

AdoShell[®], a non-fibrotic encapsulation system for human islet transplantation without immunosuppression

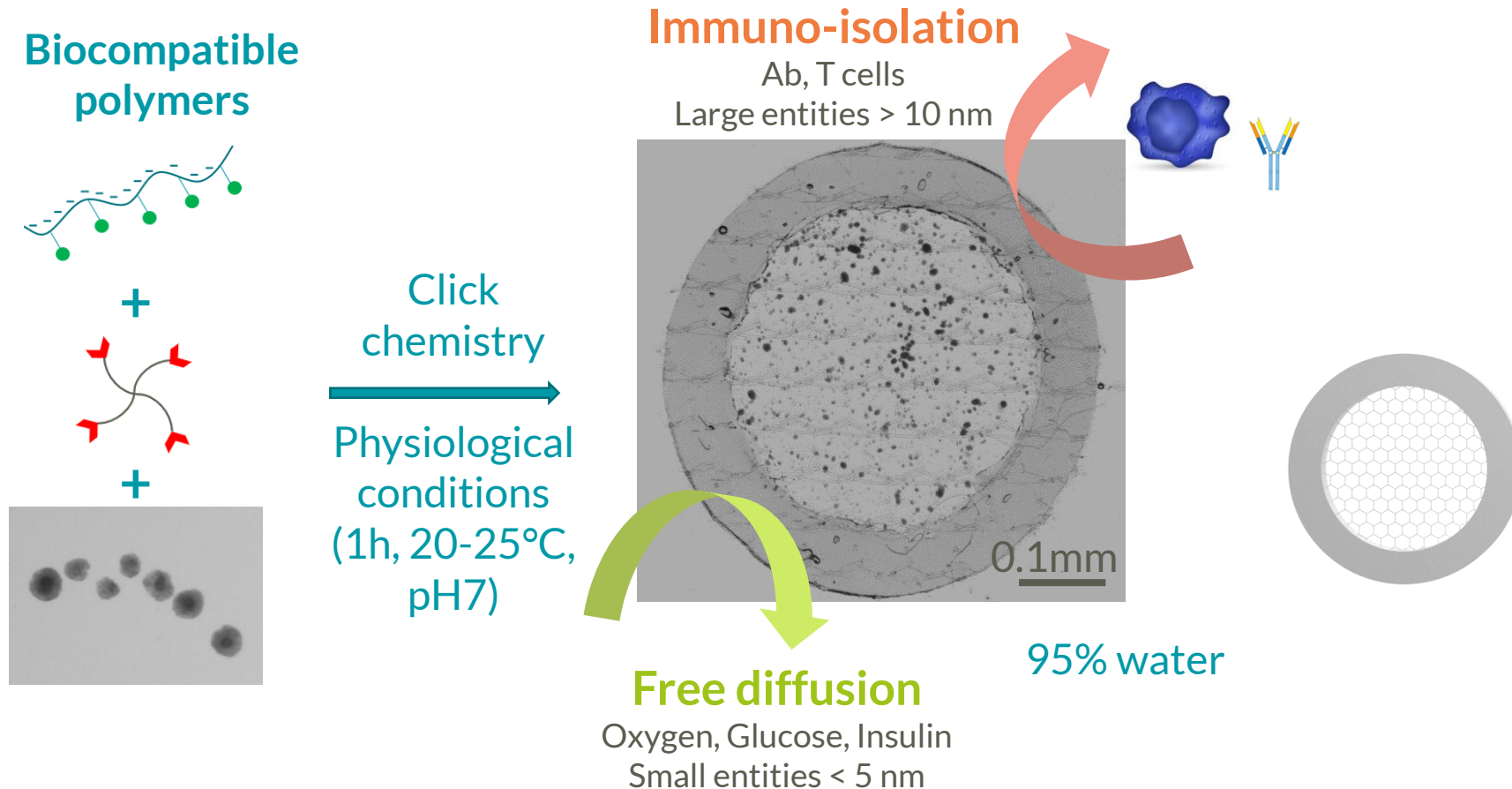
Anne-Lise Gaffuri¹, PhD

Ouardane Jouannot¹, Alexandre Martin¹, Julie Brun¹, Madeleine Frêlon¹, Camille Gautier¹, Guillaume Lefebvre¹, Romain Besnard¹, Clément Cocita¹, Claire Megret¹, Nicolas Laurent¹, Martin Gaudier¹, Rosy Eloy¹, François Pattou², Olivier Soula¹

¹ADOCIA, France

²Université de Lille, France

AdoShell[®]: Immunoprotective hydrogel for pancreatic islets transplantation without immunosuppression



Simple, aqueous and biocompatible process including reinforcement frame for mechanical resistance, manipulability and suturing

Objectives



Major previous results

✓ *In vitro* and *in vivo* immunoprotection

✓ Excellent tolerance in different species

✓ Functionality and efficacy of AdoShell® rat islets in rats

Objectives

Demonstrate that AdoShell® is compatible with human islets and scalable for human application

1

In vitro viability and functionality

2

In vivo functionality and efficacy

3

Scale up for Human application

1

In vitro viability and functionality of AdoShell[®] Human islets



2

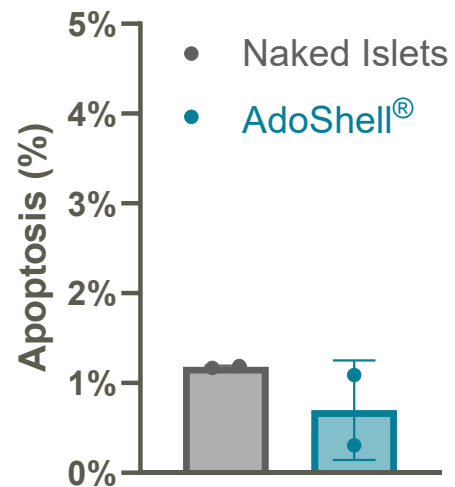
Viability, N=2 human preparations

(up to 1 week post encapsulation)

3

TUNEL staining (n=9 to 36 islets per preparation & condition)

4



- Very low level of apoptotic cells, demonstrating the maintenance of human islet viability upon encapsulation

1

In vitro viability and functionality of AdoShell® Human islets



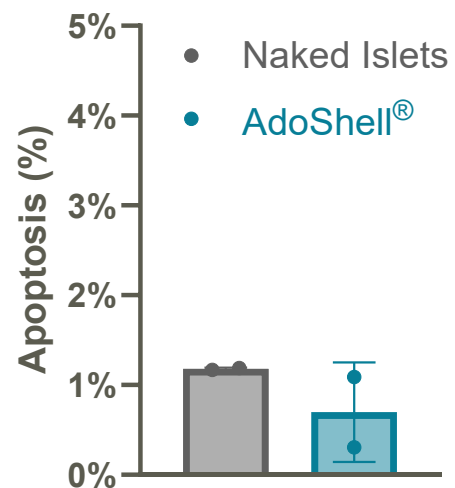
2

Viability, N=2 human preparations (up to 1 week post encapsulation)

3

TUNEL staining (n=9 to 36 islets per preparation & condition)

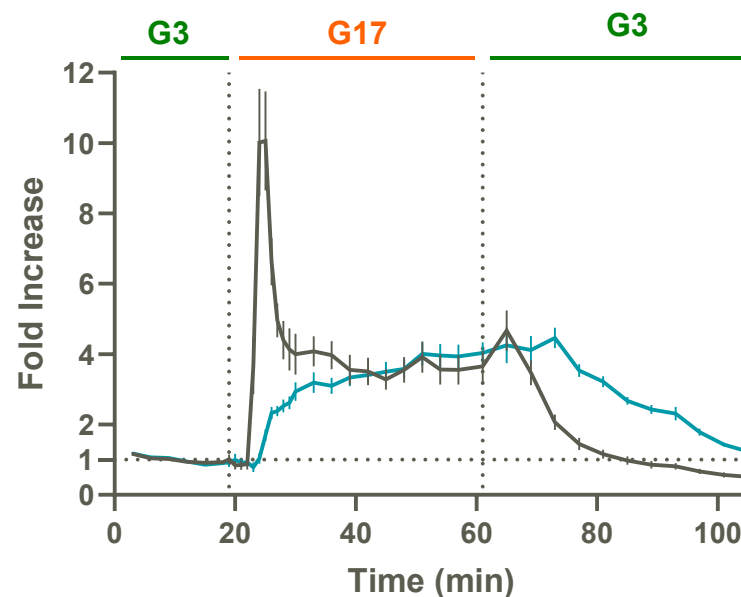
4



- Very low level of apoptotic cells, demonstrating the maintenance of human islet viability upon encapsulation

Mean ± S.E.M.

Dynamic response to glucose stimulation, N=3 human preparations (up to 1 week post encapsulation)



- Maintenance of rapid insulin release (2 min delay to the first peak)

1

In vitro viability and functionality of AdoShell® Human islets



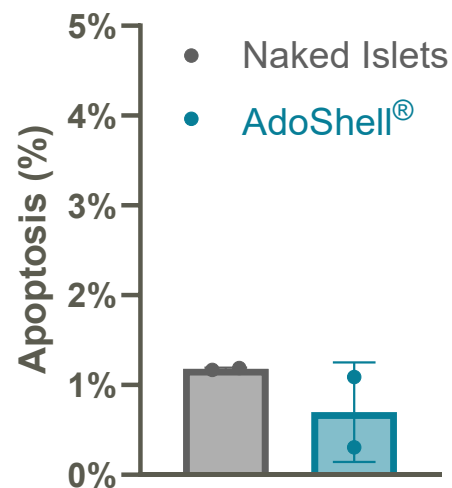
2

Viability, N=2 human preparations (up to 1 week post encapsulation)

3

TUNEL staining (n=9 to 36 islets per preparation & condition)

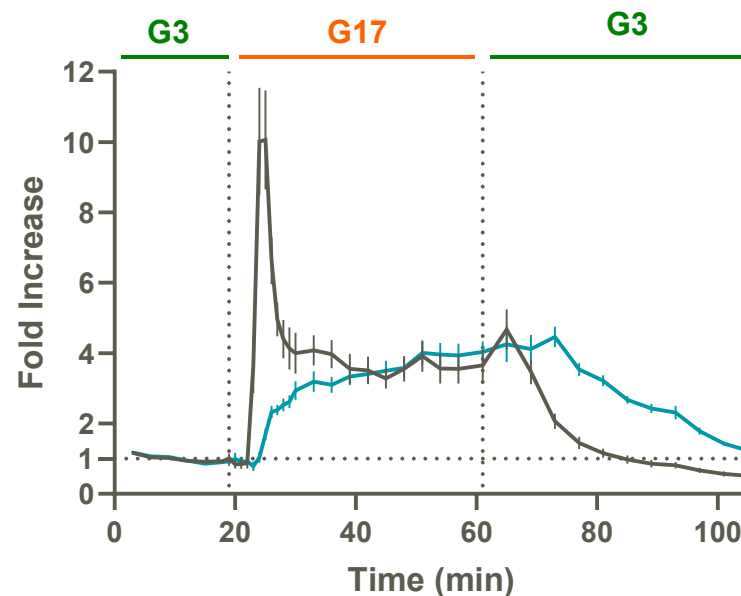
4



- Very low level of apoptotic cells, demonstrating the maintenance of human islet viability upon encapsulation

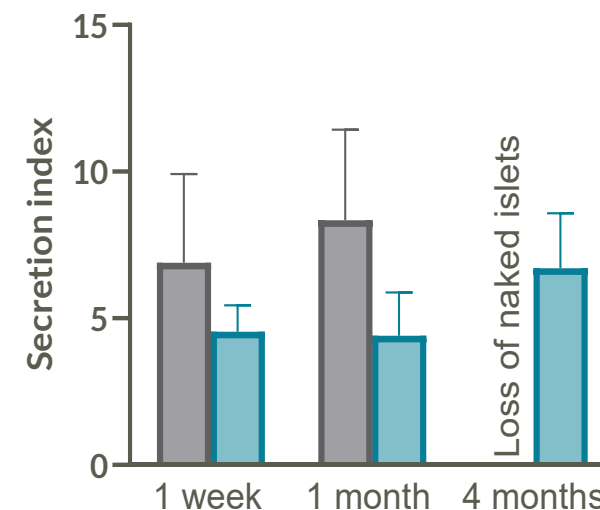
Dynamic response to glucose stimulation, N=3 human preparations (up to 1 week post encapsulation)

(up to 1 week post encapsulation)



- Maintenance of rapid insulin release (2 min delay to the first peak)

Long term functionality (4 months), N=6 human preparations



- Robust *in vitro* functionality of encapsulated human islets for up to 4 months

1

Functionality and efficacy of AdoShell[®] Human Islets in immunodeficient mice



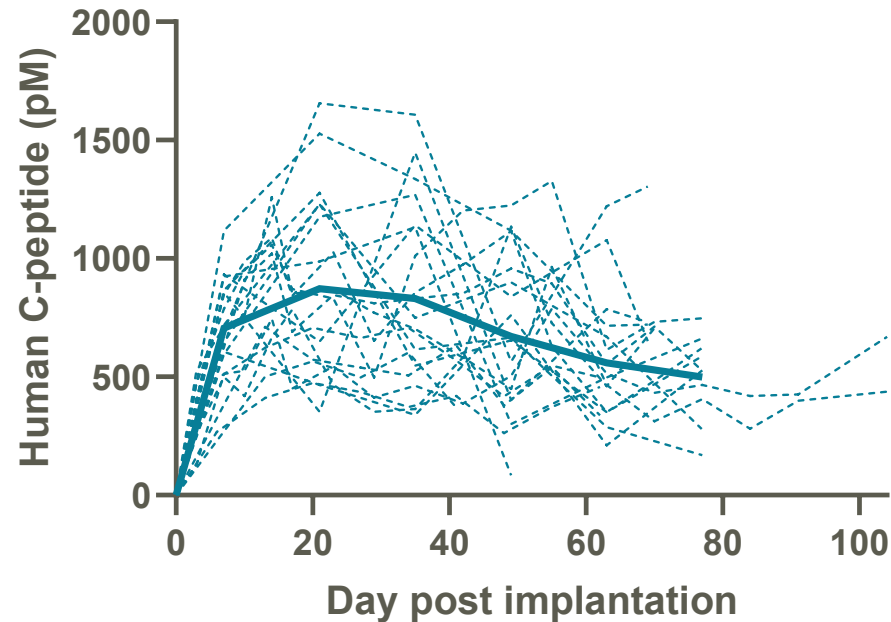
2

- Xenogeneic transplantation in NXG mice (2.2 to 3.4 kIEQ/mouse)

3

Long term *in vivo* C-peptide secretion (2 months),
N=4 independent studies, n=20 mice

4



- Functionality of AdoShell[®] Human Islets demonstrated in 100% of immunodeficient mice for at least 2 months. Two mice were maintained until 104 days with no decrease in C-peptide secretion

1

Functionality and efficacy of AdoShell® Human Islets in immunodeficient mice



2

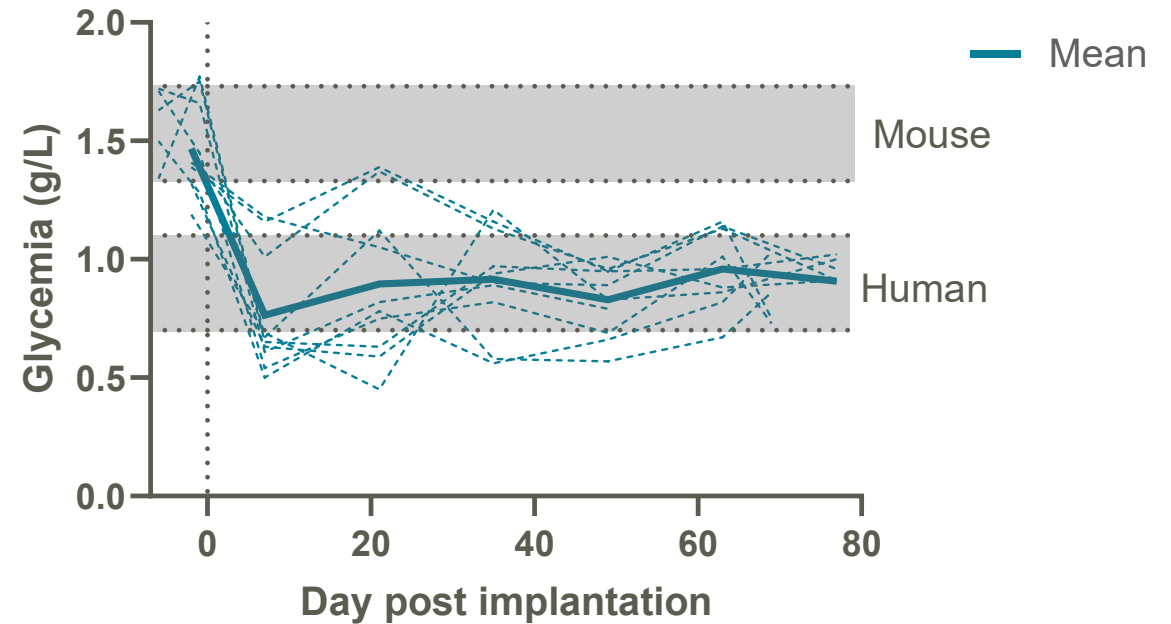
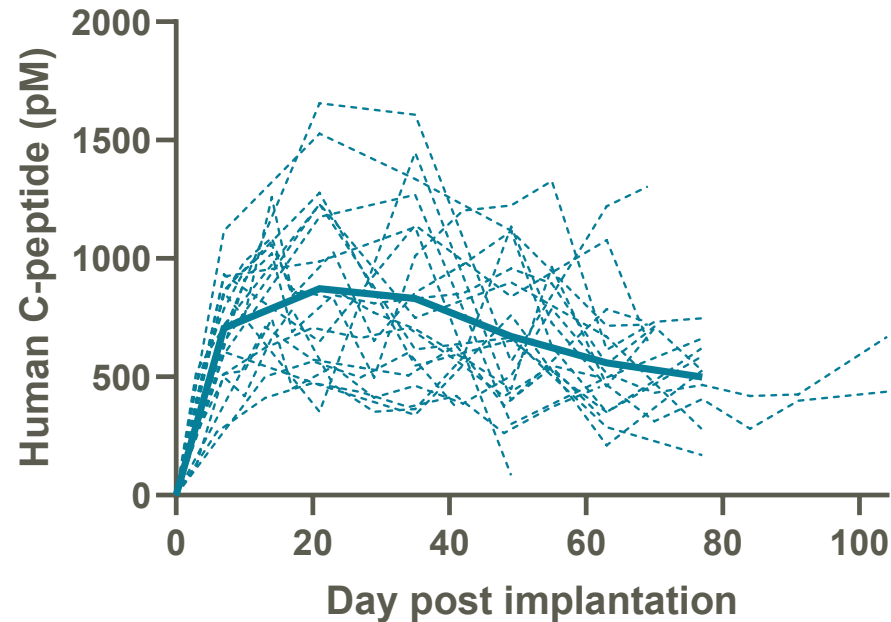
- Xenogeneic transplantation in NXG mice (2.2 to 3.4 kIEQ/mouse)

3

Long term *in vivo* C-peptide secretion (2 months),
N=4 independent studies, n=20 mice

4

Long term impact on mouse glycemia (2 months),
N=2 independent studies, n=10 mice



- Functionality of AdoShell® Human Islets demonstrated in 100% of immunodeficient mice for at least 2 months. Two mice were maintained until 104 days with no decrease in C-peptide secretion
- Regulation of mouse glycemia to Human levels after implantation with AdoShell® Human Islets

1

AdoShell[®] Human Islets in immunodeficient mice: explant analysis

2

Up to 85 days after implantation, mice were explanted, and explants were analyzed *in vitro*

3

Viability (TUNEL staining, Study 3)

4

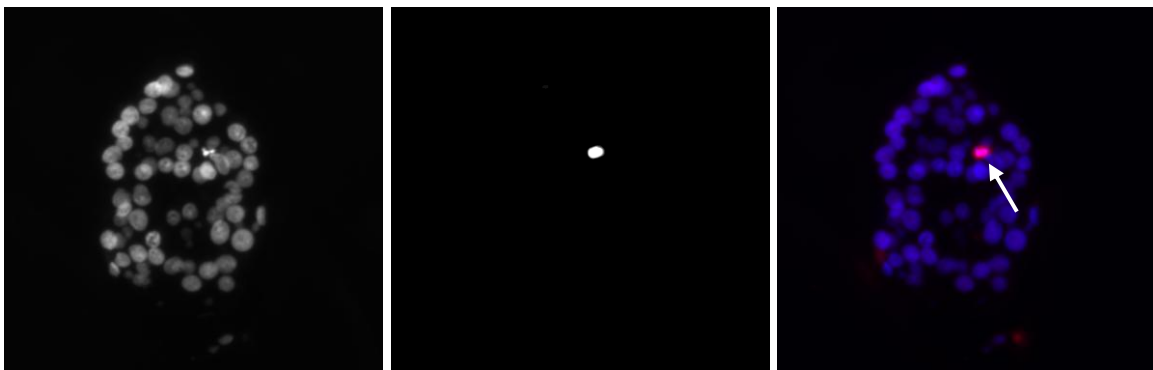
DAPI

TUNEL

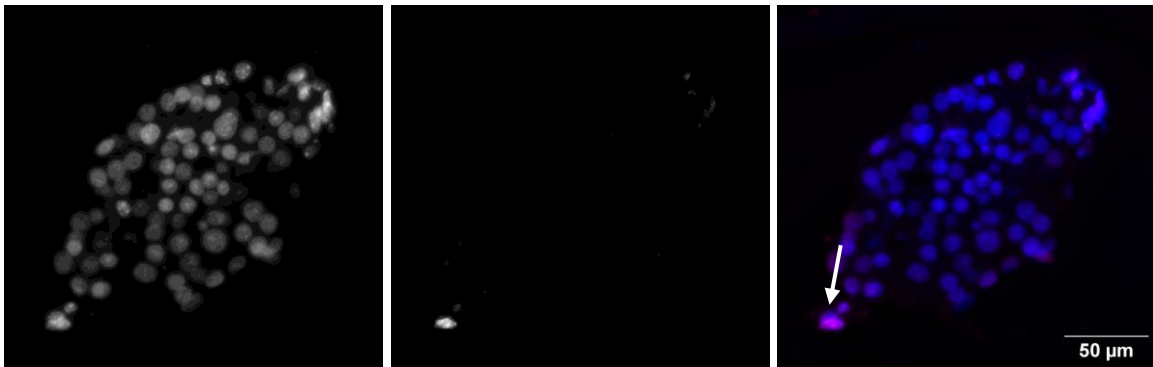
Merge

5

Controls D0



Ex vivo Explants



- In vitro*, explants (n=15) maintained viability compared to preimplantation values

1

AdoShell® Human Islets in immunodeficient mice: explant analysis

2

Up to 85 days after implantation, mice were explanted, and explants were analyzed *in vitro*

3

Viability (TUNEL staining, Study 3)

4

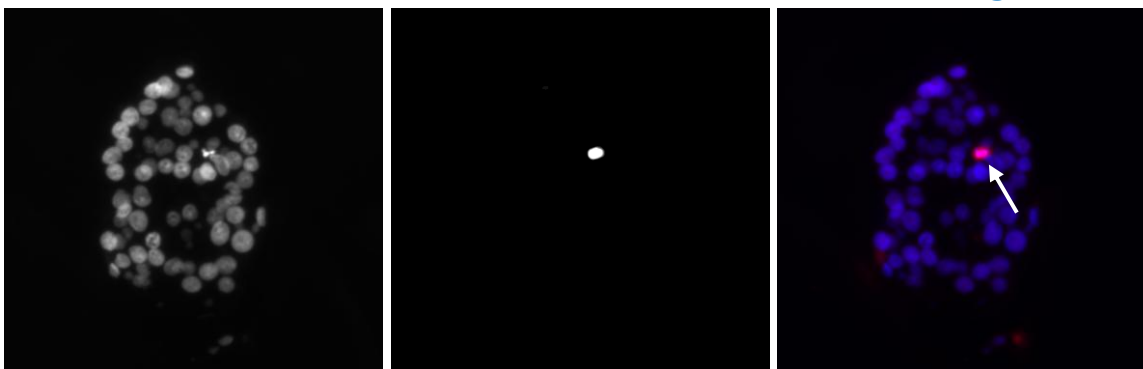
DAPI

TUNEL

Merge

5

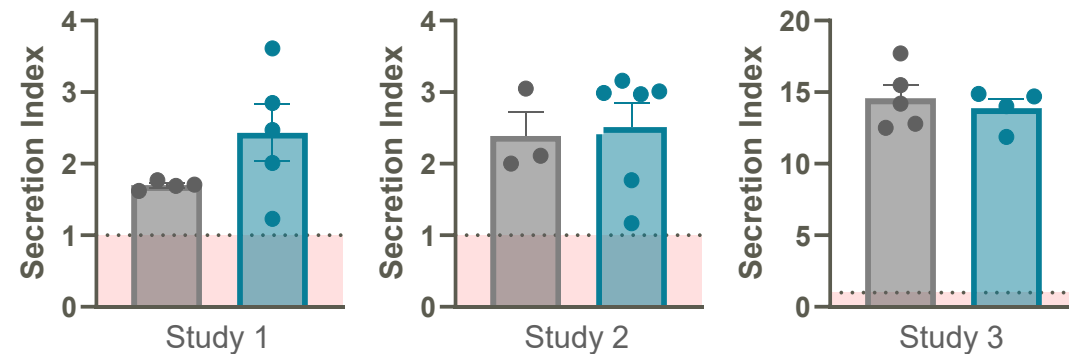
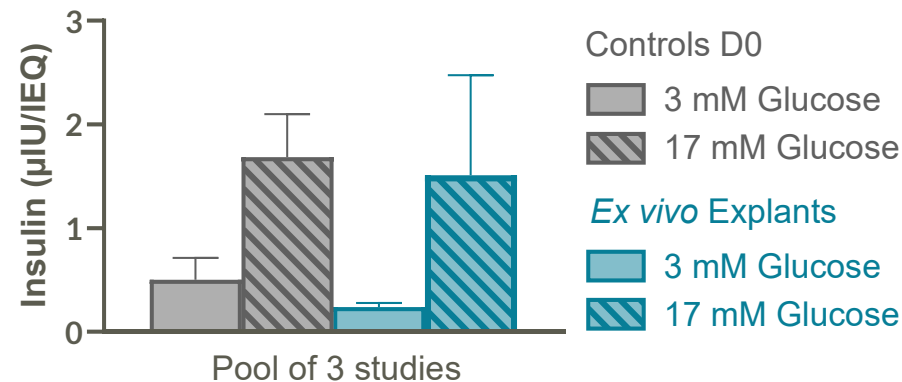
Controls D0



Ex vivo Explants



Functionality (GSIS)



- In vitro*, explants (n=15) maintained viability, secretion indexes and stimulated insulin secretion levels compared to preimplantation values

1

Scale-up of AdoShell® for human application



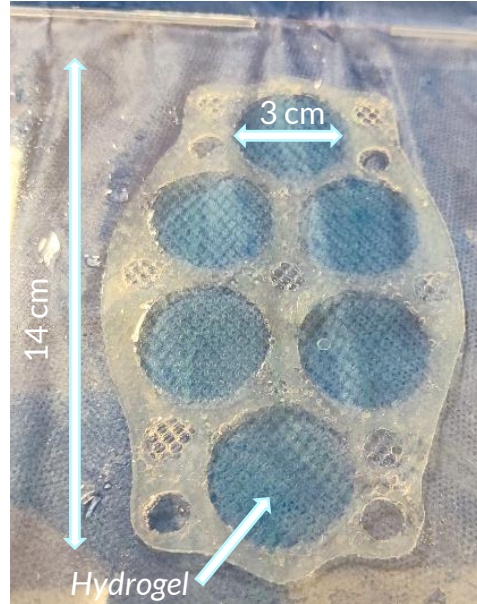
2

Human size AdoShell®
prototype

3

4

5



❖ 1 pancreas = 1 implant



1

Scale-up of AdoShell® for human application



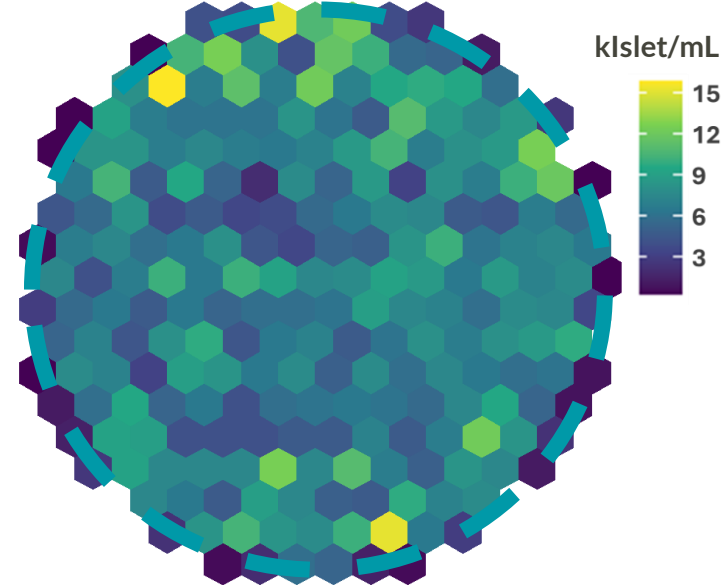
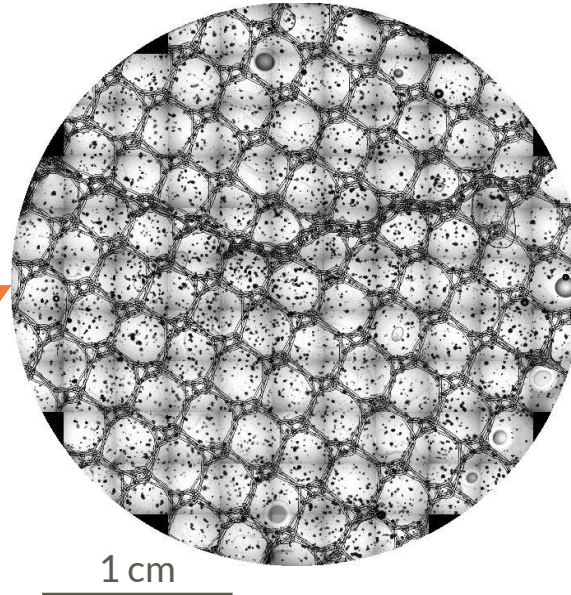
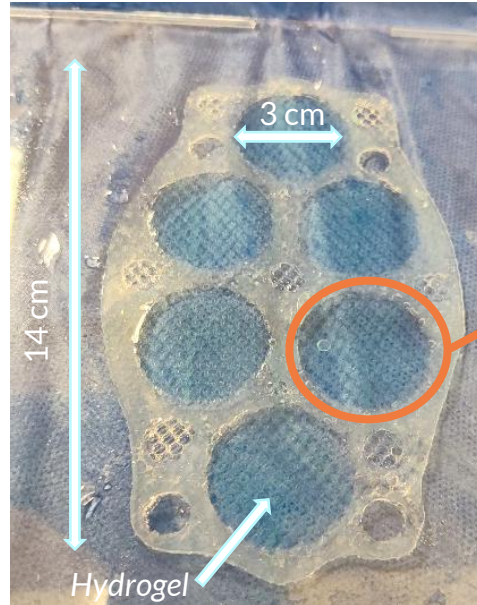
2

Human size AdoShell®
prototype

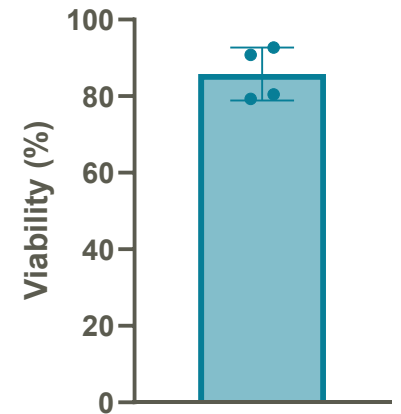
3

3D distribution
Human islets, N=1 experiment

Viability
MIN6, N=1 experiment



Live/Dead staining



❖ 1 pancreas = 1 implant

- Preliminary data: homogenous 3D-distribution of viable islets

1

Scale-up of AdoShell[®] for human application



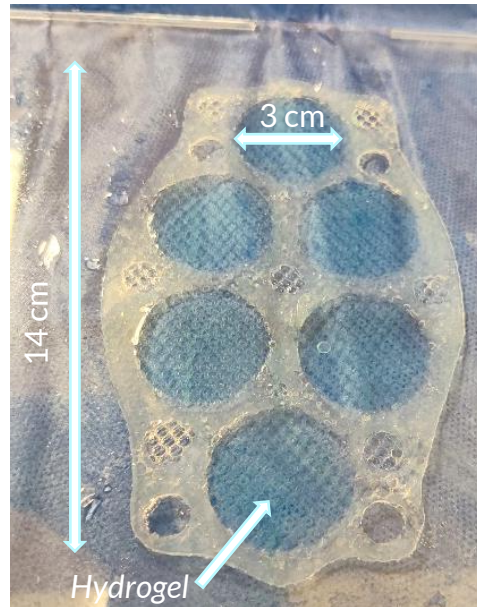
2

Laparoscopic implantation in domestic pig

3

4

5



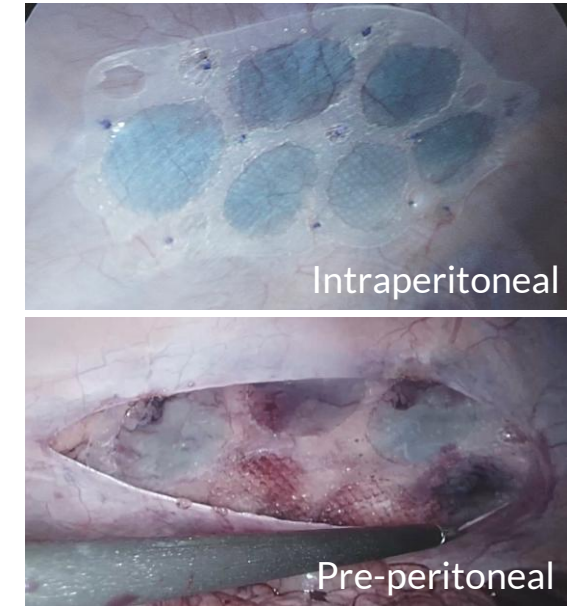
Rolling



Insertion



Implantation

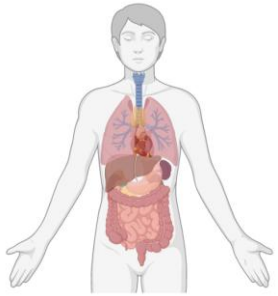


- ❖ 1 pancreas = 1 implant
- ❖ Up to 3 sites for delivery



✓ Total delivery capacity:
3 pancreas

- Ability to deliver a therapeutic dose opens a pathway towards clinical application



AdoShell® Human Islets

First in Human preparation

Regulatory
interactions

Scale-up and
surgical procedure

Regulatory studies

FIH

In progress

Stem cell-derived
islets

Other applications



85TH SCIENTIFIC
SESSIONS
CHICAGO, IL | JUNE 20-23, 2025

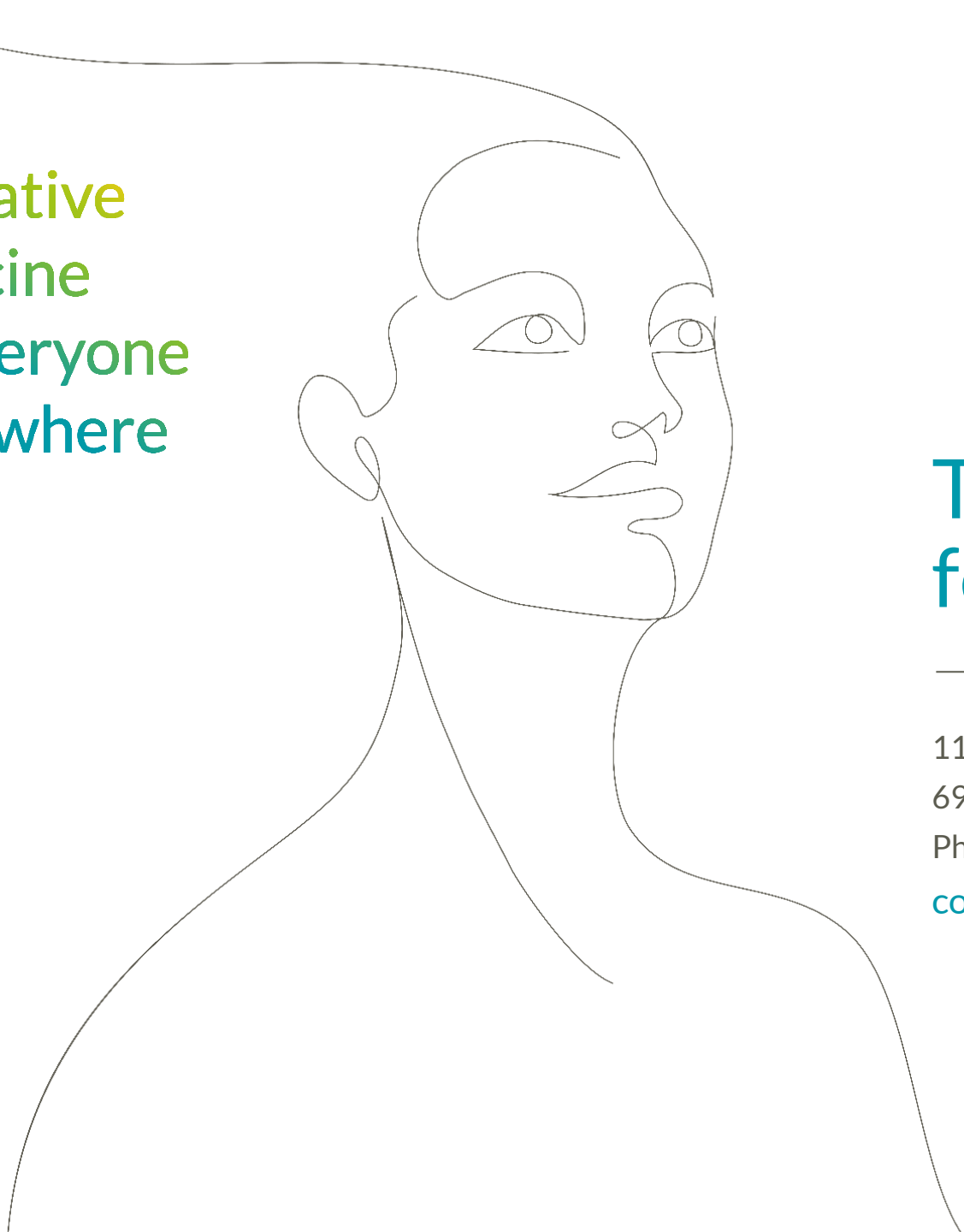
Acknowledgements

- Donors and their families
- ADOCIA - *Lyon, France*
 - Ouardane Jouannot
 - Nicolas Laurent
 - Rosy Eloy
 - Julie Brun
 - Camille Gautier
 - Baptiste Plancq
 - Romain Besnard
 - Madeleine Frêlon
 - Clément Cocita
 - Alexandre Martin
 - Lucie Jamgotchian
 - Claire Megret
 - Martin Gaudier
 - Olivier Soula
- CEED - *Strasbourg, France*
 - Karim Bouzakri
 - William Bietiger
 - Allan Langlois
- CHU Lille - *Lille, France*
 - François Pattou
- University of Helsinki - *Helsinki, Finland*
 - Timo Otonkoski
 - Diego Balboa
 - Jonna Saarimäki-Vire
- CHU Lyon – *Lyon, France*
 - Olivier Thaunat

- Institut Cochin - *Paris, France*
 - Raphael Scharfmann

- IRCAD - *Strasbourg, France*
 - Jacques Marescaux





Innovative
Medicine
for everyone
everywhere

Thank you
for your kind interest

115 avenue Lacassagne
69003 Lyon – FRANCE
Ph.:+33 4 72 610 610
contact@adocia.com

