DANISH IP FAIR
Inventions from Danish Research Institutions

Inventions represented at Danish IP Fair 2018

This document contains one-pagers for all inventions within **Biotech and Pharma** presented at the Danish IP Fair 2018. You can use this document to identify meeting partners at the event. Each invention is marked with a unique ID at the top right of the page. Use this ID to look up and book a meeting with the inventor(s) at the Danish IP Fair website - www.dipfair.dk.

The document will be updated regularly in the period February-April, so ensure to re-visit the website for the newest version.

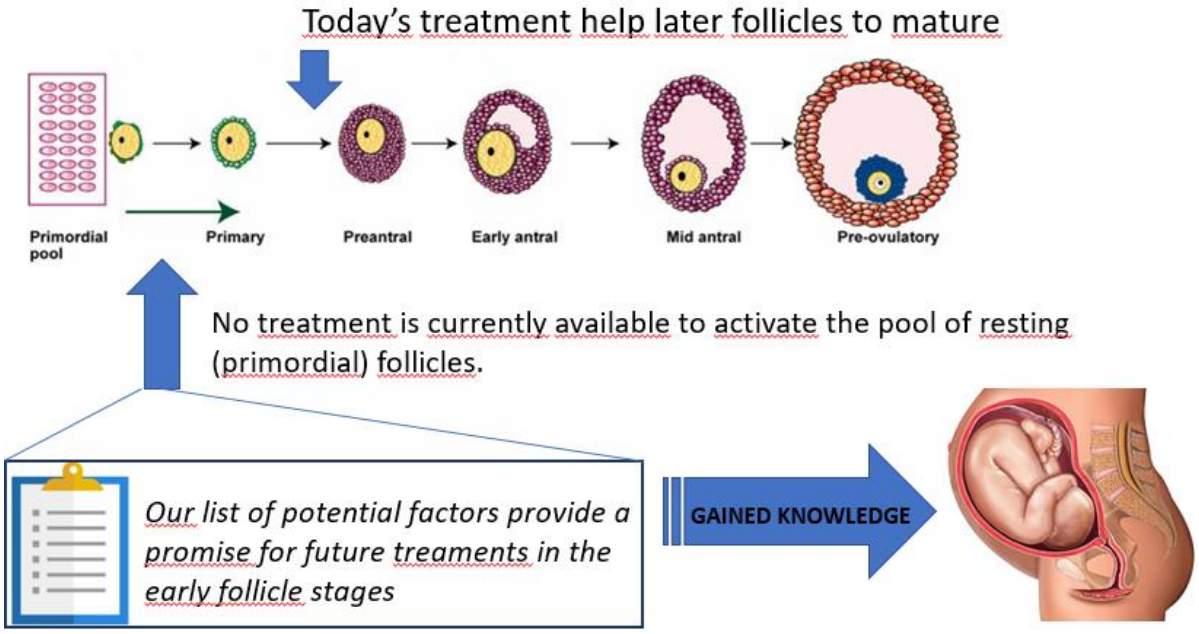
For further guidelines regarding meeting bookings please consult the menu Matchmaking on the website.

DANISH IP FAIR
Inventions from Danish Research Institutions

Invention ID: BP01

AARHUS UNIVERSITY

Compounds towards novel treatments for infertility



Value Proposition/USP

The technology allow for control of the most important early step of egg regulation via. either activation or maintenance of dormancy.

Business Opportunity/Objective/Commercial Perspectives

Present invention will make it possible to activate the resting (primordial) follicles, allowing a more effective treatment of infertility than what is possible with current commercial solutions. This could in particular help the increasing group of women with age-related decline in eggs and/or women categorized as 'low responders', who does not respond to todays treatment aiming at the later follicle stages.
The invention also allows for holding back egg maturation, thereby protecting the pool of resting eggs, i.e. the reproductive potential, from premature expiration.

Technology Description/Technology Summary

Aarhus University have invented a list of new factors for screening for compounds that regulates early ovarian follicle maturation.
We already identified compounds that hold promise for treating, preventing or ameliorating infertility in a large increasing cohort of women not responding to current available fertility treatments.
Additional compounds are expected to be identifiable through an *in vitro*-based screening method.

Development Phase/Current State

Proof-of-concept has been provided using *in vitro* primary culture of mouse ovaries as model system.
Soft funding has been secured for testing of the identified compounds, which are currently ongoing.

The inventors

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Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration

The technology is protected through European patent applications EP17173965.9 filed in June 2017 and 17209250.4 filed in December 2017.

Biotech and Pharma

DANISH IP FAIR
Inventions from Danish Research Institutions

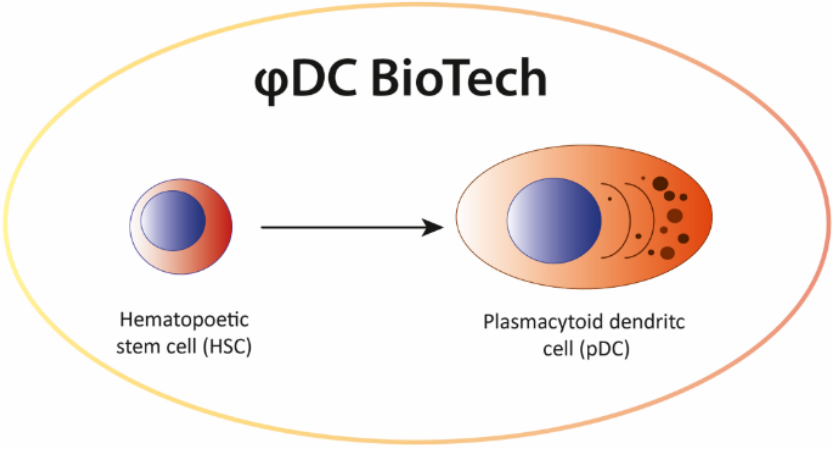
Invention ID: BP02

AARHUS UNIVERSITY

pDC BioTech ApS – enabling high-volume supply of plasmacytoid dendritic cells!

Contract Research Organisation

Strategy to develop business model towards a therapeutic approach to Oncology & Lupus




Anders Laustsen


Martin Jakobsen

BUSINESS MODEL | TECHNOLOGY | TEAM

Value Proposition

The biopharma industry needs a superior supply of plasmacytoid dendritic cells. These cells are needed as they have been linked to a number of diseases, including Systemic Lupus Erythmatosus and cancer. However, only limited quantities of these cells can be isolated from human blood or tissues.

"pDC Biotech" – a prospective startup company - seeks to meet this need through a technology that allows pDCs to be generated at high numbers. Our strategy is to build early-financing on a CRO business model and develop an *ex-vivo* therapeutic approach in Oncology.

Business Opportunity

pDC Biotech is currently designing feasibility studies with a number of biopharma companies to benchmark the technology and demonstrate how they compare to pDCs isolated directly from human blood. The company believes that these early feasibility studies will demonstrate the commercial value of the technology. The company will then employ sales staff and transition to a direct sales supply and consultancy service to the Biopharma industry.

Technology Summary

Research within pDC biology has so far been non-conceivable owing to the rarity of the cell type within blood. Our technology utilizes stem cells that are expanded under specific growth conditions. This has not only allowed us to generate high numbers of pDCs, but as the stem cells are readily amenable to genetic modification, we can generate genetically modified pDCs, allowing researchers to elucidate specific molecular pathways in pDCs.

Current State

As stem cells can be derived from patient, our technology allow patient-derived pDCs to be generated. We are therefore currently investigating the feasibility of utilizing stem-cell derived pDCs to guide specific immune responses. As an initial study we wish to investigate their potential to induce specific anti-tumoral responses. We believe that our method has high potential within clinical immune-therapy where patient-derived pDCs are used to attack the tumor with minimal adverse effects.

The inventors
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Martin Jakobsen, PhD, Associate Professor

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Seeking
Partnering discussions related to feasibility studies and future sales

The technology has been described in a 2017 European patent application (EP17170373.9) and is pending.

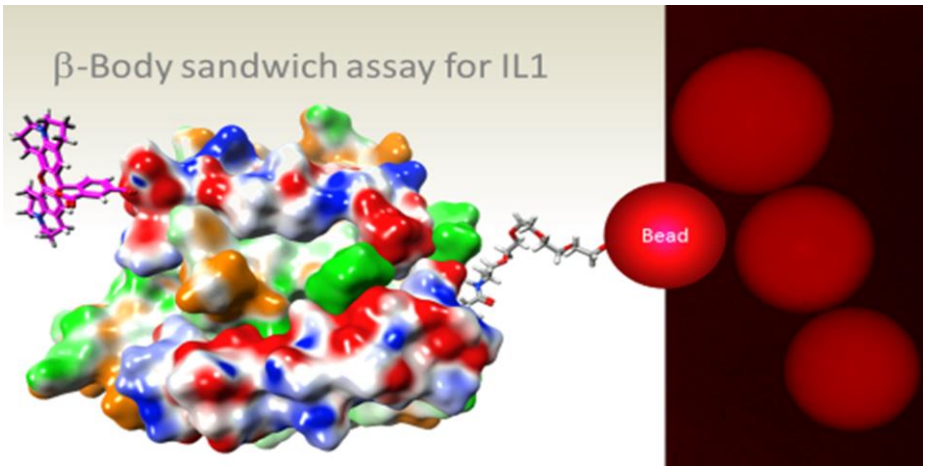
Biotech and Pharma

DANISH IP FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

β-Bodies

- antibody mimetics with ultrahigh affinity and specificity



Value proposition/USP
The technology will enable a licensee to provide customized antibody equivalents designed to recognize almost any surface of a protein.

Business Opportunity/Objective/Commercial perspectives
- Small peptides which can be synthesized using standard peptide chemical methods
- Simple and fast generation, selection and synthesis
- The peptide sequence of the antibody mimetic can be generated by computer-based methods for target proteins with a known 3D structure

Technology description/Technology summary
- Typically, the antibody mimetic is a peptide of up to 26 amino acids equal to less than 3 kDa.
- The unique peptide sequence gives the antibody mimetic a very stable 3D structure.
- The antibody mimetic can bind to its target compound with a Kd of down to 10-9-10-10.
- Applications include therapeutic or neutralizing b-bodies and in vivo use for control of cellular function.
- For detecting the presence of a target compound in a sample, the β-body may be linked to a detectable label or it may be used in a sandwich assay.

Development phase/current state
β-bodies have been designed and tested for a number of interleukins, enzymes and receptors by computer-based methods. Work on selectivity and on other target proteins is on-going. The technology is ready for any target protein with a known 3D structure. It is also feasible to use combinatorial selection of these antibody mimetics towards proteins for which the structure is unknown.

The inventors
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Seeking
- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

Intellectual property rights: Danish patent application filed on 11th November 2016

DANISH IP FAIR
Inventions from Danish Research Institutions

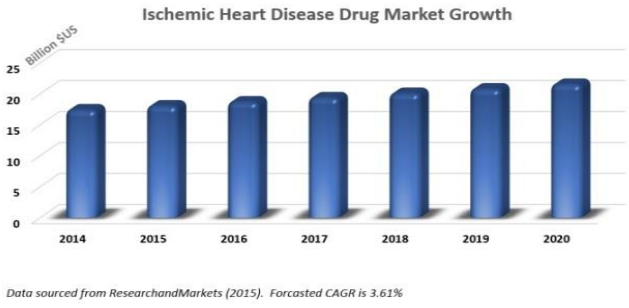
The Capital Region of Denmark

University of Copenhagen

Cardiology Stem Cell Centre

Stem Cell Treatment

- for patients with heart disease and no further treatment options



Value Proposition/USP

Ischemic heart diseases (IHD) cause increasing morbidity in an ageing population, which is a huge burden for society. There is an unmet need for effective treatments for IHD to improve patient survival, quality of life and reduce health care costs.
A promising therapeutic concept is stem cell therapy.
A means to effectively produce, store, distribute and administer adipose derived mesenchymal stem/stromal cells (ASC) has been developed, and it has been shown in the clinic that these cells can be used in the treatment of IHD.

Business Opportunity and Commercial Perspectives

Ischemic heart disease causes 40% of all deaths in EU and is the main cause of death in Europe. Overall cost for IHD in EU is almost € 196 billion a year – a cost expected to grow at a Compound Annual Growth Rate (CAGR) of 3.61% during 2014-2020.

Conventional therapies have reduced IHD mortality significantly, but have left an increasing number of patients with chronic IHD and/or heart failure without further treatment options.

Stem cell products are being tested in heart diseases and in other indications, like prevention of transplant rejection, in diseases such as degenerative disc and joint disorders or inflammatory diseases . The first stem cell products (approved in Japan) is indicated for treatment of radiation injury , chronic obstructive pulmonary disease, Crohn's disease , GVHD, Type I diabetes and myocardial infarction.

However, worldwide, there are no approved stem cell products on the market for chronic ischemic heart disease.

Technology Description/Technology Summary

The technology developed enables production of ASC from donor abdominal adipose tissue. Cells are expanded in a closed production system in a bioreactor. Each production results within 2-3 weeks on average in approximately 50 treatment doses from each donor. Vials are frozen and shipped to treatment centers globally, where the product is administered by direct injection into the patients damaged heart tissue. The product developed by the Cardiology Stem Cell Centre (CSCC) is easy to produce, store and transport – and this fully GCP grade product will advance dissemination and implementation of the therapy.

Development Phase/Current State

- An automated and scalable GMP production that is process fully compliant with EMA and FDA guidelines is developed.
- Clinical studies in patients with IHD have been conducted showing safety, applicability and clear effect indications
- Ongoing international multi center clinical phase II studies will verify the clinical observations.

The inventors
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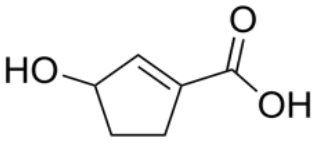
Seeking
- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR or Trade Sale

Patent application has been filed on Oct 21. 2016 - PCT/EP2016/075407

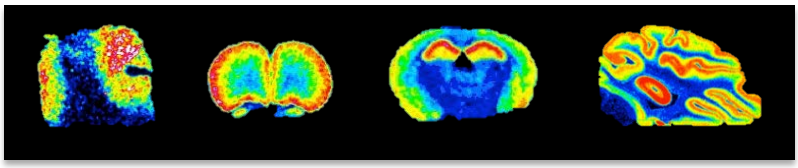
DANISH IP FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

Compounds for the treatment of acute brain injury

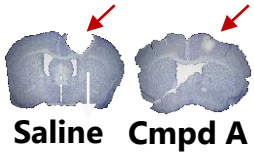


Cmpd A

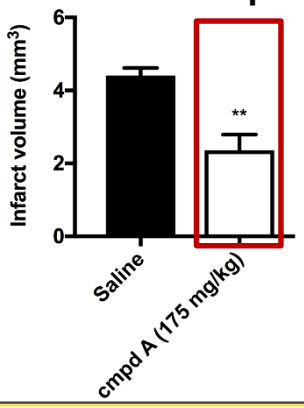


Cmpd A binding sites in the mammalian brain

Reduced infarct size

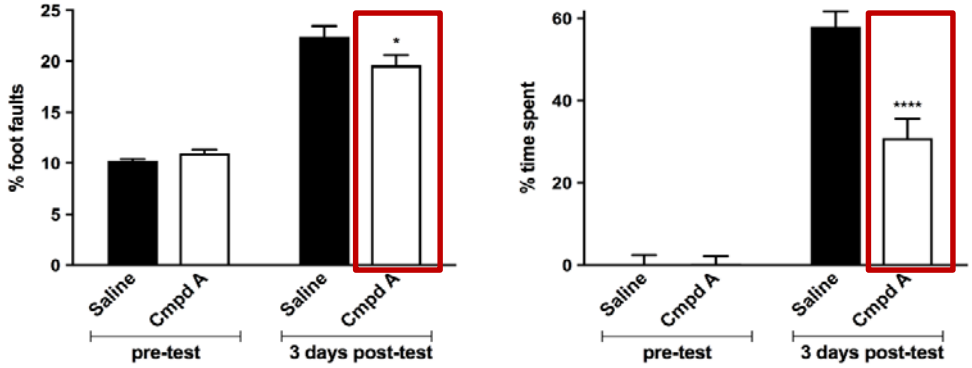


Saline Cmpd A



Reduced motor performance deficit (Day 3) in mice treated with Cmpd A 12 hours after the injury

NEUROPROTECTIVE ACTION!



Unique Selling Points

- Brain-permeable neuroprotective small-molecule compound
- **Effective when administered up to 12 hours after the injury**
- Novel targeted mechanism-of-action (first-in-class)

Commercial Perspectives

Acute brain injury is a major world-wide health issue with very limited medical treatment options. It includes traumatic brain injury (caused by, for example, road accidents or a blow to the head) and ischemic stroke. Uniquely, our compound can be given hours after the injury.

Technology Description

Cmpd A rapidly enters the brain after systemic administration and targets an intracellular, multi-functional enzyme involved in higher brain functions via a novel binding site.

Current State

Cmpd A: Proof-of-concept in several brain injury models. A scale-up synthesis use has been developed. Prodrug design is ongoing.
2nd generation compounds: *In vitro* studies to select candidates for *in vivo* testing and further mechanism-of-action studies.

The inventors
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Seeking
- Funding/investors
- Licensee
- Partner/research collaboration

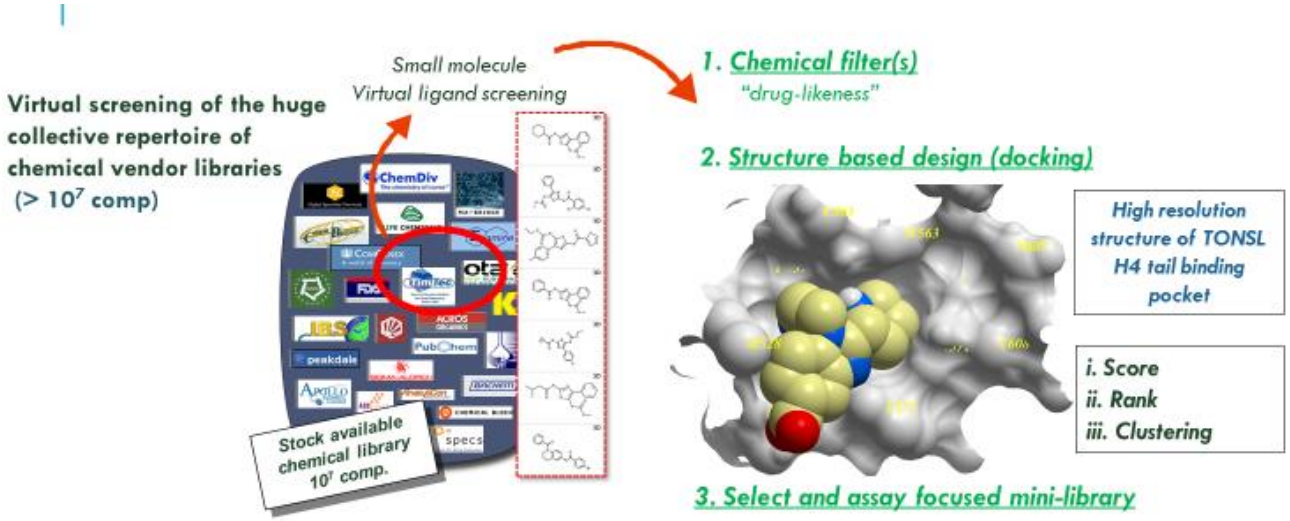
Patent application filed 02 Feb 2018

DANISH IP FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

Targeting DNA repair in cancer therapy

Structure-based design of novel small molecule inhibitors



Value proposition

Small molecule inhibitors of the TONSL protein represent a novel concept for treatment of cancer in the field of DNA Damage Repair. TONSL is involved in repair of replication associated DNA damage through homologous recombination. Since cancer cells experience high loads of replication stress, they are highly dependent on homologous recombination repair for survival. Inhibiting TONSL's function will lead to accumulation of DNA damage in and death of cancer cells.

Business Opportunity/Objectives

The need for novel anti-cancer treatments remains high and the market opportunities significant. A benchmark compound Olaparib, inhibiting the DNA repair enzyme PARP, was approved 2014 for treatment of ovarian cancer and is forecasted to sell for $ 2 billion. We are aiming at establishing a spinout company as well as pursuing collaboration with established pharma companies.

Technology description

TONSL is recruited to chromatin and DNA repair sites via binding to the tail of histone H4. The high-resolution X-ray crystal structure of TONSL in complex with H4 has been solved and is being used to design novel small molecule inhibitors of the interaction by *in-silico* screening and directed chemical synthesis.

Development phase

Under a pre-seed grant from Novo A/S we are working on designing and synthesizing novel small molecule inhibitors. In parallel, we are aiming to validate TONSL as a clinically relevant cancer target through a number of *in-vitro* and *in-vivo* screens of cells and animal models. The focus is to determine what type of cancers could benefit most from treatment with TONSL inhibitors.

The team & inventors
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Giulia Saredi (BRIC, KU)
Colin Hammond (BRIC, KU)
Dinshaw Patel (Sloan-Kettering MCC)
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Structure based drug design & screening
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Intellectual property rights: PCT application WO2017/054832

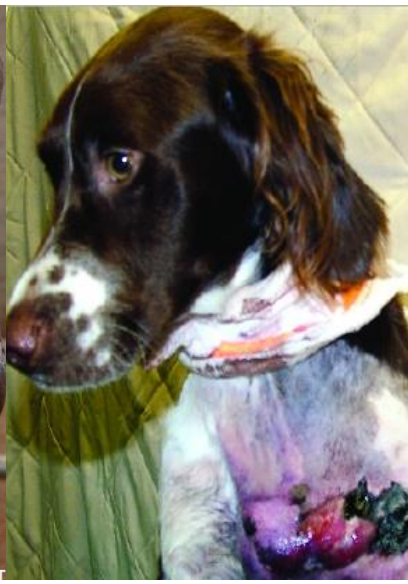
DANISH IP FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

Novel compounds to treat snake bites







Value Proposition/USP

We have identified a range of novel synthetic antibodies and other compounds that hold the promise of treating snakebite envenoming more selective, efficient and cost-effective. Snakebite envenoming is a serious problem in many areas of the world resulting in more than 100,000 deaths and 400,000 serious injuries every year. Current antivenoms (antibody based) are made in animals, giving rise to immunogenic responses in humans, expensive production (horse and snake farms needed), storage issues, cold-chain etc. The novel synthetic antivenoms can be produced as >99.9% pure and at low costs since there is no need for animal farms or snake farms.

Commercial Perspectives

There is currently a huge unmet need for synthetic, high-quality antivenoms, not only for human use but in the veterinary sector as well since many domestic animals including pets are killed by snake bites. Among the “developed” countries, USA is probably the country suffering most from the consequences of snake bites and US spending on current available antivenom drugs for humans runs into more than $ 100 millions annually. Thus, given the drawbacks of the currently available therapies there is a significant opportunity for bringing high quality and selective new antivenom products to the market.

Technology Summary

By the use of phage display techniques and other biotechnology procedures, we have been able to identify our synthetic venom toxin inhibitors that are active against essentially any snake venom toxin. We already have several venom toxin inhibitors in our portfolio and are actively pursuing the identification of additional active compounds. The synthetic anti-toxins have been shown to work in vitro (biochemical assays) and in vivo (mouse models), in the sense that these compounds can neutralize different snake toxins.

Development Phase

The novel synthetic compounds are now being characterized and optimized with regard to solubility, potency, stability, and bioavailability. It is anticipated to reach the lead stage within 12 months (1Q2019) and then progress into formal preclinical studies with one or more compound candidates.

The inventors
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+ 4 more

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Seeking

- Funding/Investors
- Partner/Research Collaboration

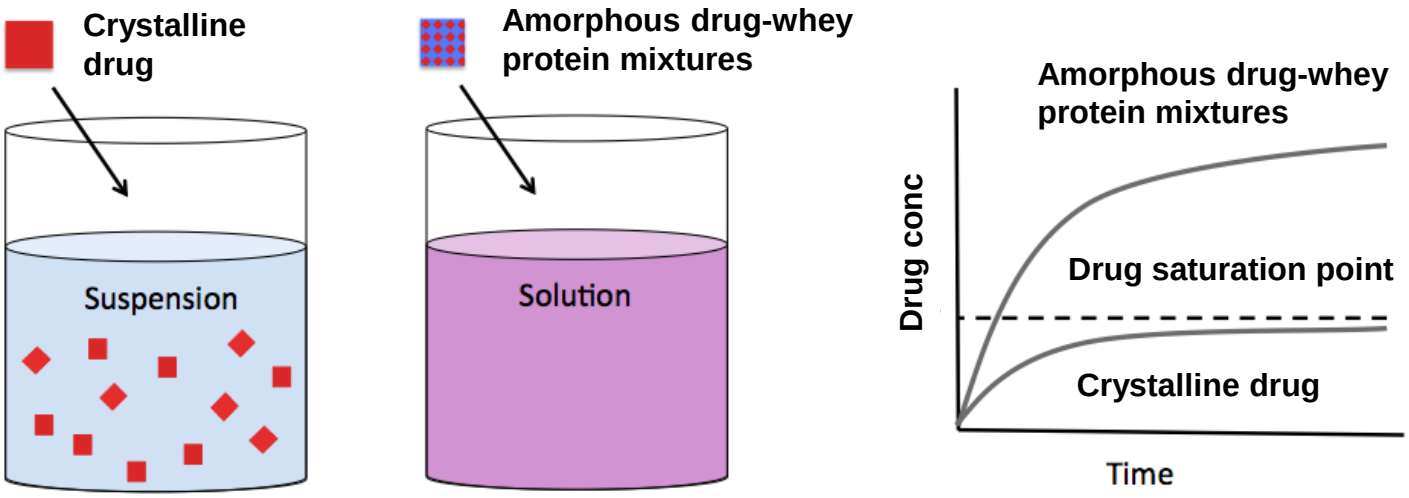
EP Priority patent application filed March 2018

DANISH IP FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

Drug Delivery by Amorphous Technology

- using biomolecules to improve bioavailability



Value proposition/USP

Poor solubility of chemical compounds is often a limiting factor in the formulation and bioavailability of drugs and food supplements. Low solubility may result in compounds not being developed at all, or the use of large quantities of the active component to overcome the problem. We have now shown that natural biomolecules can dramatically increase the solubility of otherwise insoluble compounds by the formation of an amorphous mixture. The process is simple, inexpensive and uses safe components.

Business Opportunity

The proprietary amorphous technology can be used in any field where a higher solubility of a given compound is desired. The concept makes use of readily available materials and can be combined with most existing manufacturing processes. The new technology makes it possible to e.g. increase the bioavailability of oral drugs thereby offering more attractive pharmacological properties of existing or novel drugs/supplements.

Technology description/technology Summary

Materials can be crystalline or amorphous. The amorphous form is more soluble than the crystalline form of a compound but it is unstable and tends to quickly transform into the poorly soluble crystalline form. By creating an amorphous **mixture**, which is a combination of the compound with the proteins, a highly stable system with high solubility is obtained. In particular, whey proteins have demonstrated exceptionally good properties in forming amorphous mixtures and are considered safe, non-toxic and inexpensive to use.

Development phase/current state

Proof of concept has been performed with a set of different proteins and protein mixtures in combination with commercially relevant poorly soluble drugs. The amorphous drug-protein formulations have shown higher solubility, dissolution rate and stability, in vitro and in vivo, compared with existing amorphous technologies. Furthermore, for the preparation of these mixtures industrial scale up technologies are feasible.

The inventors
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Intellectual property rights:
PCT application filed December, 2017

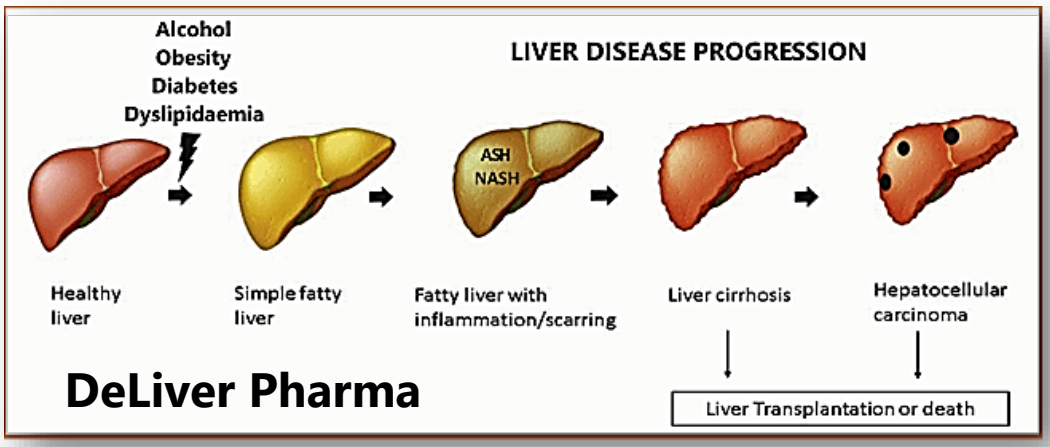
DANISH IP FAIR
Inventions from Danish Research Institutions

Invention ID: BP09

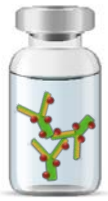
SDU

Maclizumab dexamethasone

A novel medical approach to treat acute alcoholic- and non-alcoholic steatohepatitis (ASH and NASH)



Maclizumab dexamethasone



An ADC directing the glucorticoid dexamethasone specifically to macrophages by linking to anti-CD163 antibodies (Maclizumab).

Value Proposition

Dexamethasone is a highly-potent synthetic glucocorticoid and, as such, one of the most efficient anti-inflammatory drugs for treatment of inflammation. However, the side effects seen after prolonged intake hampers the use. Therefore, DeLiver Pharma have developed an antibody-drug conjugate to specifically target and treat macrophages with a highly potent glucocorticoid that can efficiently combat inflammation but eliminate adverse systemic effects due to off-targeting. The macrophages are specifically targeted using the humanized antibody Maclizumab binding CD163 expressed only on macrophages and monocytes. The initial focus for treatment with *Maclizumab dexamethasone* is hepatic inflammation, with steatohepatitis of ASH and NASH being the lead indications.

Business Opportunity

DeLiver Pharma´s *Maclizumab dexamethasone* treatment is currently ready for development for the acute severe form of ASH (acute alcoholic hepatitis) that has a 28 day mortality of >30 % and in which we would be positioned as a first-line treatment. This will bridge to entry into chronic late-stage liver inflammation with concurrent fibrosis in NASH and ASH. *Maclizumab dexamethasone* could also potentially be offered in combination with other therapeutic applications, for example to provide targeted treatment for other liver indications that similarly suffer from unmet needs, such as drug-induced hepatitis (e.g. caused by paracetamol), liver transplant rejection, autoimmune hepatitis and acute liver failure.

Technology Description

Macrophages play a key role in many inflammatory, infectious and malignant diseases. Very exclusively, macrophages express the hemoglobin scavenger receptor, CD163 on their surfaces. DeLiver Pharma have produced and humanized an IgG4 monoclonal antibody that binds CD163, named Maclizumab, and which is internalized by the macrophages. We have developed a lead compound, *Maclizumab dexamethasone*, that specifically targets and treats macrophages with a well-known and highly-potent glucocorticoid. In the present form, a therapy based on *Maclizumab dexamethasone* will be administered intravenously (IV).

Current State

Strong Proof-of-Concept data have been obtained, showing 50-fold increased effect in pigs of our lead candidate for human use. Based on favourable pharmacokinetics and large scale producibility *Maclizumab dexamethasone* is ready for late pre-clinical and clinical development. Next development will focus on GMP production of the antibody-drug batch, the safety/toxicity testing of the GMP produced *Maclizumab dexamethasone* and hereafter early clinical testing in patients suffering from acute alcoholic hepatitis.

The inventors

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Professor **Holger J. Møller**, holgmoel@rm.dk, Department of Clinical Medicine, Aarhus University.

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Seeking

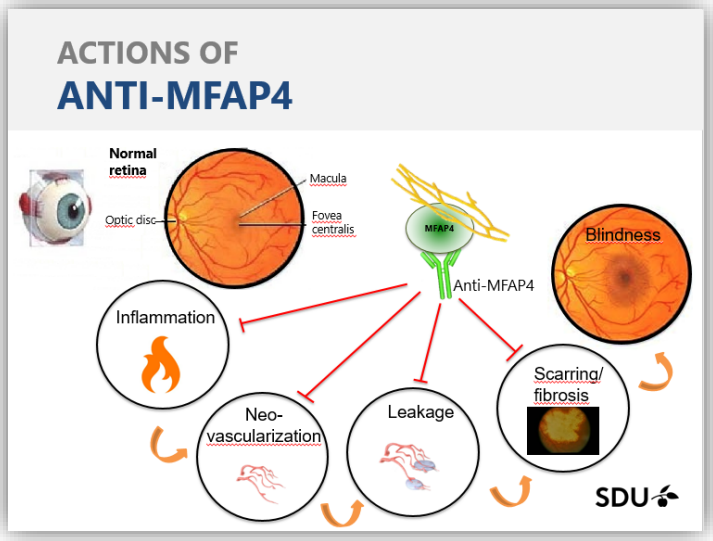
- Funding/Investors
- Licensee
- IPR Sale

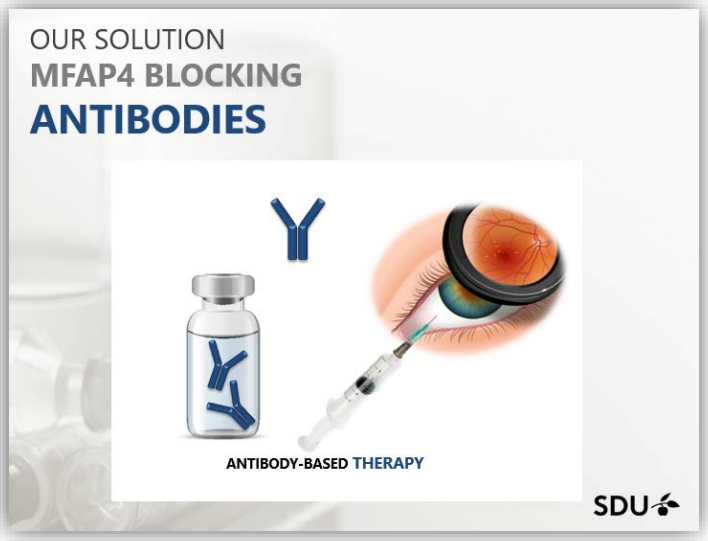
Intellectual property rights are hold by three patent families (WO2011039510, WO2011039511, WO2002032941)

Biotech and Pharma

DARE Therapeutics

- Developing a next generation treatment for wet AMD and DME





Value Proposition

We have identified a novel target; namely microfibrillar-associated protein 4 (MFAP4) and have produced and humanized a new antibody targeting MFAP4. **The antibody is a candidate for stand-alone or combination therapeutics against conditions involving neovascularization, inflammation and fibrosis in the eye and therefore potentially targets vascular ophthalmic complications such as wet (advanced) age-related macular degeneration (AMD) and diabetic macular edema (DME), and especially targets the large patient group not responding to therapies offered today (anti-VEGF).**

Business Opportunity

We believe that when the anti-MFAP4 therapy is successfully developed, a high market penetration among the non-respondent patient group would be expected. In this scenario, the estimated anti-MFAP4 therapy would benefit 4.25 million anti-VEGF non-responders with a global market size of approximately $860 million per year. Furthermore, having shown efficacy in the anti-VEGF non-responders, the anti-MFAP4 treatment might be able to challenge current first-line treatments due to the significant expected advantages, thus gaining a market share of the anti-VEGF respondent market.

Technology Description

Our target MFAP4 is fixed in the extracellular matrix and is permissive for integrin-dependent activation of inflammatory and vascular cells, causing inflammation and vascular growth. These observations suggested that anti-MFAP4 might reduce inflammation and neovascularization and have long half-life. MFAP4 is further associated to fibrotic deposition and is an inducer of fibrosis. These observations render MFAP4 an obvious target in wet AMD and DME, as these conditions are caused by pathological neovascularization in the eye and because integrin activation is a known inducer of neovascularization. Furthermore, inhibition of integrin signaling with blocking antibodies against integrin has been and is still under exploration for human administration in the eye.

Current State

We have just received 14 million DKK investment from Innovationsfonden for the late pre-clinical development phase; establishing Proof-of-Concept in the gold standard Macaca model of wet AMD and differentiation-to-standard care by reduced pathological fibrosis and inflammation, less systemic side effects and reduced injection frequency. Prior to GMP production of our antibody and moving into clinical trials, we plan to incorporate DARE Therapeutics ApS and are seeking investment hereto.

The inventors

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Seeking

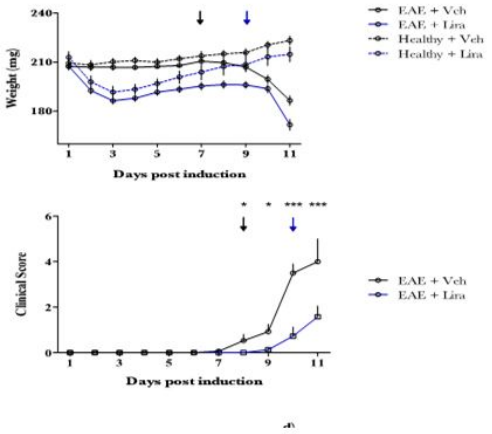
- Investors
- Licensee
- IPR Sale

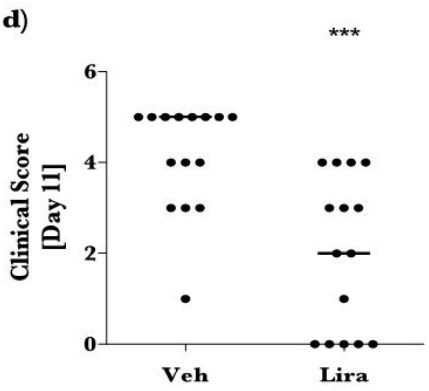
DANISH IP FAIR
Inventions from Danish Research Institutions

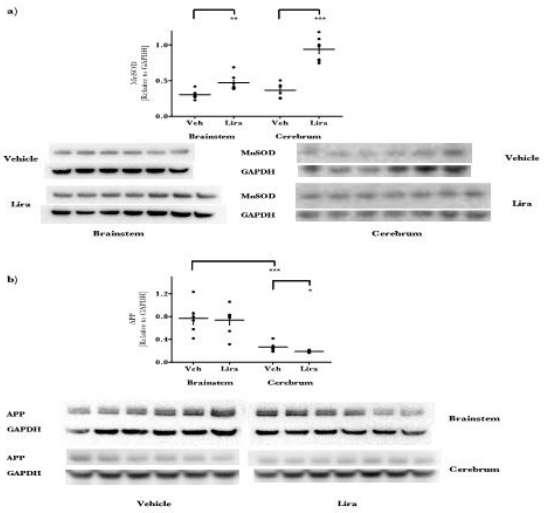
Invention ID: BP12

AARHUS UNIVERSITY

GLP-1 based treatment of Multiple sclerosis







Value Proposition

Our IP protected findings shows that GLP-1 analogue Liraglutide prevent MS-like disease activity also eliciting neuro-proliferative responses supporting an effect against depression and cognitive symptoms in MS. With the positive safety profile and limited side effects of Liraglutide as treatment of diabetes and obesity, this allows for a swift introduction of re-purposed GLP-1 drugs.

Commercial Perspectives

MS affects 2.5 million patients worldwide and current treatments options leave a clear unmet medical need for a new treatment approach. Our invention allow for re-purposing of Liraglutide for the MS marked and development strategies for expanding patent to new GLP-1 candidate combinations.

Technology Summary

The technology has proven that the activation of the GLP-1 axis reduces/prevent disease activity well-established models of multiple scleroses and identification of down-stream targets support that activation of the GLP-1 axis may also be benficial towards MS induced depression and cognitive symptoms. This allows for re-purpusing of liraglutide as well as new drug candidates with in the GLP-1 antagonist area focused as first-line treatment or combination treatment for inflammatory responses and cognitive symptoms.

Development Phase

Our aim is to facilitate the transfer of our knowledge into the first human trials on MS patients and substantiate the economical rational for investments in a (multi-)national patent strategy. We envision a 6-9 month phase of further characterization of the molecular mechanisms involved order to identify the most susceptible patient subgroups for the first test phase and provide our investment partners with additional strategies for expanding the patent with science-based co-treatment to add commercialization value.

The inventors

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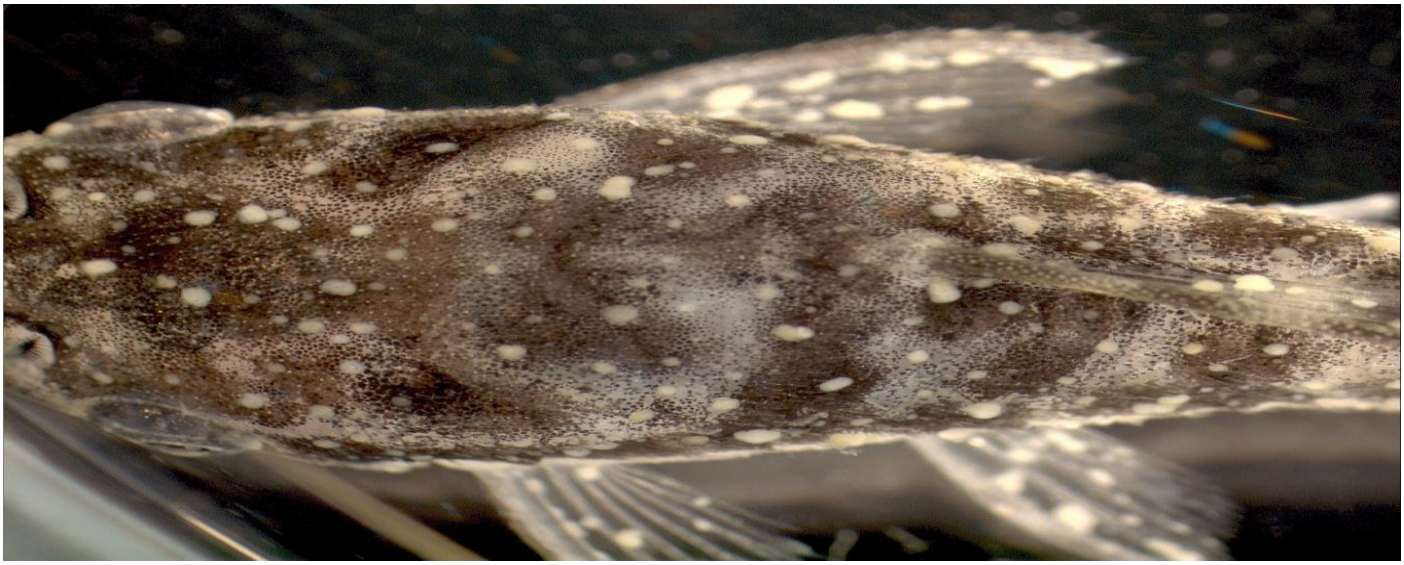
Seeking

- Licensee
- Partner/Research Collaboration

Intellectual property rights: Protected through a PCt application (PCT/EP2017/077634) filed October 27, 2017.

Biological Treatment of White Spot in Fish



Value Proposition/USP

The invention offers a biodegradable remedy against white spot. The product is very effective with up to 100% kill rate of all stages of the parasite in less than 30 minutes. The product is non-toxic and well-tolerated by fish. Acquiring the intended product is straight forward and the final product can be stored and transported for months without any special requirement for cooling. The product can be applied in all types of freshwater aquaculture systems and has the potential to control the disease in trout, salmon, eel, carp and ornamental fish.

Business Opportunity

Nederlands Instituut voor Ecologie and the University of Copenhagen are looking for an industrial partner to commercialize the invention of new anti-parasitic compounds under a license agreement. The market for such a product is huge due to the severe impact of this parasitic disease in a rapidly increasing aquaculture. Products based on the invention can be used in fish farms settings as well as in ornamental settings.

Technology Description

New lipoprotein surfactants have been identified from a known bacterium - the active lipoproteins can be applied in freeze dried form directly to the fish tank or in slow-release granules. Low concentrations in the range between 10 and 100 microgram per L are effective. No special storage or transportation is required.

Development State

Active lipoprotein surfactants have been isolated and stored as a freeze dried products. Proof-of-concept has been demonstrated in rainbow trouts. Kill rates for all stages of the parasite life cycle have been documented. The project leading to this patent application has received funding from the European Union´s Horizon 2020 research and innovation program under grant agreement No 634429.

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Seeking
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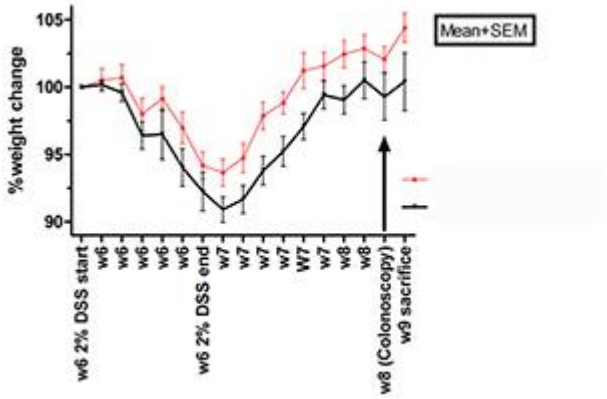
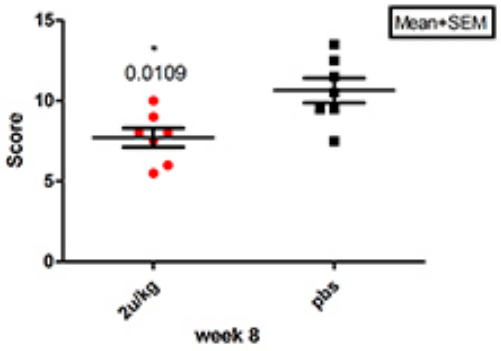
EP patent application No. EP patent application No. 17202669.2 filed 21 November 2017

Insulin as a Novel IBD Therapy

Rectal insulin administration during AOM + DSS induced colitis



Murine endoscopic index of colitis severity



Unique Selling Points

We have invented a novel therapeutic principle for treatment of inflammatory bowel disease and the therapy is especially well suited for the treatment of ulcerative colitis. The current state-of-the-art therapy for IBD targets the immune system and involves the uses of 5-aminosalicylates, steroids, thiopurines and biological therapies such as e.g. anti-tumor necrosis factor alpha antibodies.
The unique properties of our therapy are:

- Based on the repurposing of insulin which is applied locally to the colo-rectal mucosa
- Targeting the epithelium rather than the immune system
- Anti-tumorigenic effect in the colon

Business Opportunity

EnteroTarget Aps is a newly founded spin-out company based on rectal insulin for IBD. We seek investors to enter the pre-seed / seed phase following a planned human pilot study.
With rectal insulin therapy our first priority is ulcerative colitis with limited extension with an estimated world-wide annual market of 1.7 billion USD. It is envisioned that rectal insulin therapy can reach an initial 2% of the market for treatment of ulcerative colitis, rising to 20% within five years of marketing.

Technology Description

Human Insulin is instilled rectally in a volume of 100-200 ml of phosphate buffered saline. The volume may be increased in order to increase the mucosal area covered. Insulin is administered daily during active disease by the patients themselves at home. Rectal administration is already used for the drugs most frequently used in IBD (steroids and 5-aminosalicylates) and is well tolerated by the patients.
Rectal insulin may also be used in combination with existing IBD therapies.

Development Phase

Based on a solid basis of experimental evidence from experiments in the murine azoxymethane (AOM) + dextran sodium sulphate (DSS) model for inflammation and inflammation induced colorectal cancer, we are currently taking the project into a human pilot study.

The inventors

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Seeking

- Funding/Investors
- Partner/Research Collaborator

entero target

Intellectual property rights: PCT patent application filed on November 10, 2017

DANISH IP FAIR
Inventions from Danish Research Institutions

The Capital Region of Denmark

UNIVERSITY OF COPENHAGEN

L-serine prevents diabetes

- L-serine lowers diabetes incidence and improves glucose homeostasis

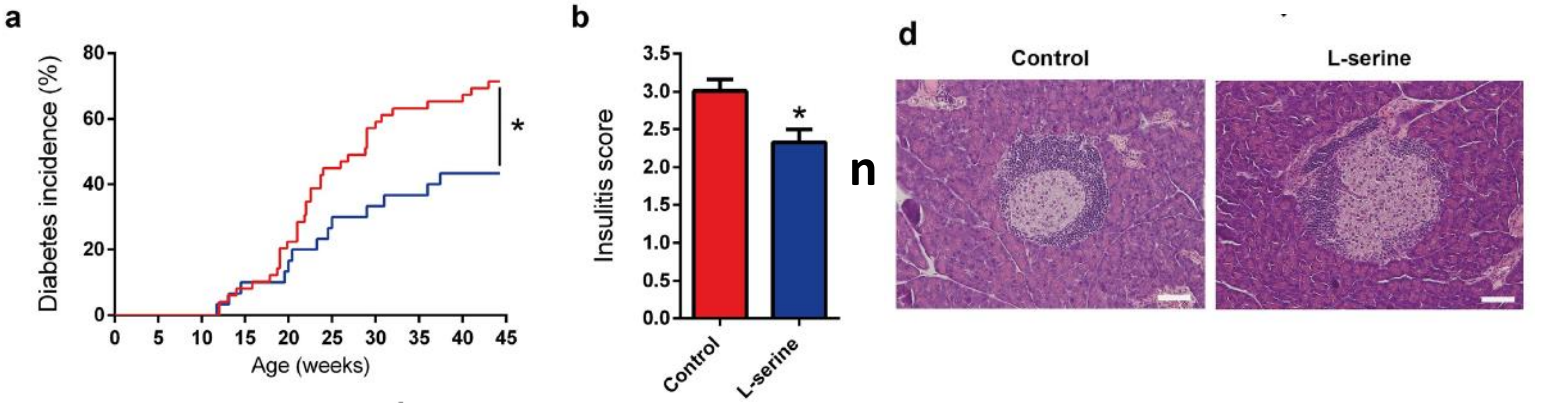

Fig 1. L-serine reduces autoimmune diabetes incidence and insulitis score in NOD mice. (a) Kaplan-Meier survival curves showing diabetes incidence up to 45 weeks of age. Blood glucose was measured once a week and diabetes diagnosis were based on two blood glucose measurements with an interval of two days ≥12mM, control (n = 49) and L-serine (n = 30), p = 0.02. (b) Insulitis score in 13-weeks-old NOD mice, 30 islets were scored per mouse. n = 5. Shown is mean ± SEM. p = 0.02. (c) Percentage distribution of insulitis levels: 0 (white), 1 (light grey), 2 (grey), 3 (dark grey), and 4 (black). p = 0.03, for insulitis level 4. (d) Representative images of insulitis level in control and L-serine mice. Scale bar, 50 μm. Control is shown in red and L-serine in blue. Statistical tests: Mantel-Cox log-rank test (a) and unpaired two-tailed Student's *t*-test (b, c). *p<0.05.

Value Proposition

Diabetes is a major health problem approaching epidemic proportions worldwide. It is associated with serious consequences for the patients regarding complications like blindness and cardiovascular disease, as well as the society in the form of increasing costs to treatment and care. Highly interestingly, we have recently demonstrated that treatment with the non-essential amino acid L-serine improves the signs of diabetes in mice. Thus, L-serine supplementation could be used to prevent diabetes in the population for the benefit of the patients and the society, and a human trial should be conduced to test the diabetes alleviating effect.

Business Opportunity

Treatment with L-serine is a new possible therapeutic intervention for both type 1 and type 2 diabetes, latent autoimmune diabetes of adults, gestational diabetes, hypoglycaemia, and neuropathy, as shown by its beneficial effect on diabetes development, degree of insulitis in NOD mice and positive effect on non-fasted blood glucose etc.

Technology Summary

Experimental tests in diabetes-prone NOD mice showed that L-serine prevented diabetes and had an overall beneficial effect on blood glucose homeostasis. Thus, the invention relates to a method of prophylactic treatment of type 1 diabetes and related disorders in subjects at risk of developing diabetes by treatment with the non-essential amino acid L-serine.

Development Phase

Experimental tests with L-serine has been conducted on diabetes-prone NOD mice, which have demonstrated promising effects regarding prevention of type 1 diabetes and improved glucose homeostasis. We propose that a randomized, double-blind, placebo-controlled study is conducted to investigate the diabetes alleviating effect of treatment with L-serine in humans.

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Seeking
- Funding/Investors
- Licensee
- Partner/Research Collaboration
- IPR Sale

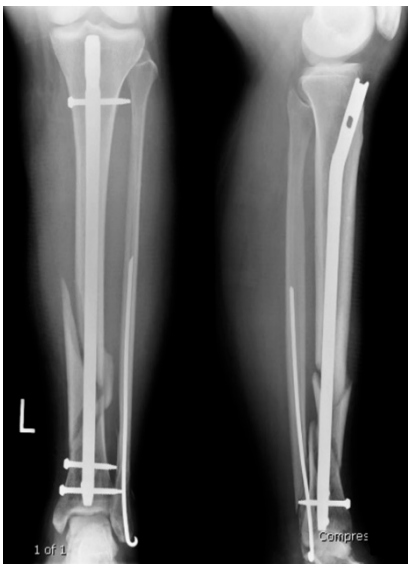
Intellectual property rights (Title: L-SERINE SUPPLEMENTATION TO PREVENT DEVELOPMENT OF DIABETES, PA201700490)

DANISH IP FAIR
Inventions from Danish Research Institutions

SDU

Orthopedic Implant Coating

Surgical coating for bone tissue enhancement



Value Proposition

This technology offers an inexpensive way to improve orthopedic implants by reducing costs, side effects, and invasiveness compared to bone allograft implants.

Business Opportunity

This technology is clinically relevant for orthopedic surgical implants. Generally, this coating is relevant for treatment of bone injuries where "Internal Fixation" is the appropriate clinical approach. More specifically, we envision this would be useful for delayed union and non-union fracture applications. Dental application in maxillofacial surgery may also be an highly useful application, as bone and implant fixation in important.

Technology Summary

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.

Development Phase

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.

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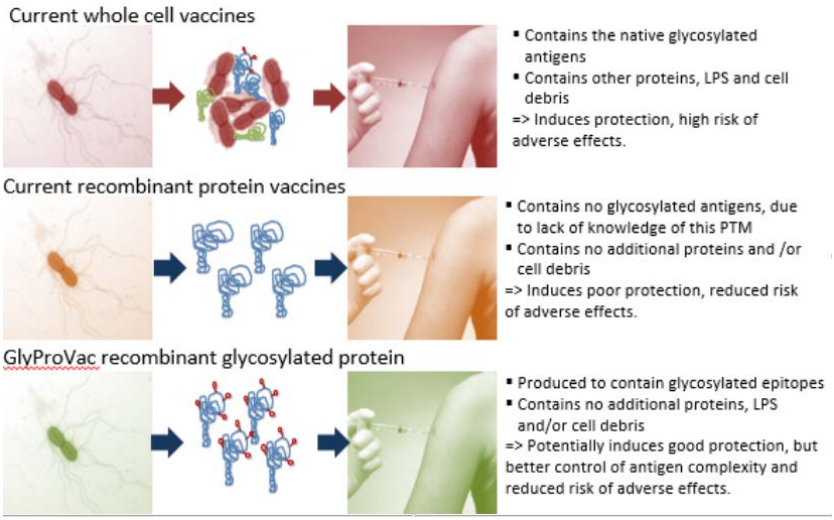
Seeking

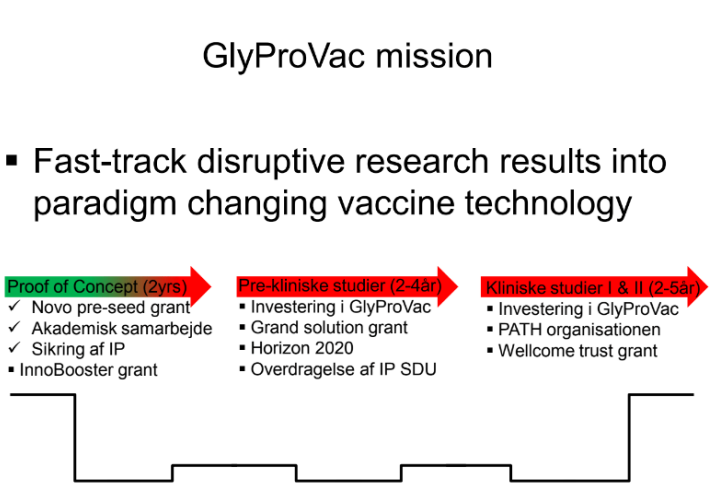
- Licensee
- Partner/Research Collaboration
- Research Funding

Patent Application In Progress.

Glyprovac

developing safe and efficient bacterial vaccines





Value proposition
Vaccine development for bacterial infections has been hampered by safety issues when using whole cell approaches and with low efficiency using bacterial proteins. Glyprovac focuses on using special epitopes of the bacterial proteins to raise a much more specific and effective immune response. Together with PATH, Glyprovac has performed a volunteer study of individuals being inoculated with ETEC; the study shows that indeed the glycosylated epitopes are particularly targeted by the human immune system - this provides the crucial evidence for using glycosylated proteins for vaccine development.

Business Opportunity:
We have identified and purified a novel ETEC antigen, which is highly O-linked glycosylated; a so far overlooked PTM. Glycoproteins may represent an reservoir of novel attractive antigens for vaccine development. Not only in ETEC. We look to partner on further testing and development of our specific ETEC lead as well as exploration of novel glycosylated antigens using our novel technology platform, BEMAP.

Our research and platform technology
using our unique platform technology (BEMAP) which allows unbiased screening for bacterial O-linked glycosylated proteins we have found that a surprising number of protein are glycosylated in human pathogens
The GlyProVac paradigm
O-glycosylated antigens display superior immune reactive properties compared to its non-glycosylated counterpart.
O-glycosylated antigens elicit protective immunity.
Bacterial O-linked protein glycosylations are highly abundant in a number of human bacterial pathogens and may represent an emerging reservoir of attractive targets for antimicrobial intervention.

Development phase
Antigen epitope in ETEC identified and purified. Response raised in rats, mice and currently working on rabbits. Proving superior immunogenicity and blocking of antigen function in vitro, investigating larger patient population for antibodies raised against glycosylated specific epitope as applied in vaccine development research.

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•Professor Martin R. Larsen
•Associate Professor Jakob Møller-Jensen
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Seeking
- Funding/Investors
- Partner/Research Collaboration

DANISH IP FAIR
Inventions from Danish Research Institutions

Invention ID: BP21

AARHUS UNIVERSITY

New Start-up: Developing SORCS modulators as therapeutics in neurodegenerative & metabolic disorders

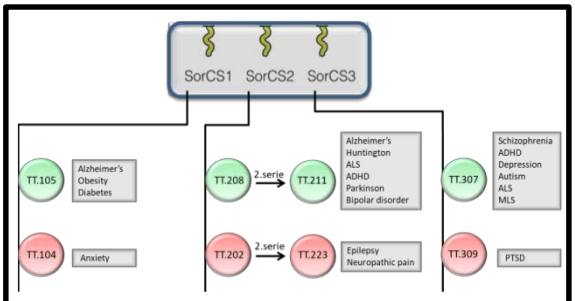

Figure 1. Pipeline: From the tails of the receptors SorCS1, SorCS2 and SorCS3, Teitur Bio has derived peptides aiming at treating a variety of diseases. The peptides can activate or inactivate pathways involved in specific diseases. Green box indicates activating peptides while red box indicates inactivating peptides, and next to each peptide is shown diseases where the receptor has been linked to the pathogenesis of the disease.

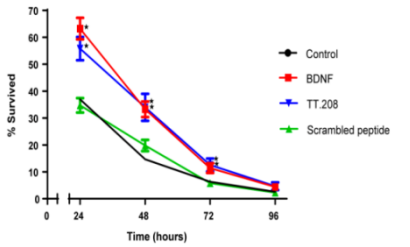

Figure 2. In neurodegenerative diseases, activation of gene programs inducing neuronal survival has been highlighted as key for preventing cell death. Compound TT.208 induces neuronal survival in cultured neurons in a similar manner to BDNF, a key protein in neuronal survival. TT.208 is therefore a possible candidate for treating neurodegenerative diseases.

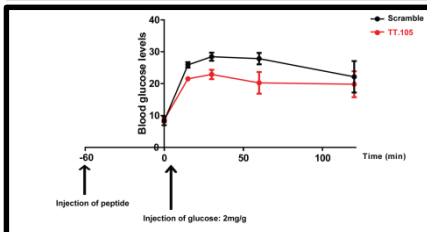

Figure 3. TT.105 is able to reduce blood glucose levels in healthy male mice, a critical factor for patients suffering from type 2 diabetes.

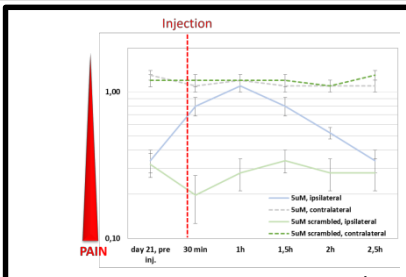

Figure 4. Post-surgery neuropathic pain in adult male mice can be completely blocked by injecting TT.202.

Value Proposition

Researchers at Aarhus University have invented an number of peptides that they believe could treat patients within neurodegenerative and metabolic diseases. The peptides derive from so far unknown interaction partners in both insulin signalling and survival of neurons, thereby offering an exclusive opportunity for development of new drugs for treating disease with limited or no treatment available today. The lead compound, TT.208 offers the potential of treating neurodegenerative diseases without relying on the presence of specific proteins on the surface of the neurons, thereby circumventing a current limitation for treating neurodegenerative diseases such as Huntington and Alzheimer's disease.

Objective

The research group are seeking translational and seed funding and propose a future start-up company, Teitur Bio to commercialise the technology. Currently, the researchers are seeking to build a network with stakeholders (Medical Research Charities, KOLs and potential commercial partners) in neurodegenerative and metabolic diseases. Their aim is to a) validate the future research development plan b) build a Scientific Advisory Board and c) build preliminary relationships with commercial partners in each therapeutic area. The start-up company would license the intellectual property from Aarhus University.

Technology Description

The pipeline consists of six compounds with different targets. SorCS1 has mainly been described in its involvement in regulating blood glucose levels and thereby a candidate drug target in type 2-diabetes. SorCS2 has been described to bind several different proteins, but the one best described is its interaction with brain-derived neurotrophic factor, a neurotrophic factor that is critical in neuronal survival. The interaction partner of SorCS3 is today unknown. Teitur Bio has used this knowledge to develop peptides with agonistic or antagonistic abilities. We can therefore turn on or off pathways critical in several different diseases, including type-2 diabetes and neurodegenerative disease.

Development Phase

Peptides for different indications have been developed. In collaboration with an external CRO, the research team are working on optimizing the peptides for in-vivo studies leading to a pre-clinical work package

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Seeking

- Funding/Investors
- Partner/Research Collaboration

Patent: "SorCS peptides and uses thereof: WO 2017101956 A1

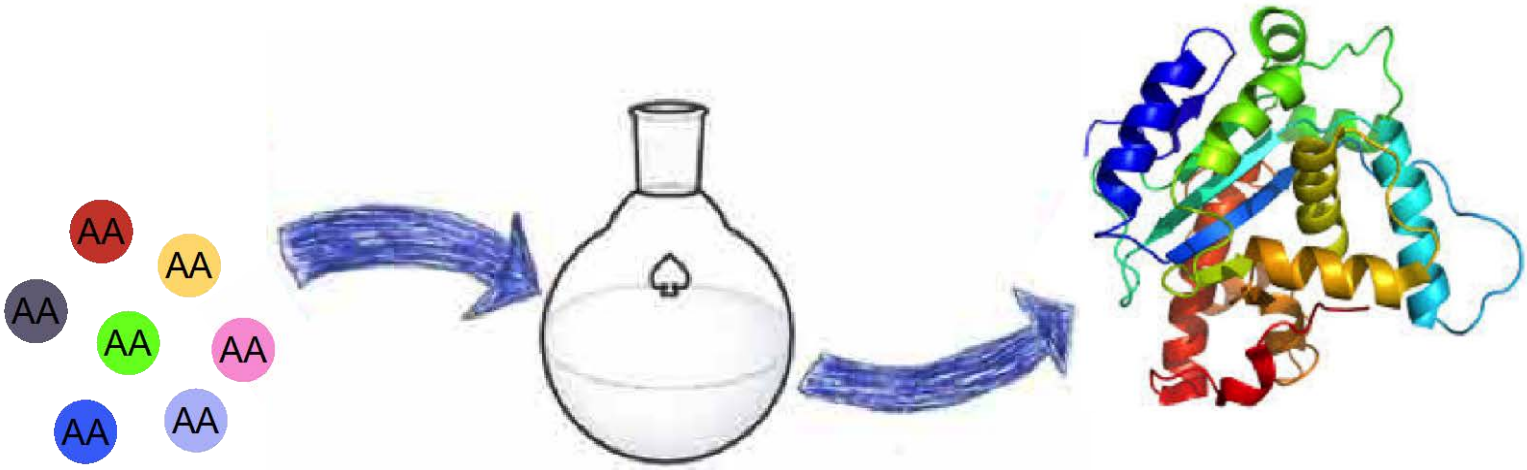
Biotech and Pharma

DANISH IP FAIR
Inventions from Danish Research Institutions

Invention ID: BP22

Technical University of Denmark

No more purification when synthesizing long peptides and proteins!



We use light…not acid

Value Proposition/USP

1. The technology enables a fast and efficient synthesis of structurally diverse peptide hydrazides
2. No need for post-synthesis purification.
3. Peptide hydrazides are widely used as powerful precursors for peptide ligations and synthesis of biological important heterocycles.

Business Opportunity/Objective/Commercial Perspectives

Fast and more efficient way to synthesize therapeutic peptide hydrazides that will reduce time and improve purity of end product.

You get a practical method for a “one-pot” native chemical ligation of peptide hydrazides that circumvent the need for isolation of the intermediate products. This method employs light instead of harsh chemicals and make the whole process faster and cheaper.

The partner we are looking for must be the sole face to the customers and handle operations, whereas DTU will provide the measuring equipment and technical support.

Technology Description/Technology Summary

The development strategy allows the mild synthesis of peptides without the need for post-synthesis purification. The peptide hydrazides are synthesized on solid-support and released by light, which allows for the direct applications in biochemical reactions, where contamination with cleavage reagents is undesirable.

Development Phase/Current State

We have developed an efficient synthetic strategy for the solid phase synthesis and photolytic release of peptide hydrazides. The peptides hydrazides are released under biocompatible conditions allowing for an efficient one-pot strategy, combining solid-phase synthesis, a mild photolytic release and the direct ligation of peptide hydrazides to provide the desired product in high yield. Such strategy will significantly improve chemical protein synthesis. Furthermore, we have demonstrated the developed strategy to be useful for the synthesis of biologically interesting heterocycles, such as pyranopyrazoles with antidiabetic activity.

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Seeking

- Licensee
- Partner/Research Collaboration
- IPR Sale

IPC No.: CA2922332A1; EP3044204A1; US20160272672. Patent no.: WO2015036481

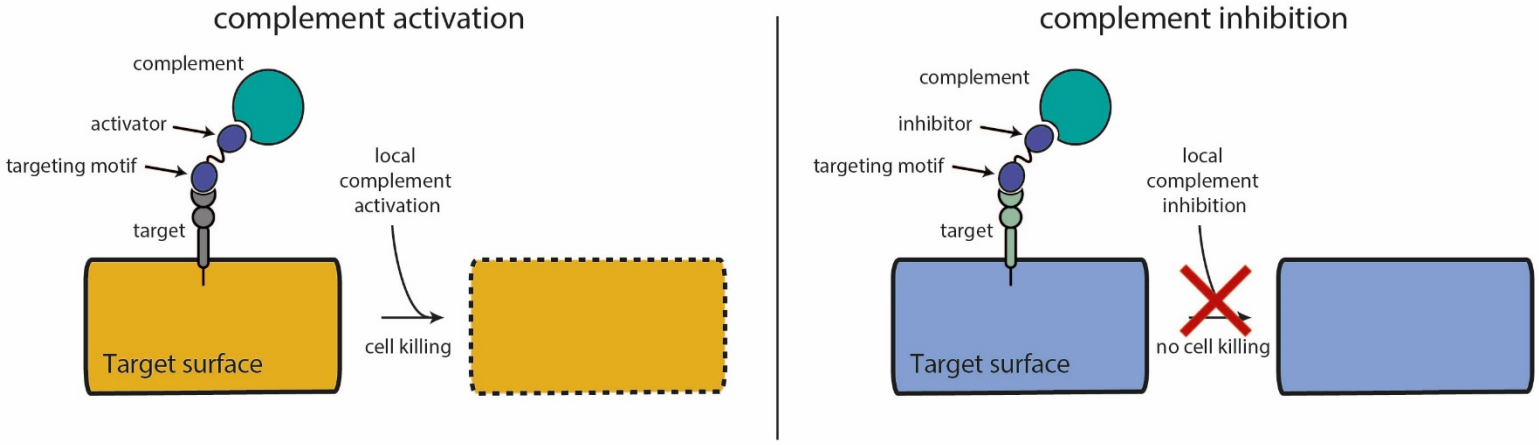
Biotech and Pharma

DANISH IP FAIR
Inventions from Danish Research Institutions

Invention ID: BP23

AARHUS UNIVERSITY

Domain antibodies for targeted activation and inhibiton of the complement system



Value Proposition
Improper activation of the immune system, including the complement system, is increasingly being recognized as a molecular driver for diseases, eg. cancers. At the other end of the spectrum, chronic complement activation is involved in a number of diseases included Alzheimer's disease, PNH and age related macular degeneration.

Our invention allow for regulation of the complement system in form of either inhibition or activation, potentially leading to new treatments for autoimmune diseases and certain cancers respectively.

Business Opportunity
We are looking for a commercial partner to help us bring the antibodies to the next stage towards a commercial product. We are open for licensing, but are also exploring the potential for starting a spin-out company to further develop the technology.

Technology Summary
We currently have a pipeline of activating and inhibitory domain antibodies for testing in specific disease models where we believe targeted complement modulation would be favorable such as cancer and Alzheimer's disease.

Systemic complement inhibition has several disadvantages depending on the complement protein that is inhibited. Our domain antibodies are easily engineered to contain a targeting motif for specific local complement inhibition which should lead to better pharmacokinetics and pharmacodynamics and thus fewer side effects compared non-targeted inhibitors.

Current State
We have characterized the structure and function of our domain antibodies and are working on optimization and planning of safety and efficacy animal studies.

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+ 5 more

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Seeking
- Funding/Investors
- Licensee
- Partner/Research Collaboration

A patent application is being drafted and will be submitted before May 29 2018

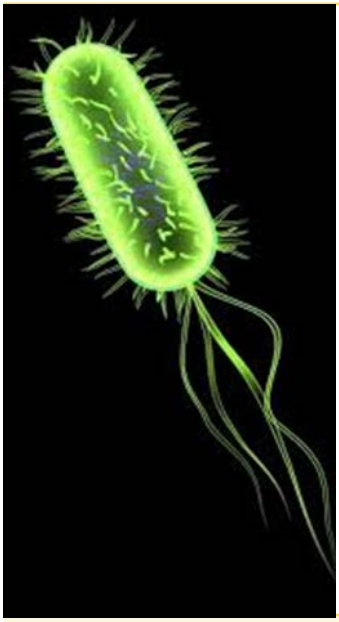
DANISH IP FAIR
Inventions from Danish Research Institutions

Invention ID: BP24

AARHUS UNIVERSITY

VPCIR.COM
FOOD SAFETY. MADE EASY

- Disrupting the growing market for food pathogen testing



To be disruptive in the pathogen analytical business, a new method should be:

- **Cheaper than the current culture method**
- **As sensitive as other approved methods but without false positive results**
- **Obtain official recognition**
- **Detect >1 pathogen in one test**
- **Give results more rapidly than PCR**

This is Viability Polymerase Circle Reaction VPCIR

Value Proposition
Food safety is safeguarded *inter alia* by testing products prior to marketing. If contamination is found, intervention is mandated including in some cases recalls. Rapid test technologies are thus in demand for ensuring rapid response and minimizing recalls. Rapid test technologies *are* gaining market but is still not an industry standard due to cost and complexity. The present technology is based on invention of a new rapid test technology with the USP's listed above - with the intention to disrupt the current food pathogen testing market. Inventors have created a spin-out VPCIR.COM around the technology.

Business Opportunity
VPCIR.COM focus on the food pathogen testing market dominated by <10 multinational laboratory-service corporations. This market is growing consistently due to increasing incidence of food-borne infections, and is expected to reach ~400 million tests by 2024, half of these for *Listeria* valued at ~$1.3 billion. In addition, licensees to the VPCIR technology can be found in other life-science businesses.

Technology Summary
VPCIR.COM's technology builds on identification of specific sets on DNA modifying enzymes that are unique to a bacterial species; enzymes that rapidly deteriorate after cell death (hence "*Viability*"). The enzymes occur in 1000's of copies in the cell, hence the sensitivity and speed. By combining the right sets we may identify >1 pathogen in the same test (="multiplex" test). Detection is performed in simple steps not needing special equipment or training. The steps include cell lysis by means of a proprietary microfluidics system and a p*olymerase*-mediated *reaction* where certain *circular* DNA products are multiplied and detected by routine off-the-shelf readers.

Development Phase
VPCIR.COM has Proof-of-Concept at the prototype stage based on detection of non-pathogenic bacteria and of *Plasmodium falciparum*. The proprietary microfluidics system exist in a functional prototype version. It is a consumable in the shape of a small reaction chip. A patent application has been submitted in April 2018. VPCIR.COM has developed a business plan based upon this IP, around which the spin-out company has been created.

The invention is co-owned by Aarhus University and The Chinese University of Hong Kong

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Birgitta R. Knudsen, Associate Professor
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Seeking
- **Funding/Investors**
- Licensee
- Partner/Research Collaboration

Intellectual property rights: Patent Application " Detection of endonuclease activity" PA 2018 70196, 4 April 2018

Biotech and Pharma

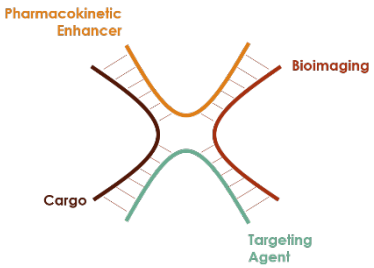
DANISH IP FAIR
Inventions from Danish Research Institutions

Invention ID: BP25

AARHUS UNIVERSITY

Modular platform for drug delivery and bioimaging

Modular platform for theranostics



Our team

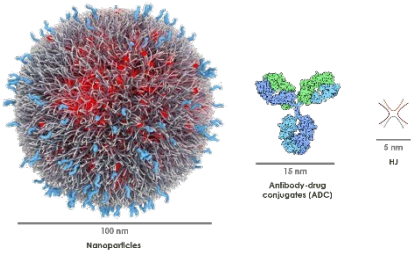
Jesper Sejrup Nielsen
PhD

Verocia Liv Andersen
PhD student

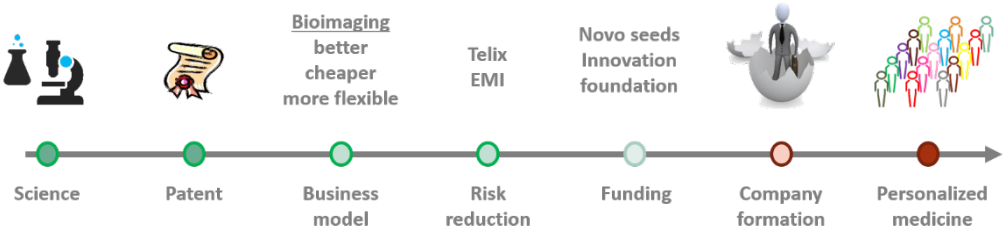
Jørgen Kjems
Professor

Colin Mothershead
PhD student

Closest competitor



Timeline



Value Proposition
Our unique platform technology can accommodate almost any type of molecule and is compatible with high throughput combinatorial screening. By combining a rational design process with combinatorial screening, we can develop novel types of diagnostic compounds faster and cheaper than what is currently possible. In time, we believe this will lead to much better in in vivo translation.

Business Opportunity
We are looking for partners/collaborators that can help us take the next step in our journey towards becoming a CRO type company. Specifically, we are looking for partners with expertise in drug delivery/discovery as well as bioimaging/diagnostics. In addition, we are seeking partners with access to novel targeting and/or imaging agents.

Technology Description
We have developed a modular nanoscale device that can be used for bioimaging, targeted drug delivery and combinatorial screening. The device consist of four modules each of which can carry a specific functionality (i.e. an imaging agent or a therapeutic payload). Each module is produced and stored separately but can be combined with any other modules simply by mixing them together. This assembly process is fast and reliable and we anticipate that it could ultimately be used in a clinical setting where specific configurations would be assembled on-site as required.

Development Phase
In collaboration with Aarhus University, we have patented the HJ technology and are currently in the proces of creating a Spin-out. In the start-up phase, we have planned a series of proof-of-principle experiments designed to illustrate the HJs potential while also directly comparing it to clinically relevant diagnostic agents.

The inventors
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Seeking
- Funding/Investors
- Partner/Research Collaboration
- IPR Sale

Danish priority application was filed in July 2017. Application reference: EP17180234

Biotech and Pharma

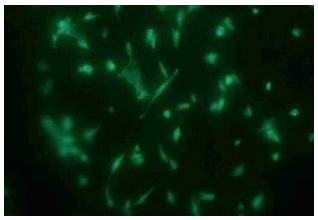
DANISH IP FAIR
Inventions from Danish Research Institutions

Invention ID: BP26

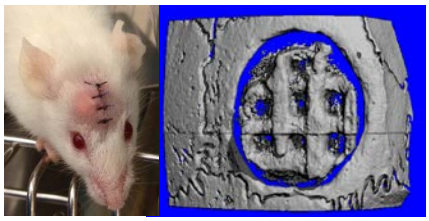
SDU

Solid lipid/ceramic composites

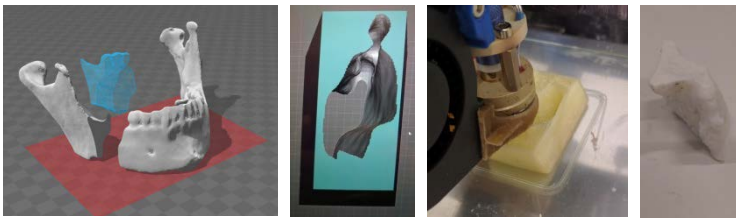
- Controlled release from natural & strong biomaterials



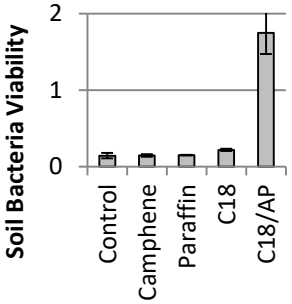
Stem cells on material



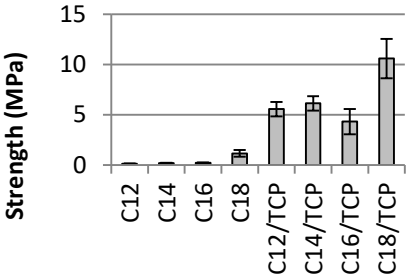
In vivo Implantation



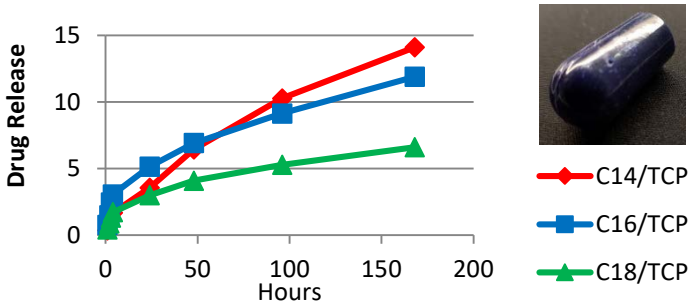
Patient fittable with 3D printed molds



Bacterial & Fertilizer Uses



High Compressive Strength



Controllable Drug Release

USP

- Controlled release of compounds & resorption/biodegradation by tailoring fatty acid tail length
- Mechanically strong and inexpensive biomaterial
- Made 100% from natural components found in the human body. Non-toxic. Proven biocompatible *in vitro* and *in vivo*
- Moldable, 3D Printable and Extrudable. May be personalized based on patient data.

Business Opportunity

- Medical: The material may be used to create personalized pharmaceutical pills, controlled release depots and implants
- Industrial: The material may be used to create bioreactors, immobilized bio-cultures and enzyme/compound releasers
- Agricultural/Environmental: The material may be used for controlled release of fertilizers, nutrients or other compounds

Technology Description

1. Our invention covers mixing a solid lipid (e.g. a fatty acid) with a ceramic, protein or carbohydrate powder.
2. When melted, these components create a thermoplastic suspension that can be 3D printed, molded or extruded.
3. When cooled, the suspension freezes into a strong biomaterial object that is 100% natural, biocompatible & biodegradable.
4. Properties can be tailored with the fatty acid tail length and by including different compounds in to suspension.

Current State

- Technology is covered by two patents (PCT phase)
- Medial applications (implants) have been tested in 4 animal trials
- Spin out company created (Particle3D), looking for collaboration partners
- Pharmaceutical applications have been tested in vitro, seeking academic & industrial partners for collaboration & licensing
- Industrial applications have been testing lab scale, seeking academic & industrial partners for collaboration & licensing
- Further research has been funded and is ongoing

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Seeking
•Funding/Investors
•Licensee
•Partner/Research Collaboration
•IPR Sale

Intellectual property rights: PCT/EP2018/058891 – priority from April 2017

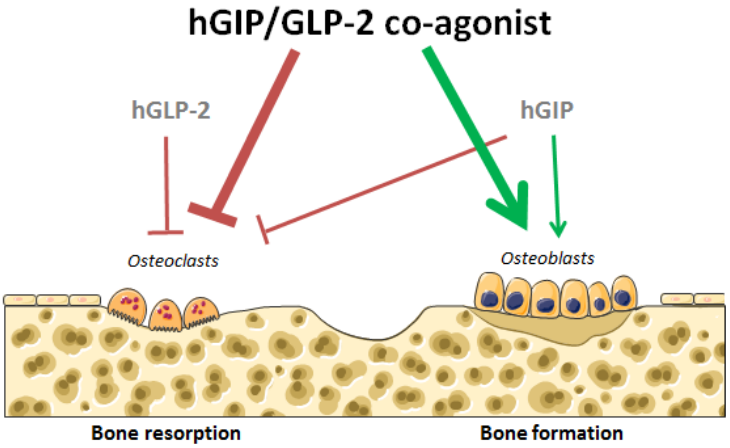
Biotech and Pharma

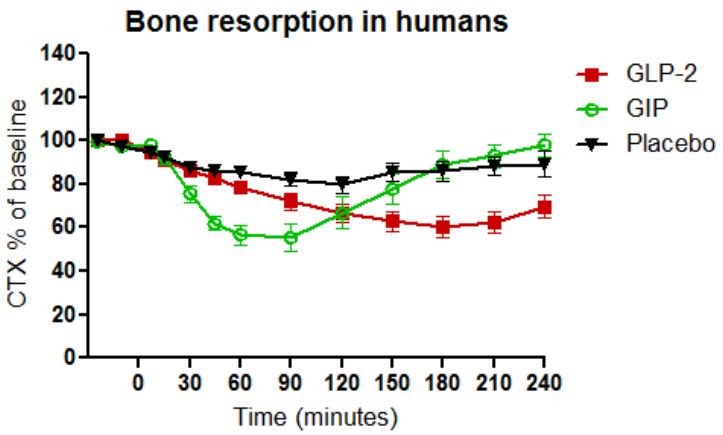
DANISH IP FAIR
Inventions from Danish Research Institutions

UNIVERSITY OF COPENHAGEN

GIP/GLP-2 dual targeting

- A new and safe treatment for osteoporosis





Value Proposition

- GIP and GLP-2 are natural human hormones, i.e. no immunological side effects
- Both have already been used in numerous human studies
- No observed adverse effects in humans
- PK/PD: Established in vivo pharmacokinetic properties and mechanisms of action

Commercial Perspectives

Worldwide, it is estimated that there are around 9 million osteoporotic fractures per year. In the United States, the direct costs of osteoporotic fractures are estimated at around $18 billion annually and in Europe the corresponding figure is around €36 billion. These costs are set to increase twofold or more by 2050.

Technology Summary

We have performed a proof of concept study in humans showing pronounced effect of GLP-2 and GIP on bone resorption. We expect that co-activation of both receptors will result in an even more pronounced inhibition of bone resorption. Based on knowledge of ligand binding-modes to the GIP and GLP-2 receptors, we have developed GIPR/GLP-2R co-agonists.

Development Phase

At present, we have human data supporting a synergistic effect of the two hormones on bone resorption and we are now studying the effect on bone remodelling in osteopenic women. In addition, we have designed single molecule, dual agonists capable of activating both the GIPR and GLP-2R with a very high potency and we have developed analogues with high affinity and prolonged T½.

The inventors

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Seeking

- Funding/Investors
- Licensee
- Partner/Research Collaboration