



TECHNOLOGY PRESENTATION

Circular RNA as efficient and stable miRNA inhibitor

TECHNOLOGY SUMMARY

High profile inventors Jørgen Kjems and Thomas Birkballe Hansen from Aarhus University Interdisciplinary Nanoscience Center (iNANO) and Department of Molecular Biology and Genetics

The technology presented here is a circular RNA polynucleotide, which is capable of inhibiting the specific interaction between microRNAs and their mRNA target while being resistant to degradation by exonucleases.

It works by attaching to selected microRNAs through simple base pairing and preventing the microRNA from binding to its target – hence termed “circular microRNA sponge” (CiRS).

The invention was published in Nature; [Nature. 2013;495\(7441\):384-8](https://doi.org/10.1038/nature12345)

APPLICATIONS

- A circular RNA general platform for antimicrobial technologies.
- A general technology to control gene expression in cells, tissue, animals and eventually humans.

INTELLECTUAL PROPERTY RIGHTS

European patent was granted on 25 July 2018 under the patent number 2 925 866. Validation in CH, DE, DK, FR and GB.

CURRENT STATE

- Expression cassette has been optimized for circular RNA production.
- Efficient miRNA inhibition has been validated in cell culture.
- Heterologous sequences maintaining circularization potential have successfully been tested
- Jørgen Kjems was awarded 880k € in 2015 from the Danish Council for Independent Research for the project “Biogenesis and function of circular RNA”.
- Thomas Birkballe Hansen was awarded 1.5m € in 2016 from the Novo Nordisk Foundation for the project “Function and Biogenesis of Circular RNAs Involved in Neurological Disorders”

COMMERCIAL PERSPECTIVES

- Treatment of diseases caused by mis-regulated microRNAs
- Increased protein yield of e.g. antibodies, enzymes, hormones in industrial scale protein production
- As a laboratory tool to inhibit the activity of any microRNA or combinations of microRNAs of choice in cell/tissue cultures

BUSINESS OPPORTUNITY

We are seeking a commercial partner within the miRNA therapeutic field to assist validating the technology:

- Research collaboration with option to license
- Our end goal is to license the intellectual property related to the technology:
- Licensing opportunity

INVENTORS



Jørgen Kjems

Professor and Director

Head of Interdisciplinary Nanoscience Center (iNANO) and Department of Molecular Biology and Genetics

[Link to AU website](#)



Thomas Birkballe Hansen

Assistant Professor

Interdisciplinary Nanoscience Center (iNANO) and Department of Molecular Biology and Genetics

[Link to AU website](#)

REFERENCES

- [Nature. 2013;495\(7441\):384-8](#)
- [DFF-Research Project Grants from the Danish Council for Independent Research, May 2015](#)
- [The Novo Nordisk Foundation awards 85 million to new research fellows, May 2016](#)

Technology Transfer
Contact

Jesper Keis Hansen
Aarhus University

Mob +45 4086 5182
Mail jkh@au.dk