# enantis

# APPLICATION OF STABLE FGF2 IN WOUND HEALING

ZDENĚK RUČKA

ETPN Webinar, March 16<sup>th</sup> 2017





#### Established in 2006

- Masaryk University spin-off
- 10 employees



JIC INBIT – Biotechnology Centre

Biotechnology & protein engineering



#### We focus on proteins around us

MORE

ecove zero

#### Most proteins are **unstable** at high temperatures.

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#### Most proteins are **unstable** at high temperatures.

We can fix it!

#### **Our key competence**



Protein engineering

- Combination of evolution-based approach with state-of-the-art software tools
- Site-directed mutagenesis to create multiple mutants to be tested

## **Our key competence**



- Protein engineering
  - Combination of evolution-based approach with state-of-the-art software tools
  - Site-directed mutagenesis to create multiple mutants to be tested

#### We can help you fix your protein





#### Stability problem to be fixed = opportunity

## FGF2 in stem cell media

helps to maintain the cells in the pluripotent state

- wild-type FGF2 is highly labile at 37°C its halflife is as low as 9 hours
- daily media changes with fresh FGF2 are needed
- cells are exposed to fluctuation of FGF2 concentration



Source: Russo E. (2005) Follow the Money—The Politics of Embryonic Stem Cell Research. PLoS Biol 3(7): e234.

## Stem cell market is growing



Stem cell market forecast 2015-2020 in billions USD



Source: Transparency market research, 2015

#### **FGF2-STAB®** – stable and active



FGF2-STAB stays active after 20 days at 37°C

#### **FGF2-STAB®** – stable and active





FGF2-STAB maintains pluripotency marker expression of human embryonic stem cells equally with the wild-type.

#### **FGF2-STAB®** saves money and labour

FGF2-STAB may reduce media changes by more than 60-70%



Source: Pulmonary Hypertension News





What we need:

Strong partner able to produce and distribute new generation of stem cell cultivation media

What we offer:

Close collaboration and access to protected IP: FGF2-STAB<sup>®</sup>

#### **Growth-factor-based therapies are on the rise**



Source: MedMarket Diligence, LLC; Report Wound Management, Worldwide Market and Forecast to 2021.

## **Market drivers**



- World's population is growing and aging at accelerated rate
- Growth factor therapies are the most promising area of wound healing
- Greater awareness among the public, increasing demand for advanced care

# FGF2 in wound healing



- Mitogenic for fibroblast and endothelial cells
- Potent angiogenic factor
- Stimulates the proliferation and migration of cells at the wound area
- Accelerates acute wound closure and promotes tissue regeneration



# FGF2 in wound healing



- Regulates the release of TGFβ1 to promote re-epithelialization
- Induces the expression of inflammation-related genes in endothelial cells
- In chronic wounds levels of FGF2 are decreased



#### FGF2 treats chronic and acute wounds



## Applications are limited by low stability

- Multiple administrations are needed to achieve therapeutic effect
- The amount of exogenously-applied FGF is much higher than that under normal physiological conditions
- Low stability increases cost of final products based on FGF2

## **Our solution: FGF2-STAB®**

- Prolonged half-time at 37°C more than 20-times (from hours to weeks)
- Prolonged and sustained delivery provides greater therapeutic effect and faster healing
- Reduced frequency of administration contributes to improved patient comfort





Costs for preclinical study are covered by H2020 SME Instrument phase 2

#### **Research partner wanted**



What we need:

- Research partner with skills in drug delivery systems
- Research partner interested in developing other applications of FGF2-STAB<sup>®</sup>

What we offer:

- Access to protected IP: FGF2-STAB<sup>®</sup>
- Close collaboration

## **Business partner wanted**



What we need:

- Strong partner with business and therapeutical knowledge
- Financial support to conduct a clinical trial

What we offer:

- Access to protected IP: FGF2-STAB<sup>®</sup>
- Close collaboration during pre-clinical testing of this unique protein

#### Luxury anti-ageing skincare



Another opportunity for FGF2-STAB<sup>®</sup>
Another opportunity for business collaboration



Source: DNA Renewal Systems



#### Horizon 2020's SME Instrument: phase 1 & 2

 This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 756471



## Thank you for your attention



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