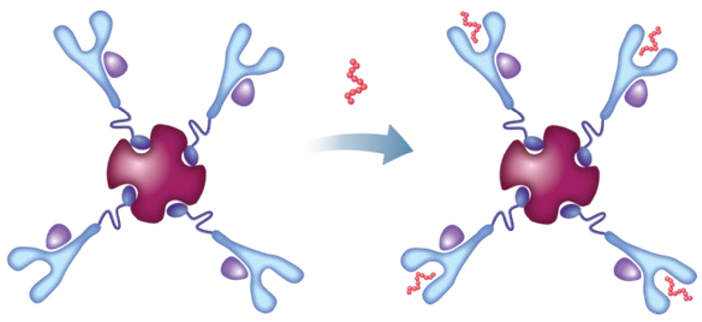
Biotech & Pharma

Fast, bright and cost-effective detection of T cells in research and development of personalized immunotherapy.





- Tetramer staining is the precise assay for monitoring antigen-specific T cells.
- We have developed Empty Loadable MHC Tetramers to address the current limitations with conventional tetramers.
- Empty Loadable MHC Tetramers have shown to be both more stable, flexible and cost effective compared to conventional tetramers.



Empty Loadable MHC Tetramers – just add peptide and instantly stain.

Reagents (RUO) – Marketed

Diagnostics – Opportunity

Platforms – Opportunity

Technology Description

Tetramer Shop is producing and distributing MHC Tetramer reagents for detection of antigen-specific T cells. We supply MHC Tetramers with unsurpassed flexibility, stability and brightness, to a fast-growing niche market, through an extremely cost-effective, fast and reliable business model for the benefit of our customers.

Tetramer Shop is founded on intellectual property and technology from Professor Sebastian H. Springer, Jacobs University in Bremen, Germany, and further developments in the laboratory of Professor Sine R. Hadrup, Technical University of Denmark.

Intellectual Property Rights

IP is exclusively licensed from Jacobs University, DE to Tetramer Shop ApS

Team

Founder
Søren N Jakobsen
CEO, Tetramer Shop

Inventor/founder
Sebastian Springer
Advisor, Tetramer Shop

Founder
Sine R Hadrup
Advisor, Tetramer Shop

Inventor/founder
Sunil K Saini
Advisor, Tetramer Shop

Scientist
Amalie H Rasmussen
Scientist, Tetramer Shop

Current State

Tetramer Shop (www.tetramer-shop.com) was public Marts 1st 2019 and started selling RUO products/reagents medio Marts 2019. Positive cash flow from day zero.
Negotiations with platform companies has been initiated and technical testing has commenced.

Business opportunity and Call to action

We are looking for partners and advisors within personalized medicine in general and within personalized cancer immunotherapy in particular.
Keywords: Neoantigen detection, patient stratification, single T cell identification, single cell platforms, single cell diagnostics, companion diagnostics, adoptive cell transfer, cancer vaccines.
Expertise needed: License negotiation, market identification, market opportunities.

DANISH IP FAIR

Inventions from Danish Research Institutions

DTU

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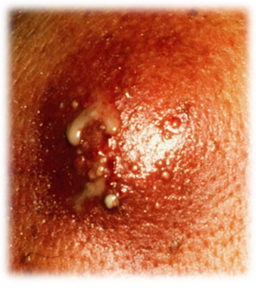
Biotech & Pharma

Novel antimicrobials to combat antibiotic resistance Gram-positive bacteria

Challenge:

Emergence of bacterial resistance against antimicrobials currently used to treat/eradicate MRSA in:

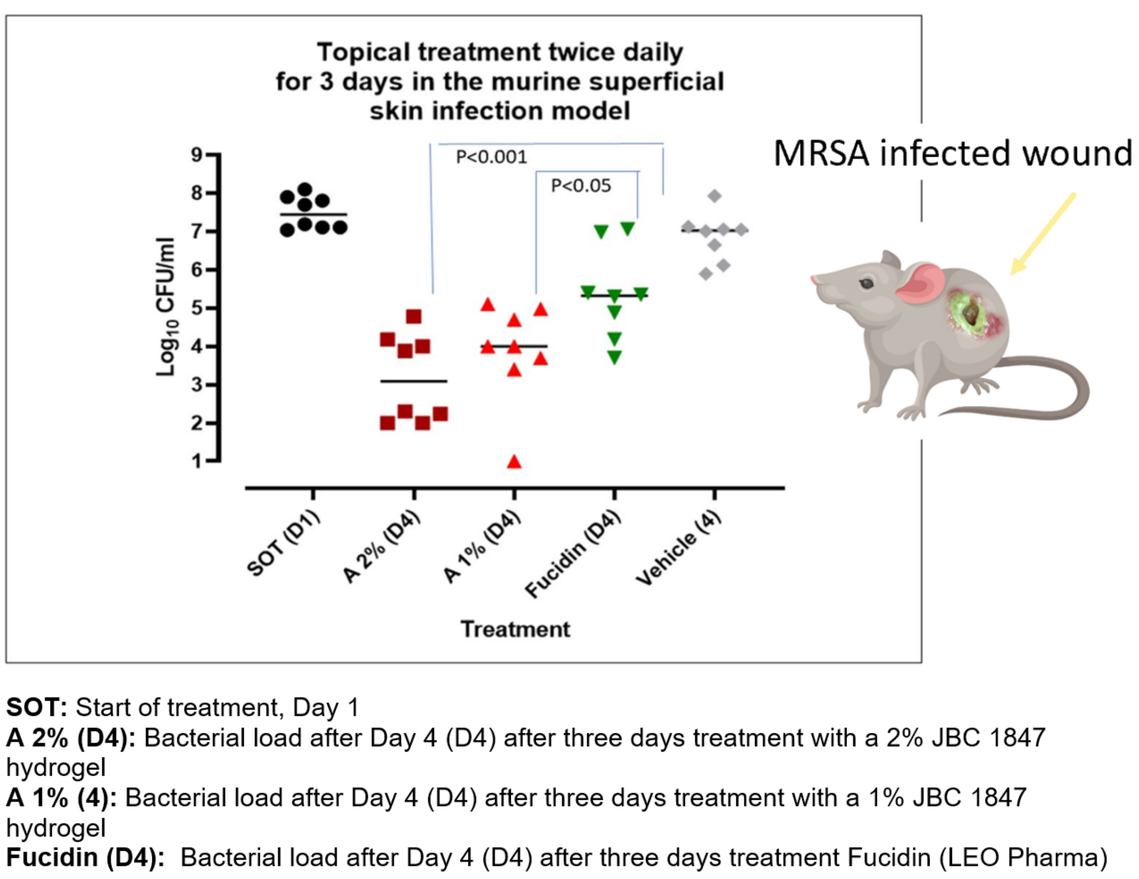


Skin infections with (multi-resistant) *S. aureus*

&

Healthy carriers of methicillin resistant *S. aureus* (MRSA)

Solution: A novel highly potent antimicrobial with low rates of resistance development



MRSA infected wound

SOT: Start of treatment, Day 1
A 2% (D4): Bacterial load after Day 4 (D4) after three days treatment with a 2% JBC 1847 hydrogel
A 1% (4): Bacterial load after Day 4 (D4) after three days treatment with a 1% JBC 1847 hydrogel
Fucidin (D4): Bacterial load after Day 4 (D4) after three days treatment Fucidin (LEO Pharma)

Low resistance development

JBC 1847 is remarkably stable compared to fusidic acid* – (* API in standard treatment of *S. aureus* skin infections**)**

- The sensitivity of *S. aureus* to fusidic acid decreased **233 fold** in 23 days
- The sensitivity of *S. aureus* to JBC 1847 decreased **3.5 fold** in 23 days

JBC 1847 as a Business case – Key selling points

- Superior to Fucidin® in reducing *S. aureus* load
- Due to low resistance rate, the expected antibiotics markets for JBC-1847 include both treatment and eradication of *S. aureus*
- Unique CAS number expected
- Estimated price 10,000 DKK/kg
- Compounds patented

Technology Description

The inventors have a collection of 51 novel compounds synthesized at University of Copenhagen, all with antimicrobial activity. Compound JBC1847 is currently our lead candidate, yet we have eight “close-to-lead” compound.
In vivo data in mice MRSA skin infection model have shown JBC 1847 to be highly superior to Fusidic acid (LEO Pharma) in reducing the load of MRSA in wounds, while in vitro data has shown a resistance development rate more than 50-times lower than fusidic acid.
In addition to *S. aureus*, the novel compounds also shows high activity against other skin pathogens, e.g. *Cutibacterium acnes*, the causative agents of severe acne.

Intellectual Property Rights

Priority patent application submitted April 2019

Associate Prof.
Rikke H. Olsen
Scientific officer

Aassociate Prof.
Jørn B. Christensen
Technology officer

Anders Permin
Business development

Current State

In vitro: High in vivo activity documented against 11 different bacterial species, including strains highly resistant to conventional antibiotics
In vivo: High efficacy in skin models
Next steps : 1) In vivo POC comparing JBC 1847 to Bactoban (to eradicate MRSA from health carriers); 2) Regulatory toxicological studies (in vivo) to further document safety of JBC1847

Business opportunity and Call to action

- Establish University **SPIN-OUT** company – Open position for experienced biotech CEO
- Funding and investments' to drive the further development activities
- Industrial partner to complete all mandatory pre-clinical assessments to allow the lead compound to enter Clinical Phase 1

DANISH **IP** FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

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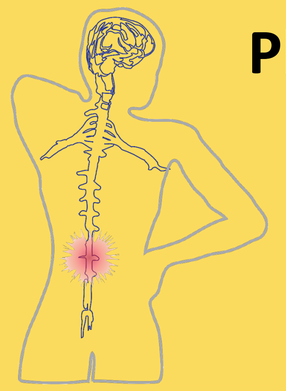
Novel mechanistic approach to treatment of neuropathic and inflammatory pain

- a new principal for pain treatment

Biotech & Pharma



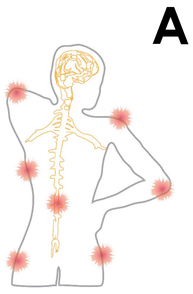
The problem

- Chronic pain is a malfunctioning of the nervous system caused by disease or tissue injury
- 10% of the adult population world-wide is affected by chronic pain
- Available drug therapies address symptom relief and generally lack efficacy and also interfere with normal perception
- There is a huge unmet medical need for a targeted and efficacious treatment

The solution

- We have developed a portfolio of IP protected bivalent high-affinity peptides
- The peptides work by blocking an unconventional but potent target for therapeutic intervention in chronic pain
- In-vivo Proof-of-Concept (in several relevant animal disease models)
- Targets diseased states without interfering with normal pain perception
- Free from side-effects related to general reduction of synaptic transmission

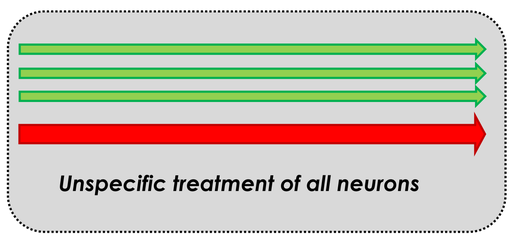
A disease-modifying intervention



Pain transmission in neuropathic pain

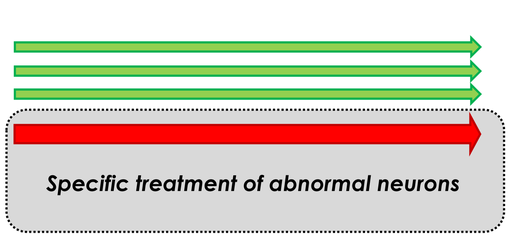
Issues with existing pain treatments

Efficacy limited by significant side-effects on normal neuronal transmission

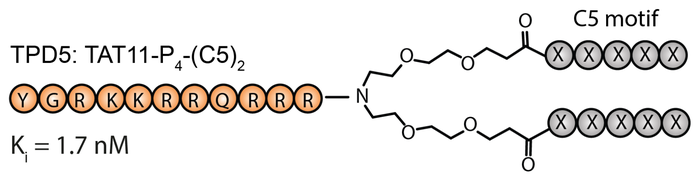


DolorestBio's solution

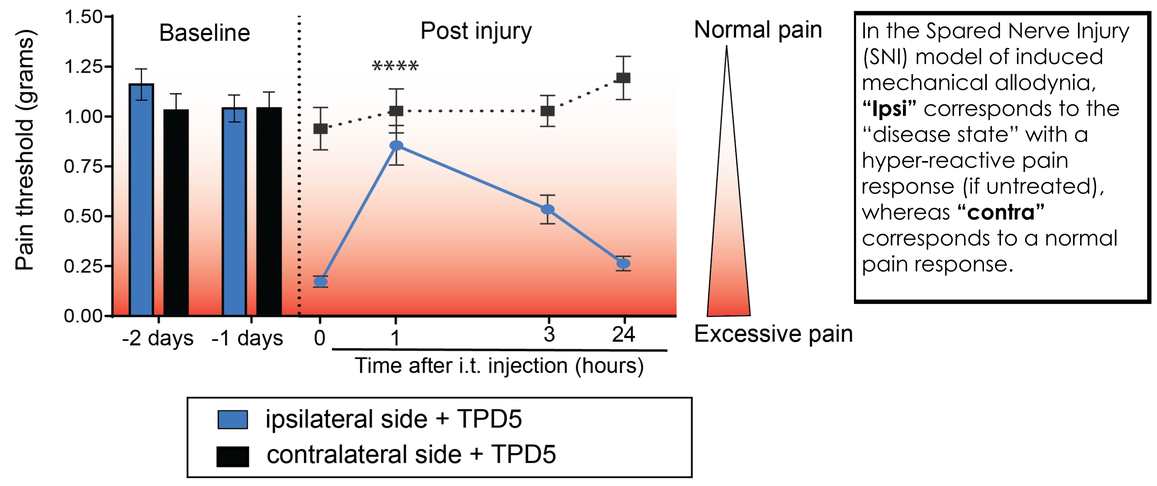
Pain relieve by only targeting abnormal pain transmission



Complete blockade of neuropathic pain



Chronic neuropathic pain model (SNI)



Technology Description

The inventions cover bivalent peptides that enable high-affinity inhibition of the scaffolding protein PICK1. The peptides allow for subcutaneous administration.

The project is driven by solid biological understanding of PICK1 protein.

The target protein, PICK1, has previously been evoked as a potent target for therapeutic intervention in chronic pain, but no efficacious inhibitors has been developed.

Intellectual Property Rights

PCT appl. *WO2020083905* "Inhibitors of PICK1 and uses thereof"

Priority appl. *EP20161524* "A fatty acid bivalent inhibitor targeting PICK1"

Team

Founder, Project lead
Kenneth L. Madsen
DolorestBio

Founder, Scientific adv.
Andreas Toft Sørensen
DolorestBio

Founder, Scientific adv.
Ulrik Gether
DolorestBio

Founder, Commercial/Development
Marigold Innovation (Peter Horn Møller, Niels Skjærbæk, Jakob H. Rasmussen)

Clinical advisor
Nanna Brix Finnerup, MD, DMSC
Head of Danish Pain Research Center

Current State

- The project is currently sponsored by NNF Preseed & InnoExplorer grants
- An exclusive license agreement is currently being negotiated with UCPH and will also cover the two patents related to AAV encoded peptides (see other poster presented here at the Danish IP Fair)
- A fast-track to PoC in human program, estimated 3-5 years, has been initiated
- The prospect spinout company DolorestBio will be launched Q3/Q4 2020

Business opportunity and Call to action

DolorestBio is advancing two treatment programs towards the clinic: peptide (lead candidate) and gene therapy (2nd generation)

Backed by a strong IP position and a large set of pre-clinical data supported by CMC considerations, the team behind DolorestBio is looking for relevant development partners as well as potential investors.

DANISH **IP** FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

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Evodia

Biotech & Pharma

Fragrances and flavors with an environmental conscience

Animal-free, no plant overharvesting, no land overuse, no toxic chemicals

Customers demand environmentally-friendly fragrances and societies demand sustainable production methods

New trends in the perfume industry

- Actions against climate change
- Sustainable Development Goals
- New lifestyle trends (veganism, etc.)
- Animal welfare
- Economical viability

•No animal products

•No toxic and polluting chemicals

•No land and water abuse, no overharvesting of natural populations

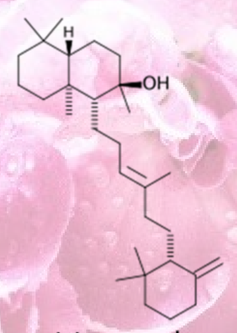
Our solution is to produce fragrances and flavors in a sustainable, animal-free manner using baker's yeast

Innovative solution

✓Robust
✓High yields
✓Industry-ready

Fragrance production in baker yeast

Sustainable bioproduction Chemical-free process



Natural and organic fragrances

Transition towards sustainable fragrances

First movers on environmentally-conscious products

Proposed Value

- Sustainable and friendly perfumes and fragrances
- Stable supply and consistent quality
- Sustainable use of natural resources
- Ethical utilization of land for basic needs

Technology Description

Advantage	Benefits
Improved technology	Increased production levels, higher purity.
Established infrastructure and methodology	Baker's yeast has been used in industrial fermentation for years and allows for easy scale-up
Competitive price	Our method can meet current price for non-sustainable versions, but has the potential to sell at higher prices due to being a specialty product
Future use	The technology will be expanded to additional fragrances and to new molecules with novel and exotic scents

Intellectual Property Rights

Patent Application filed

Team

Associate Prof.
Sotirios Kampranis
CSO

Postdoc
Simon Dusséaux
CTO

PhD student
Victor Forman
Business intelligence

Current State

- The project is currently funded by Innoexplorer funding.
- First milestone achieved: fragrance producing strains established
- Next step: Optimize production to high titers through metabolic engineering of yeast strain
- **TRL: 3**
- Technology that can have further applications beyond fragrances

Business opportunity and Call to action

The team is looking for:

- *Investors for spin-out and further development of the business model*
- *Licensee*
- *Partnerships for R&D*
- *Advisors with expertise in business development*

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Contact information

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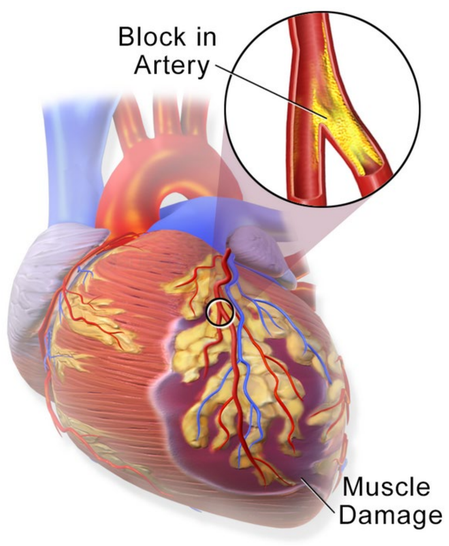
Novel peptide based treatment for cardiac arrhythmias

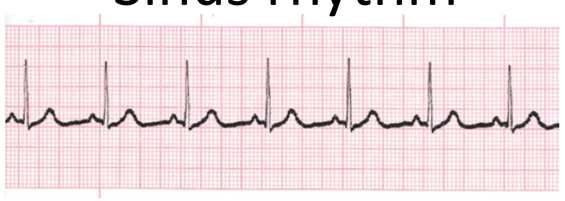
Biotech & Pharma

Novel target and MoA for anti-arrhythmic drugs

Myocardial infarction increases the risk of life-threatening arrhythmia

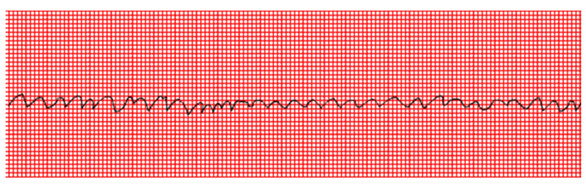


Sinus rhythm

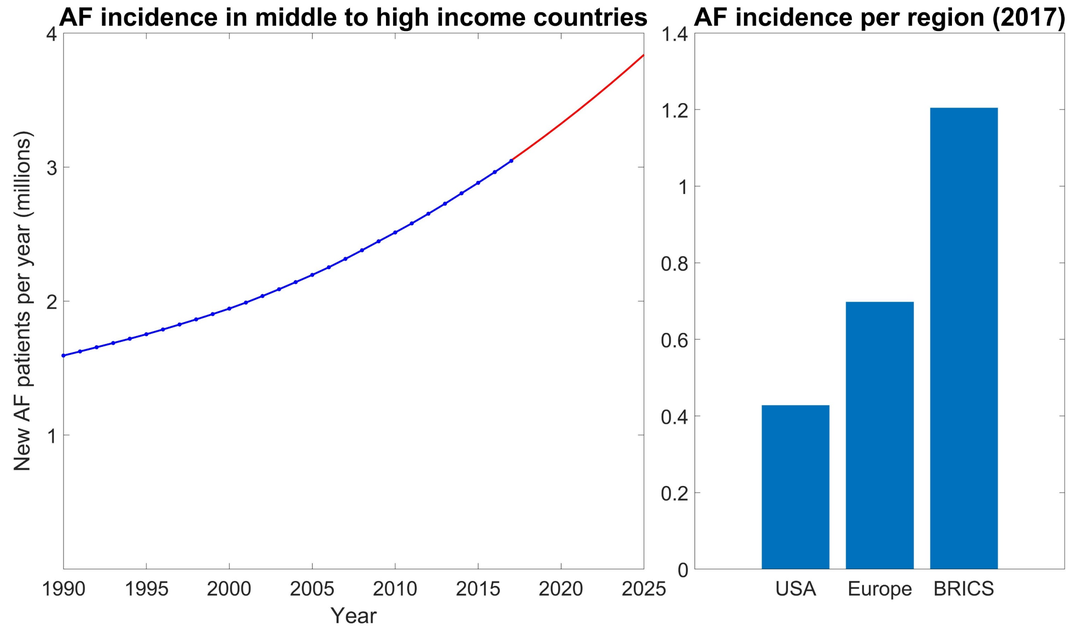


NPY3-35

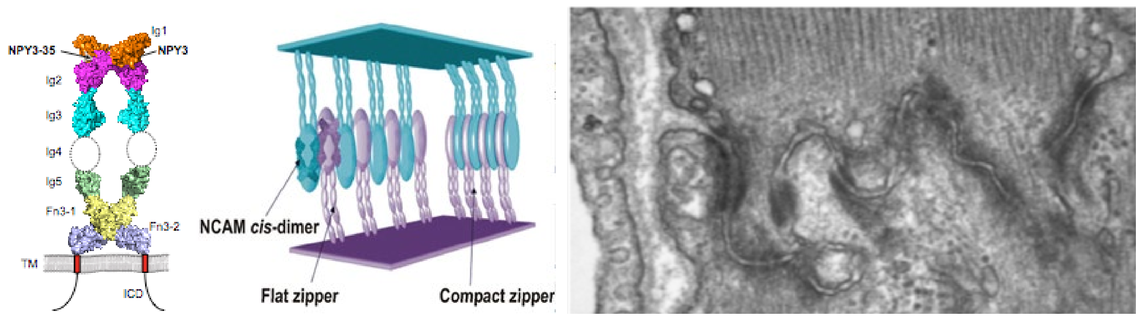
Ventricular fibrillation



New indication - Cardioversion of atrial fibrillation



NPY3-35 acts on NCAM - an intercalated disc structural protein



Selected current treatments

Treatment	Efficacy	Pro-arrhythmia	Price (DKK)	Adverse effects
DC conversion	70-90%		9500	+
Vernakalant	47-70%	-	4072	+
Amiodarone	30-70%	-/(+)	500	+
Ibutilide	31-51%	+	1777	+
NPY3-35 derivative	High	-	4000	-

Technology Description

Cardiac arrhythmia, e.g. atrial fibrillation, can be a serious life-threatening condition. Current anti-arrhythmic drugs that target ion channels or G-protein coupled receptors, are often associated with troublesome side effects. We have discovered that NPY3-35, an endogenous metabolite of neuropeptide Y (NPY) previously believed to be without biological effect, can induce significant anti-arrhythmic effect by interacting with NCAM in the intercalated disc (IC) connecting cardiomyocytes. The IC is central for proper cardiac activation and NCAM has not previously been identified as an anti-arrhythmic target. This makes our technology unique compared with existing drugs on the market.

Intellectual Property Rights

Patent application filed with priority date 29 Nov 2018 (“The use of NPY3-35 and other fragments of NPY for treating cardiovascular diseases”) by UCPH. Currently in PCT phase.
An Extended European Search Report (EESR) from EPO on 21st of May 2019 concludes that: “the subject matter of the claims for use of these peptides in the treatment of cardiac arrhythmia is new”

Team

Associate professor
Morten Schak Nielsen
Scientific Advisor & Board Member

Associate Professor
David Woldbye
Scientific Advisor & Board Member

Professor
Thomas Engstrøm
Clinical Advisor & Board Member

Current State

In vitro proof-of-concept has been provided showing anti-arrhythmic effects in the setting of ischemia-reperfusion. Mouse and rat data show that NPY3-35 increases conduction velocity in an NCAM-dependent manner.
Next step will be to develop novel NPY3-35-related peptides with increased affinity/efficacy and to broaden the indications for the technology to atrial fibrillation and orphan arrhythmogenic diseases.

Business opportunity and Call to action

We seek

- Collaboration for development of novel peptides with improved NCAM affinity, better stability and novel composition-of-matter IPR.
- Soft-funding for Proof-of-Concept in atrial fibrillation and orphan arrhythmogenic diseases (~2 million DKK from primo 2021)
- Partners for business development and company formation including a CEO as co-founder and members for an advisory board

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Inventions from Danish Research Institutions

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Obesity targeted by a GLP-1 and NT receptor co-agonist

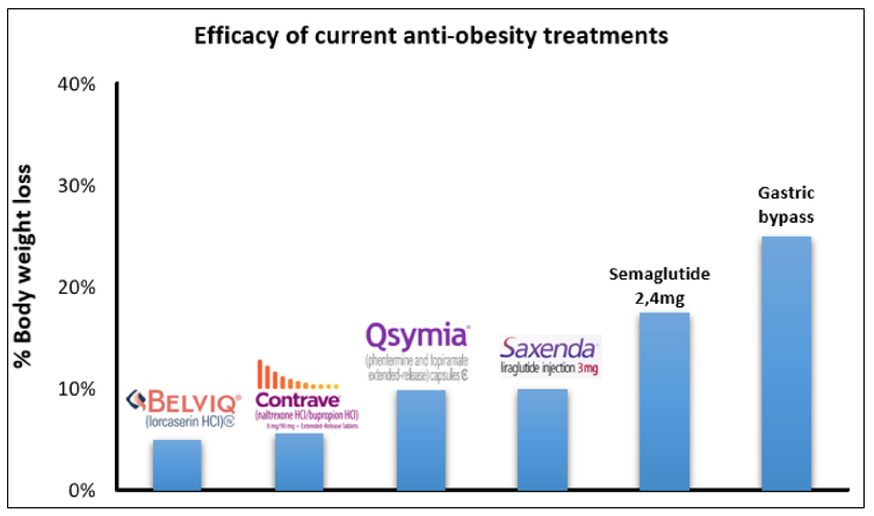
Biotech & Pharma

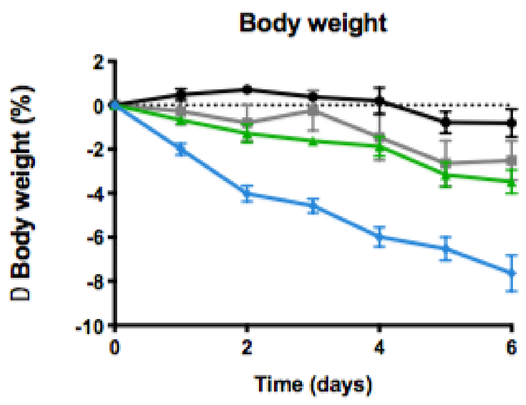
Targeting multiple pathways reverses obesity

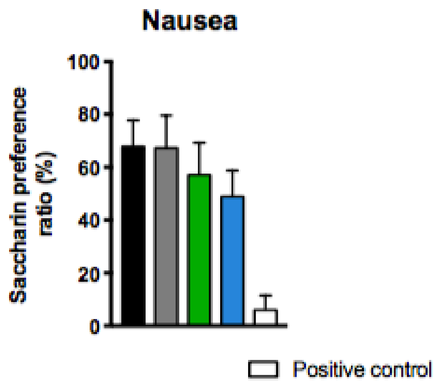
Combination treatment with subthreshold GLP-1 analog and neurotensin synergized to amplify body weight loss and improve life-style diseases

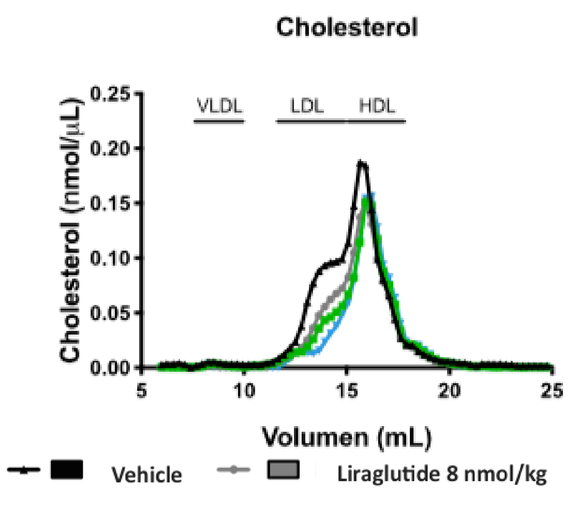
Obesity facts

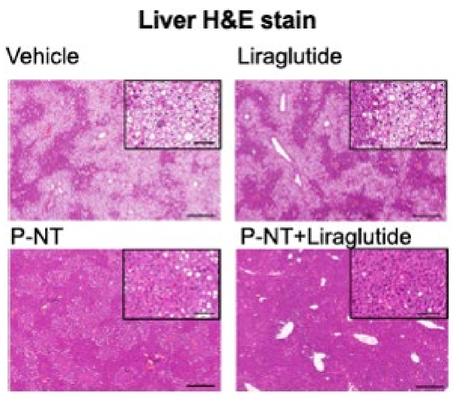
- 650 million adults are obese (BMI>30kg/ m^2)
- 41 million children are obese
- Bariatric surgery results in 20-25% weight loss (10yrs follow up)
- Current pharmacological treatments result in an average weight loss of 5-10%
- The market for safe and effective pharmacological anti-obesity treatment is enormous

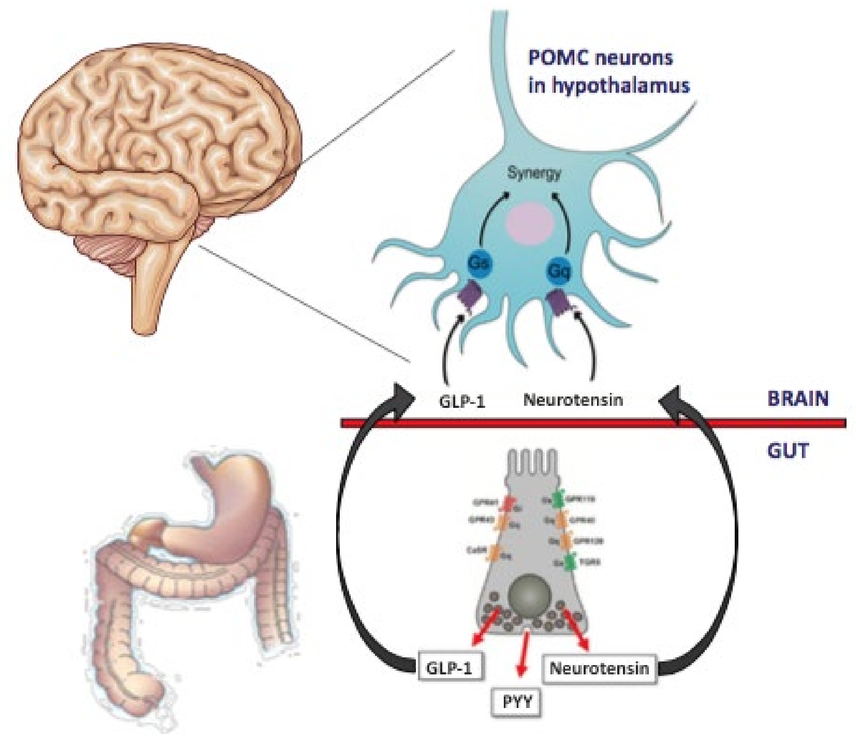


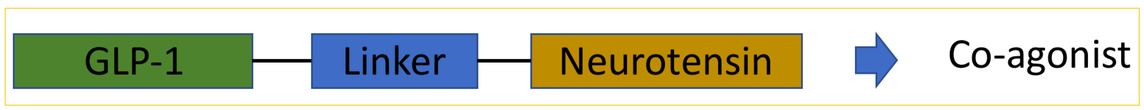












Technology Description

We have combined a long-acting neurotensin and subthreshold liraglutide, which synergize to amplify anorexic signaling and reduce body weight in obese mice with improved tolerability compared to therapeutic doses of liraglutide.
Our goal is to develop anti-obesity drugs with minimal side effects. Our approach is simultaneously activating two complementary pathways in appetite regulating centres of the brain in order to obtain sufficient weight loss.
We have developed peptide based co-agonists that act synergistically to reduce food intake and/or increase energy expenditure leading to body weight loss. Targeting multiple signalling cascades not only increases efficacy but also reduces effective doses thereby decreasing adverse effects. In addition to the decreased bodyweight we have data indicating a specific decrease in fat accumulation in the liver.

Intellectual Property Rights

Priority patent application filed December 4, 2018

Team

Professor
Birgitte Holst Lange
Inventor

Post doc
Cecilia Friis Ratner
Inventor

Research assistant
Alexander Jakobsen

Current State

We have performed a Proof-of-concept clinical trial on obese volunteers using combination treatment with GLP-1 and neurotensin, which we will finalized Q4 2020.
Furthermore, we are currently optimizing our co-agonist in order to obtain a better pharmacokinetic profile.
Current funding situation: We have obtained Pre-seed funding from the Novo Nordisk Foundation, 2019.

Business opportunity and Call to action

- We seek collaborators within protein chemistry to optimize our co-agonists
- We plan to found a university spin-out in Q2 2021
- We are looking for an experienced business developer and advisory board members to support our commercialization of the invention
- We seek funding and investors to take our lead peptide candidates through pre-clinical development and into clinical Phase I trial

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SUNDEW

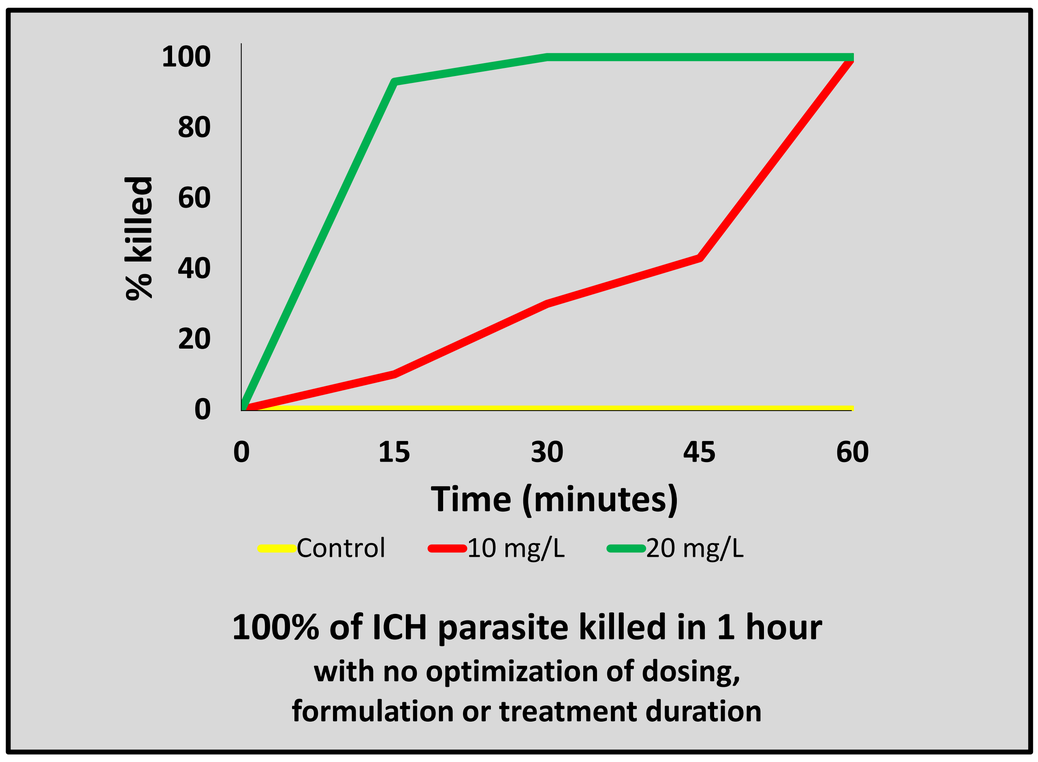
Treating Aquatic Pests & Diseases

Biotech & Pharma

Water-borne disease is a huge burden to society and economy, affecting aquaculture and agriculture as well as human health. Sundew intends to sell biological products with activity against such diseases.

Our first product BIOKOS kills commercially important fish parasites (“Ich”) better than any currently available remedy. It appears non-toxic to fish, bio-degradable and relatively easy to manufacture, and Sundew has a worldwide all fields license to the underlying IP.

“Ich” is a significant part of the ca. $10bn large disease problem in global aquaculture, but we also expect BIOKOS to work on additional parasites. There is also a good chance it will work on certain human diseases (e.g. bilharzia), certain agricultural diseases and environmental issues (e.g. red tides).



From Al-Jubury et al., 2018. Impact of Pseudomonas H6 surfactant on all external life cycle stages of the fish parasitic ciliate Ichthyophthirius multifiliis J. Fish Disease 41: 1147-1152.

Technology Description

Water-borne pests and diseases disrupt aquaculture, ornamental fish, human health, agriculture and ecological balance. Aquaculture alone suffers c. $10B in annual losses from disease. Existing remedies are typically hazardous, toxic, expensive or difficult to use. We use biosolutions to control water-borne disease, and our first product – BIOKOS – uses a *Pseudomonas* lipopeptide to kill the ICH (*Ichthyophthirius multifilis*, “white-spot”) parasite. It is non-GM and compatible with organic labels. Early data shows that it works on other fish parasites. It appears harmless to fish and is quickly degraded in the environment. It is amenable to manufacture using low-cost fermentation and DSP.

Intellectual Property Rights

PCT/EP2018/081923 – De Bruijn, Raiimakers, Buchmann – TREATMENT OF PARASITIC INFECTIONS OF FISH SURFACES – Nederlands Instituut voor Ecologie (Nioo-knaw) & University of Copenhagen.

SUNDEW has obtained an exclusive licence for any use for this IP.

Team

Chief Technology Officer
Jørgen Hansen, PhD

Senior Scientist
Boqian Wu

Chair of Board
Neil Goldsmith

Chief Finance Officer
Andy gardiner

Collaborator & Advisor
Prof. Kurt Buchmann, PhD, DVSc. UCPH

Collaborator & Advisor
Ass. Prof. Claus Sternberg, PhD. DTU

Collaborator & Advisor
Niels Henriksen, Chief Vet. Dansk Akvakultur

Current State

BIOKOS has been shown to work efficiently on an extraordinary high number of Ich parasite life stages, appears to be safe for fish and environmentally biodegradable. Gram scale production has been accomplished and further toxicity and environmental studies are underway as are testing on further, distinct fish parasites. Producing organism has been sequenced and responsible genetic circuits identified. We plan to produce at 100 kg levels and to have first sales commitments on Ornamental’s market within 18 months. Current TRL level 5/6 expected to increase to 7/8 within same time frame.

Business opportunity and Call to action

Due to a recent GUDP (Grønt Udviklings- og Demonstrations-project) grant Sundew is now able to perform the necessary environmental & toxicity-studies as well as manufacturing process development. The company is currently looking for possible commercialisation partners (both within ornamentals and food aquaculture) as well as investors who understand the relevant industries and markets. BIOKOS is Sundew’s first product but we expect to soon add several other product candidates to our portfolio.

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Inventions from Danish Research Institutions

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>jorgenh@sundew.bio<

Biotech & Pharma

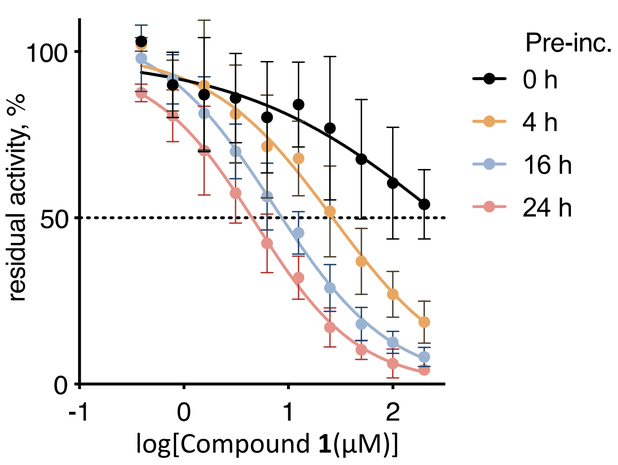
Targeting Blood Cancers

Covalent inhibitors targeting SIRT5 in blood cancers

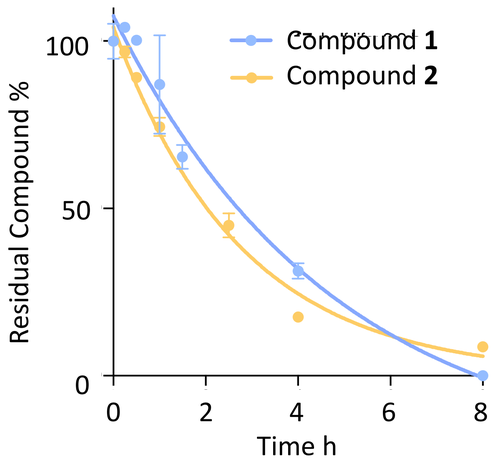
Background

Targeting SIRT5 for blood cancer treatment. Blood cancers represent a major health risk and many forms are still poorly managed clinically. Therefore, there is an imminent need for novel therapeutics with alternative mechanisms of action. Our solution to a new way of targeting cancer cells is predicated on recent biological discoveries, showing a role of the mitochondrial enzyme sirtuin 5 (SIRT5) as a tumor promoter in blood cancers. We have discovered an unprecedented chemical framework that selectively inhibits this enzyme.

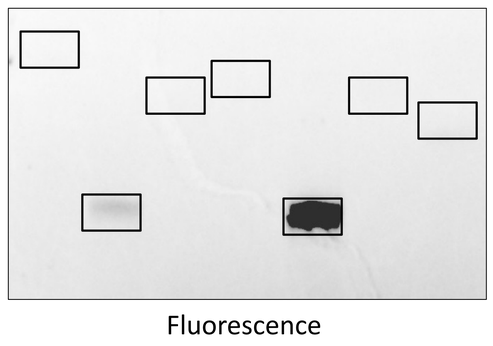
Selective inhibition and labeling of SIRT5



Compound **1** exhibits pre-incubation-dependent inhibition of recombinant SIRT5

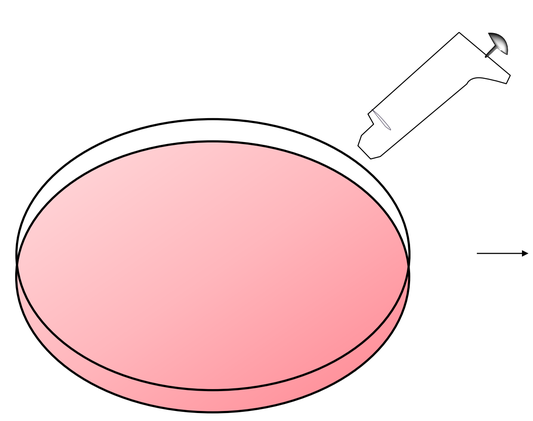


Compounds **1** and **2** exhibit high stability in human serum (t_h: 3.3 h and 2.9 h, respectively)

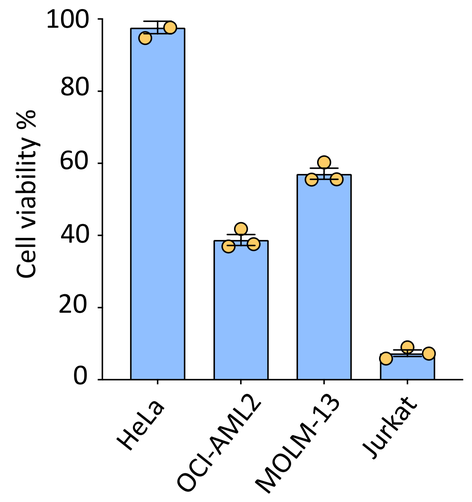


Compound **1** showed high selectivity for recombinant SIRT5 and does not significantly label the other 6 isozymes SIRT1–4, 6, and 7

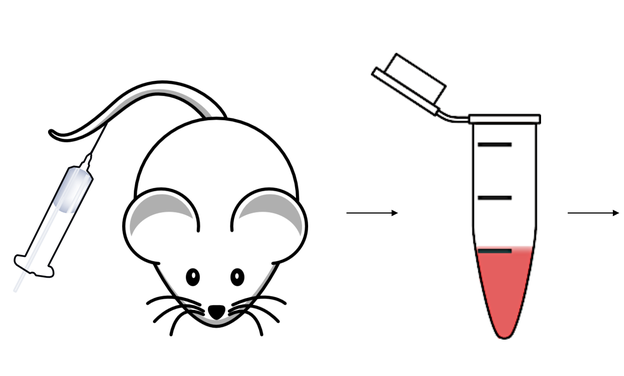
In Vitro studies of compound 1 and 3



Treat HeLa cells or blood cancer cell lines OCI-AML2, MOLM-13, and Jurkat with compound **3**

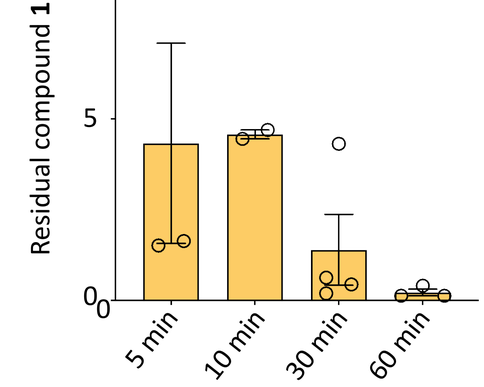


Determine cytotoxicity of compound **3**



Injection of compound **1** or vehicle

Draw blood samples



Amount of compound **1** in samples

Technology Description

- Developed compounds **1**–**3** are novel covalent inhibitors of SIRT5
- Compounds **1** and **3** are easily water soluble
- Compound **1** has a sedative effect for <6 h and is well tolerated in mice
- Structure-based drug design enabled optimization is available due to recent X-ray co-crystal structures with non-covalent parent compound
- Stability of compound **1** in 100% human serum >3 h
- Compound **1** exhibits high selectivity toward SIRT5 compared to other human sirtuin isotypes

Intellectual Property Rights

PCT application PCT/EP2019/086660 was filed on 20 December 2019

Current State

This work provides a strong foundation for the further development to provide a new type of therapy for the clinical management of certain aggressive blood cancers.

- No drugs exist against target
- Our work will be published in the near future
- Compounds **1**-**3** has been tested in SIRT5 dependent blood cancer cell lines

Future perspectives

- Validate target engagement in mice
- Further medchem optimization
- Show efficacy in xenograft mouse model

Team

MSc
Julie Eilskov Bolding

PhD
Nima Rajabi

Professor, PhD
Christian Adam Olsen

Business opportunity and Call to action

The need for novel anti-blood-cancer treatments remains high and the market opportunities are significant. The University of Copenhagen is seeking a licensee to commercialize the invention.

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Inventions from Danish Research Institutions

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Biotech & Pharma

Targeting FFAR1 for Diabetes Therapy

Revitalizing a clinically validated T2D target

Development of FFAR1 modulators

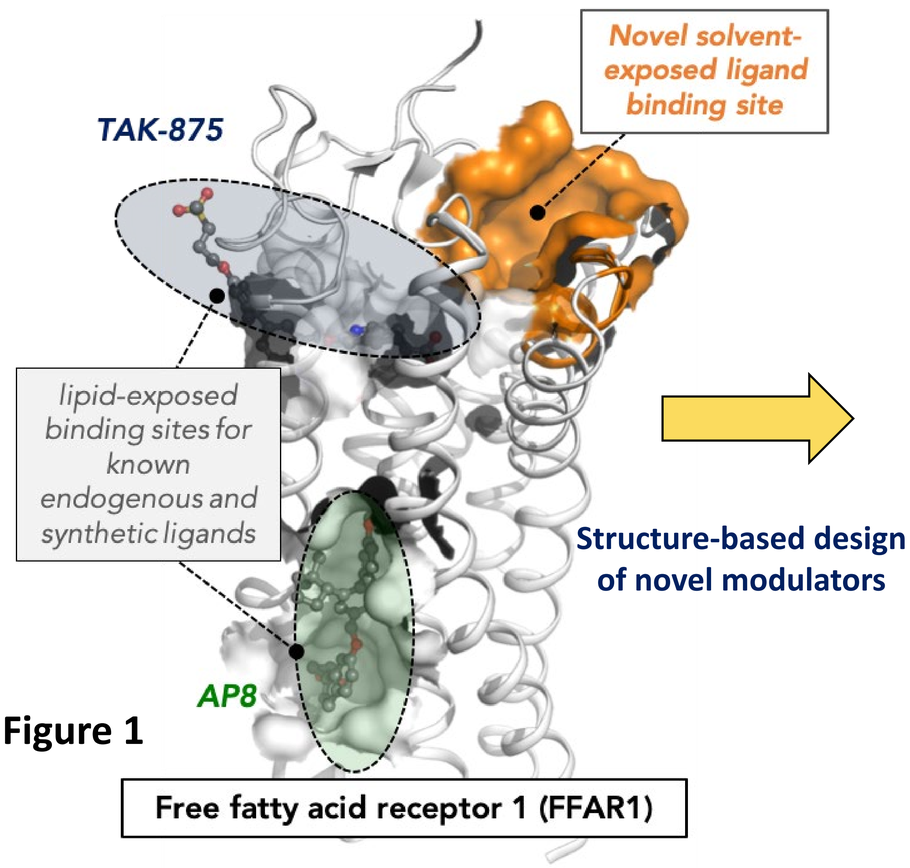


Figure 1

Structure-based design of novel modulators

Discovery of novel chemotype enabling positive modulation of endogenous signaling

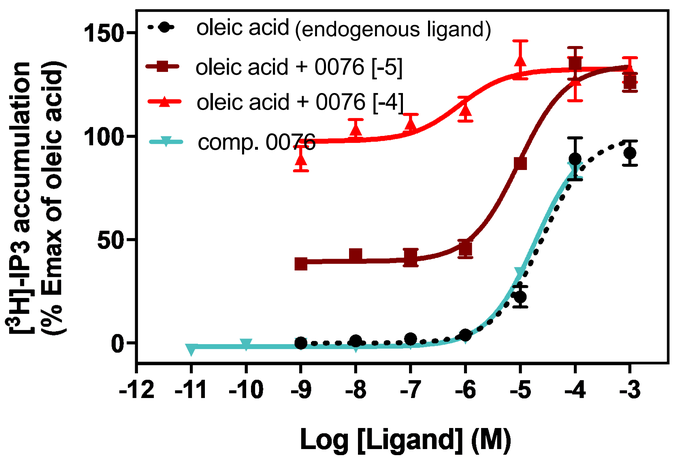
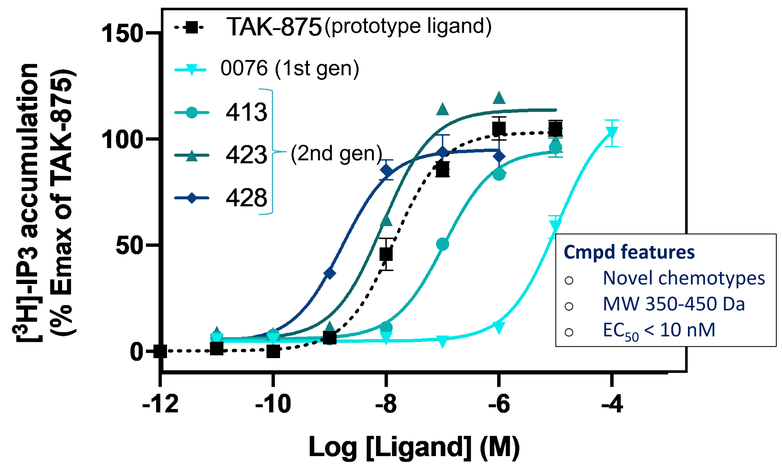
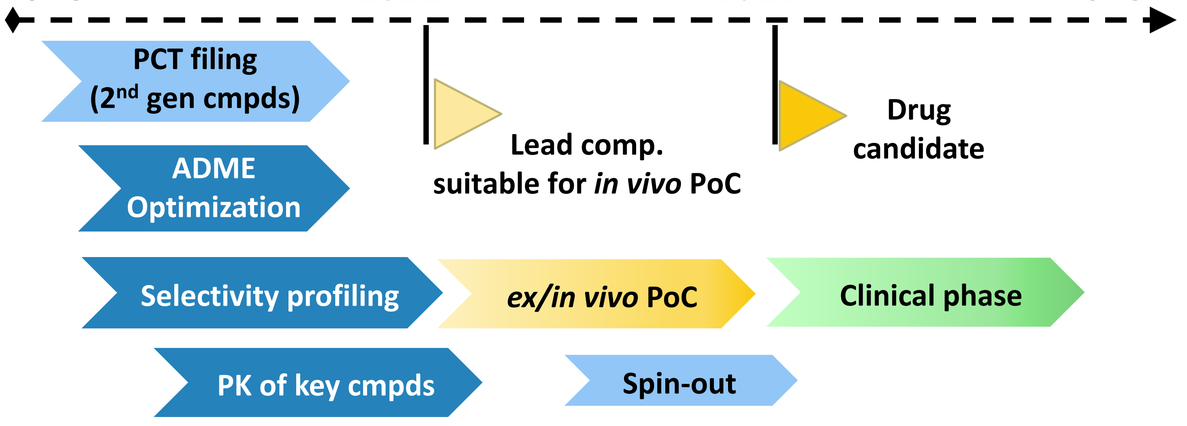


Figure 2

Synthesis and development of a SAR-rich and IP protected chemical package of novel small molecule FFAR1 allosteric modulators



Timeline and Commercialization Perspective



The global diabetes therapeutics market is forecasted to grow at a pace of ~16% a year, mainly driven by the increase of T2 diabetes prevalence worldwide. This underlines the commercial potential of novel chemotypes aiming to fulfil the therapeutic capabilities of FFAR1. The main goals for our development pipeline include:

- Medicinal chemistry optimization guided by structure-activity relationship (SAR), main ADME properties and pharmacokinetic (PK) properties
- Proof of concept (PoC) studies in animals.
- Optimize and characterize dual acting FFAR1 & FFAR4 agonists

Technology Description

Our novel modulators provide an excellent starting point to revitalize a clinically proven anti-diabetes target, the free fatty acid receptor 1 (FFAR1). This metabolite receptor is activated by long chain fatty acids to stimulate gut hormone and insulin secretion. A multitude of highly similar lipid-like ligands has been developed that act through binding to membrane lipid-exposed binding sites (Fig. 1). Traditionally, it has been notoriously difficult to develop less lipophilic and chemically attractive chemotypes for this target. We have discovered modulators with a novel chemotype combined with a beneficial signaling profile (Fig. 2). These new potential drug candidates act not only as agonists, but also as positive allosteric modulators (ago-PAMs) of endogenous free fatty acid ligands, through a new mechanism via a previously unexploited solvent-exposed binding site (Fig. 1). Optimization of 2nd generation compounds has shifted potency into the single digit nM region, while achieving significant improvements of key ADME parameters..

Intellectual Property Rights

A priority patent application was filed on November 21, 2018. A second priority patent application, covering 2nd generation compounds, was filed on May 20, 2020.

Team

Post doc
Michael Lückmann
Staff Scientist
Computational Chemistry and Molecular Pharmacology Platform

Assoc. Prof.
Thomas M. Frimuer
Group Leader
Computational Chemistry and Molecular Pharmacology Platform

Prof.
Thue W. Schwartz
Head of Program
Nutrient and Metabolite Signaling

Novo Nordisk Foundation
Center for Basic Metabolic Research

Current State

Using a combination of advanced computational chemistry and high-end-molecular pharmacology, we have designed, synthesized and experimentally tested a series of custom-made chemical mini-libraries. This has resulted in the development of a solid IP-secured chemical package of highly potent (single digit nM) and novel modulator leads with proven activity in cell-based functional assays. Further, we have validated their mode-of-action, chemical stability and established custom chemical synthesis routes for two novel scaffolds, to allow rapid chemical variations of critical areas.

Business opportunity and Call to action

We wish to attract funding to drive the further optimization of our prototype compounds. Ultimately, we seek to increase the value of the project by establishing a broad, solid industry-standard drug discovery chemical package ready for subsequent out-licensing negotiations with biotech companies and in particular the pharmaceutical industry.

DANISH IP FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

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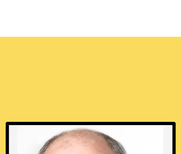
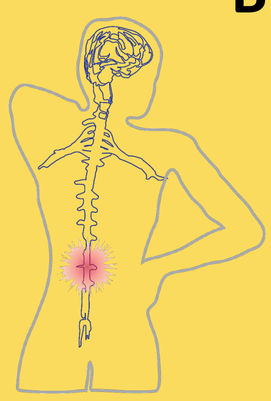


Persistent treatment of neuropathic pain using AAV gene therapy

- a new principal for pain treatment



Biotech & Pharma

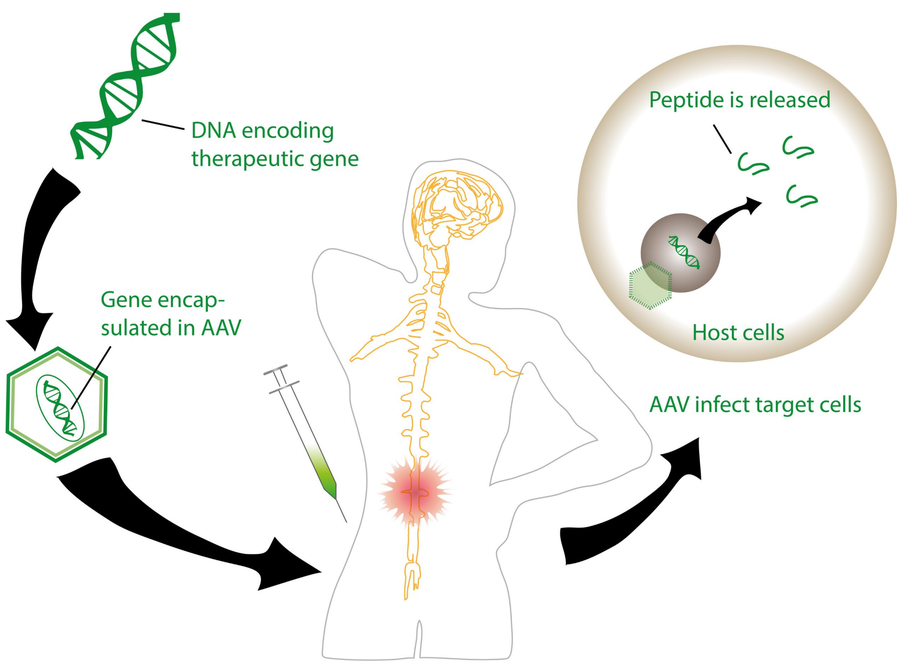
The problem

- Chronic pain is a malfunctioning of the nervous system caused by disease or tissue injury
- 10% of the adult population world-wide is affected by chronic pain
- Available drug therapies address symptom relief and generally lack efficacy and also interfere with normal perception
- There is a huge unmet medical need for a targeted and efficacious treatment

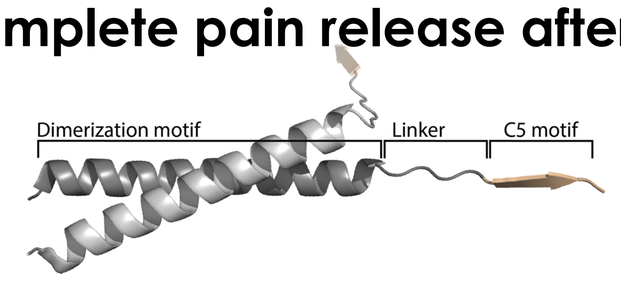
The solution

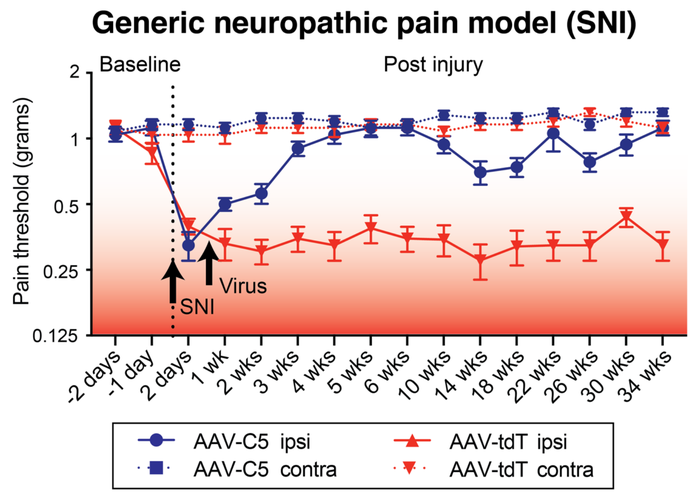
- AAV gene therapy is considered a major breakthrough technology for clinical applications
- The IP protected AAV-encoded recombinant peptide blocks maladaptive AMPA receptors trafficking
- In-vivo Proof-of-Concept (in several relevant animal disease models)
- Complete and enduring (life-long) blockade of neuropathic pain after a single AAV administration
- Targets diseased states without interfering with normal pain perception

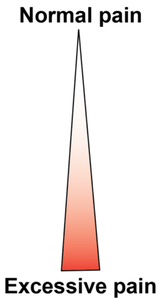
The principals of AAV gene therapy



Complete pain release after AAV treatment







In the Spared Nerve Injury (SNI) model of induced mechanical allodynia, **"Ipsi"** corresponds to the "disease state" with a hyper-reactive pain response (if untreated), whereas **"contra"** corresponds to a normal pain response.

Technology Description

The invention involves an AAV technology platform that permits targeting of any PDZ domain proteins for treatment of pain, but also other neurological disorders.

The invention is particularly tailored for intracellular expression of recombinant peptides that can be selectively directed to malfunctioning neurons or other cell types.

Intellectual Property Rights

PCT appl. WO2020083916 "Virally expressed inhibitors of PDZ domains, such as PICK1 and uses thereof"

Priority appl. EP20161493 "Viral multimeric peptide constructs for targeting PDZ domains"

Team

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Founder, Commercial/Development
Marigold Innovation (Peter Horn Møller, Niels Skjærbæk, Jakob H. Rasmussen)

Clinical advisor
Nanna Brix Finnerup, MD, DMSC
Head of Danish Pain Research Center

Current State

- The project is currently sponsored by NNF Preseed & InnoExplorer grants
- An exclusive license agreement is currently being negotiated with UCPH and will also cover the two patents related to the synthetic peptides
- The AAV gene therapy program serve as a potent 2nd generation product or viable backup to our peptide approach (see other poster presented here at the Danish IP Fair)
- The prospect spinout company DolorestBio will be launched Q3/Q4 2020

Business opportunity and Call to action

DolorestBio is advancing two treatment programs towards the clinic: peptide (lead candidate) and gene therapy (2nd generation)

Backed by a strong IP position and a large set of pre-clinical data supported by CMC considerations, the team behind DolorestBio is looking for relevant development partners as well as potential investors.

DANISH **IP** FAIR
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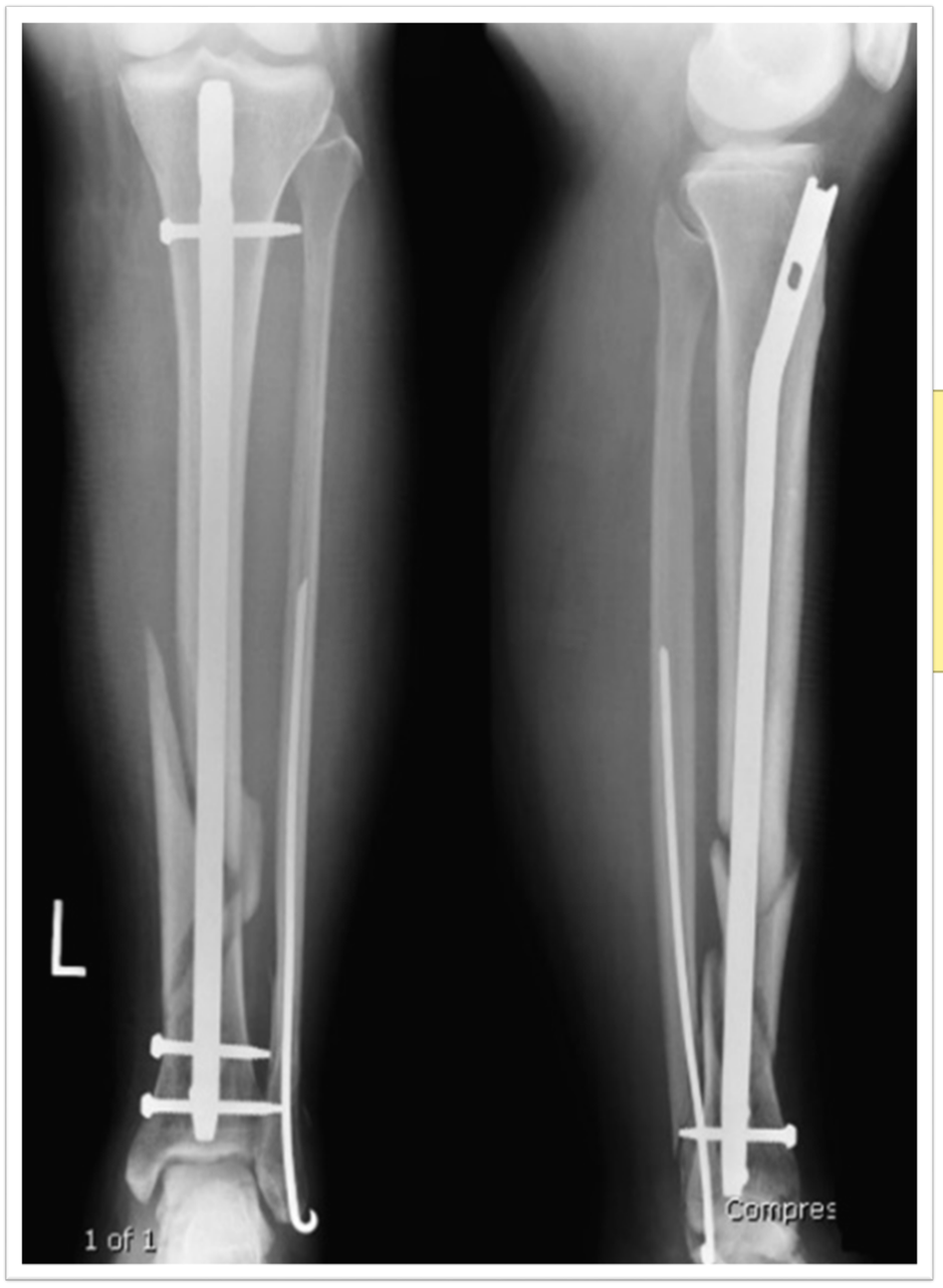
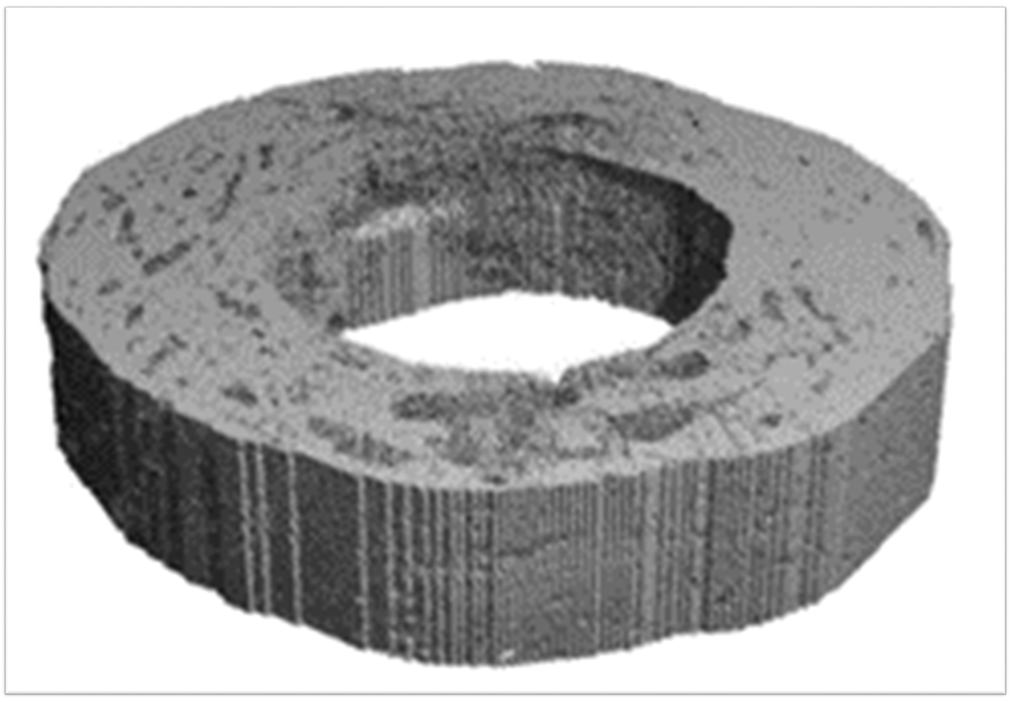
Orthopedic Implant Coating

Biotech & Pharma

Surgical coating for bone tissue enhancement

An inexpensive way to improve orthopedic implants by reducing costs, side effects, and invasiveness compared to bone allograft implants





Bone stimulation and healing of critical size defects <12 weeks. BV/TV : 64% . (above)

Long bone fracture with intramedullary nail. (left)

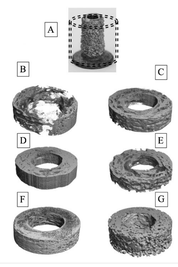


Figure above: microCT images of bone stimulation and healing of critical size defects <12 weeks.. **A:** Illustrated region of interest displayed (2 mm concentric gap without implant). **B-E +G**: Implants with various coating formulations **F:** Allograft.

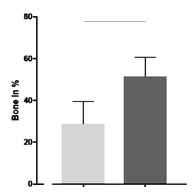


Figure above: BV/TV statistics from allograft and the optimal formulation of the novel coating. No difference between coated implants compared to allograft.

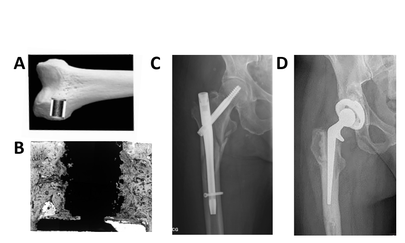


Figure **A:** Illustration of the placement of the 10mm x 10mm titanium implant into the trabecular bone structure in the distal femur condyle. **B:** Histolgy of coated implant in a critical size defect after 12 weeks. **C.** Hip fracture, short gamma nail. **D:** Loosened hip arthroplasty

Technology Description

This surgical implant coating stimulates blood vessel formation locally and improves bone tissues formation in efforts to heal critical size bone defects. This technology offers a highly effective combination and ratio of cells/growth factors/biomaterials/release method in a simple and clinically useful delivery format.

Results from a pilot study in sheep models show bone formation is regained in a critical size defect. Practically, this demonstrates regeneration of bone tissue on demand, and can enhance ingrowth of new bone and stabilization of inserted implants. The initial results show a clinical advantage over the best current surgical option, allograft bone implants. The medical coating composition is currently being optimized and target clinical applications are being investigated.

Intellectual Property Rights (1-2 lines)

Patent Pending, Priority: October 2018: PCT/EP2019/077866, Coating composition for medical implants

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Current State

Planning further animal testing and requirements before application for human trials.

Call to action

- Licensee
- Partner/Research Collaboration
- Research Funding

AB-Pred
by **Biogenity**

Biotech & Pharma

Recombinant Antibody Prediction Software

Save up to 50%
of the production costs.

Technology Description

At Biogenity, we are developing new software that will facilitate antibody-producing companies gaining unprecedented precision when it comes to selecting the right recombinant antibody candidates. Using AB-Pred, companies can get an easy-to-use tool to predict which antibodies are most likely to succeed during production.

How does it work?

It's quite simple, and all you need is the amino acid sequence. We have trained an AI on a unique database from antibody production. The AI can predict the production level of the individual antibody's; this makes it possible to filter antibodies with low production capability or adjust production scale, so the desired amount of antibody is achieved. With this, the production can be significantly optimized. Thus production time and cost can be reduced.

The next chapter for recombinant antibody production is soon arriving

The Inventors

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twitter.com/biogenity
facebook.com/biogenity

Current State

AB-Pred is in its early stage of beta-testing. We will release a public beta in 2021.

Get early access as a partner

If you want to optimize your production and get hands-on experience before the official launch, we recommend you to apply your company to become a partner. You will get access to our beta testing program of the software, which means exclusive access before anyone else.

Call to action

Do you want to get ahead of your competitors? Learn more about AB-Pred or get early access as a partner. Ask for a meeting today or introduce us to relevant researchers that can benefit from AB-Pred.

Visit us at ab-pred.com or give us a direct call on (+45) 71116050.

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BREAKING NEW GROUND
AALBORG UNIVERSITY