

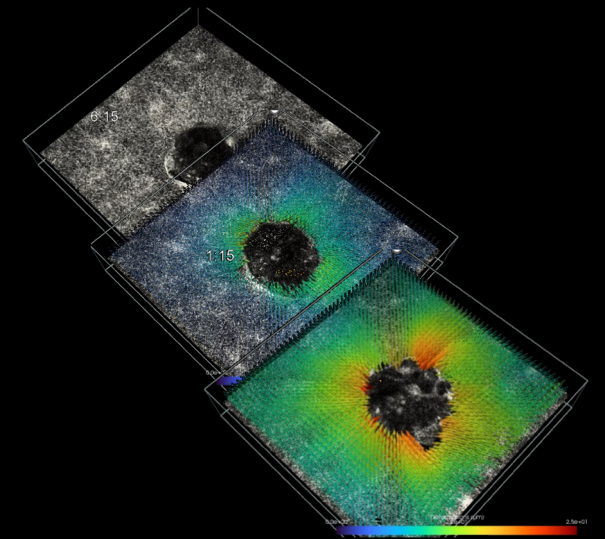
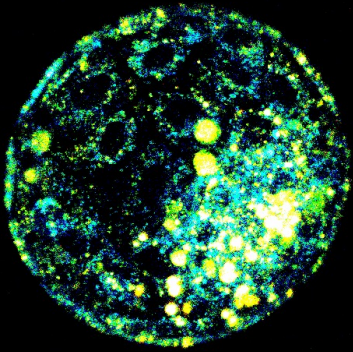
BSRM

Belgian Society for Reproductive Medicine

Ex Vivo Implantation Of Human Embryos

Samuel Ojosnegros
Open Innovation Lab
IBEC, Barcelona

Brussels, March 2026



COI:

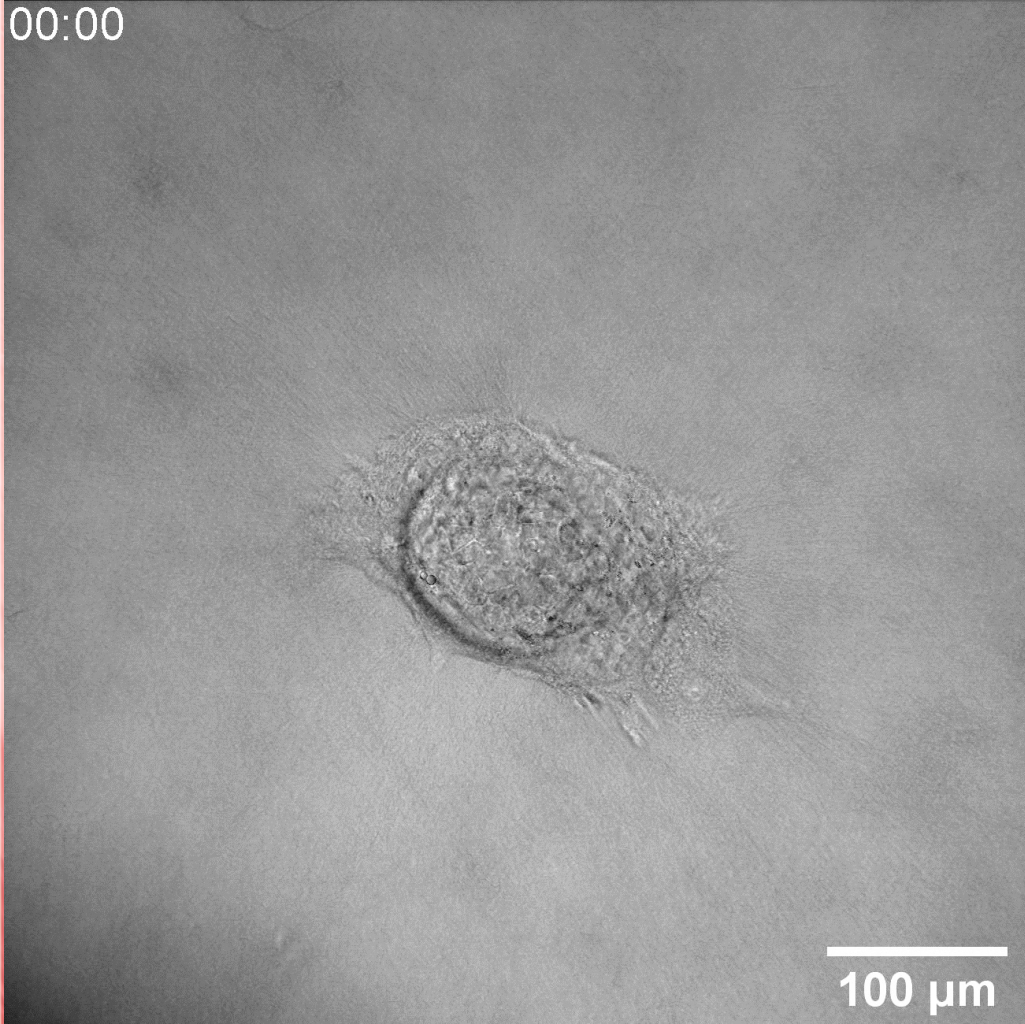
lumiris
Reliable embryo selection

SERABIOTICS
PLASMA SOLUTIONS

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ENDOMETRIUM

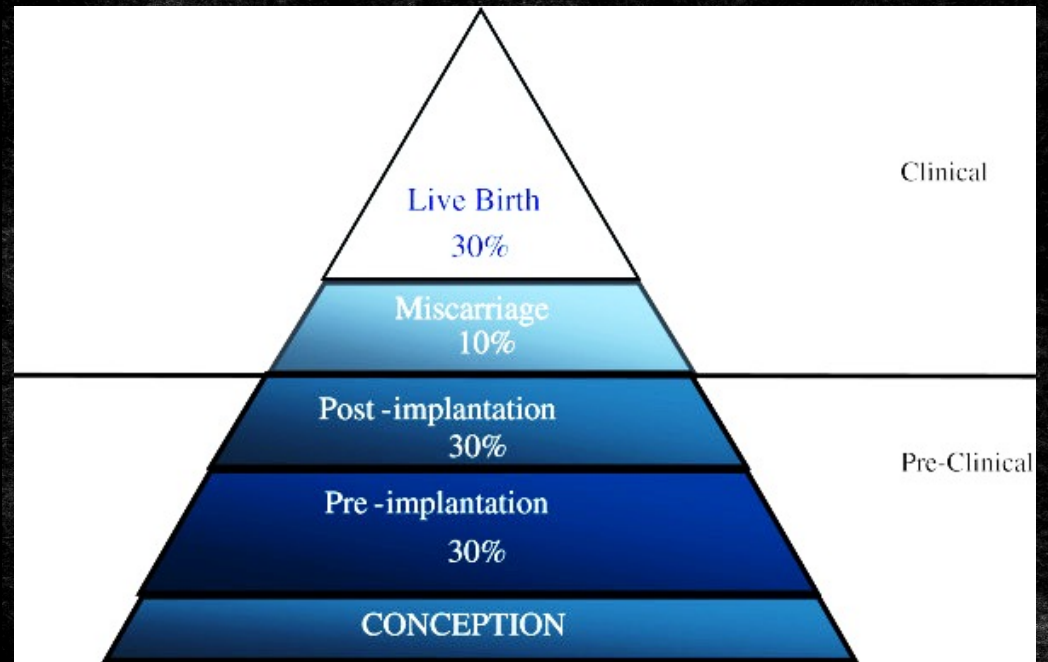
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Ex vivo implantation of mammalian embryos

00:00

THE ICEBERG OF IMPLANTATION



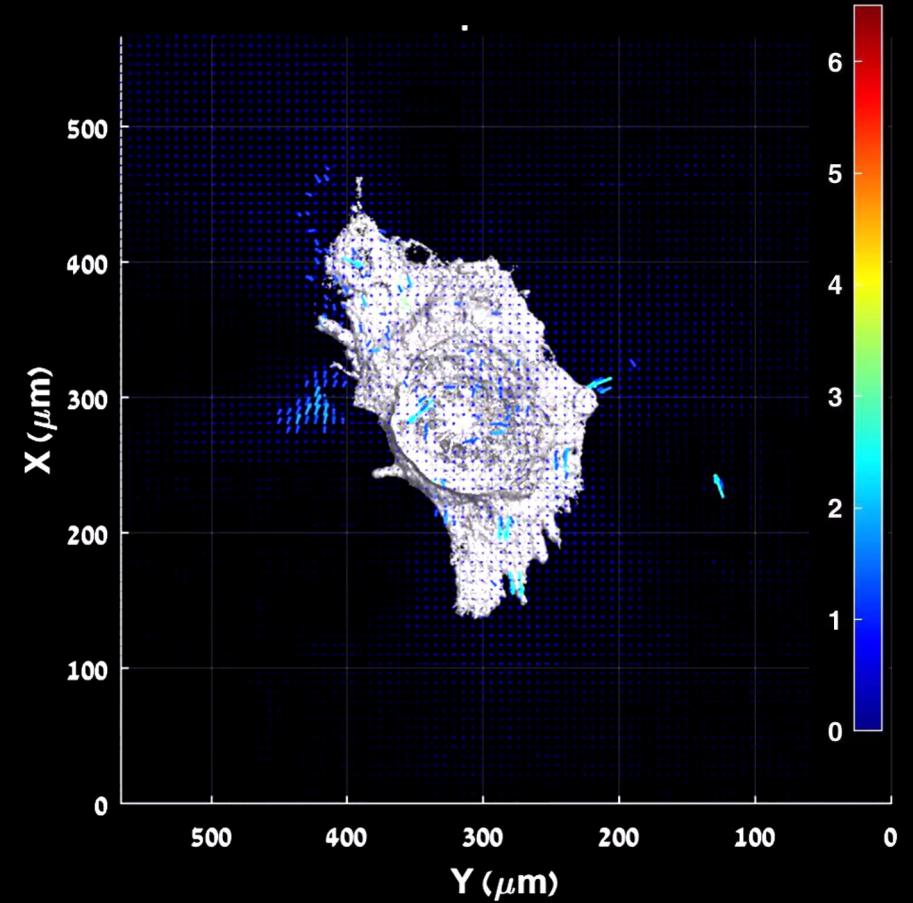
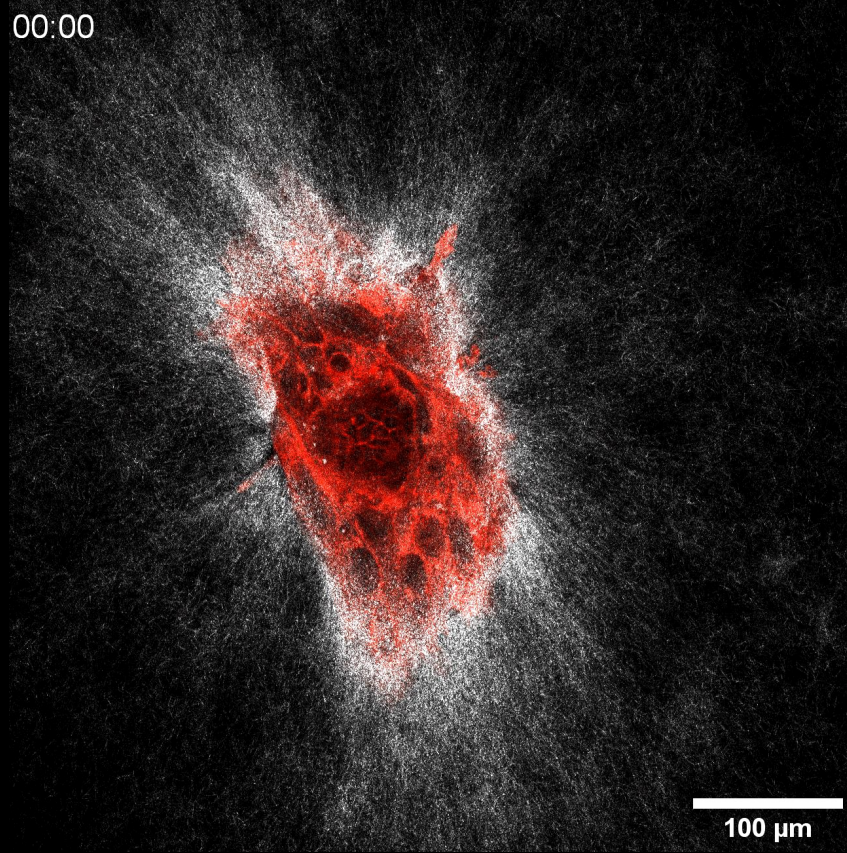
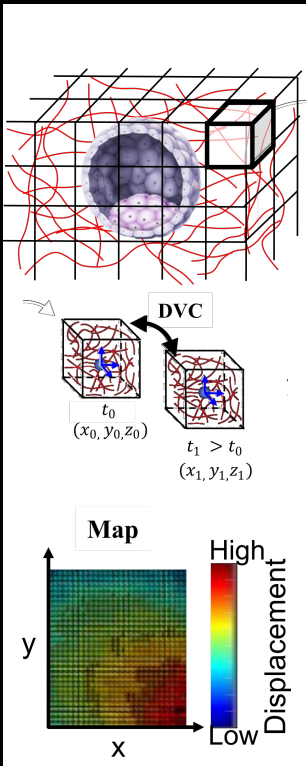
Larsen et al. BMC Medicine 2013 (Nick Macklon's group)

Ojosnegros et.al HRU (2021)

Time in hh:mm

100 μm

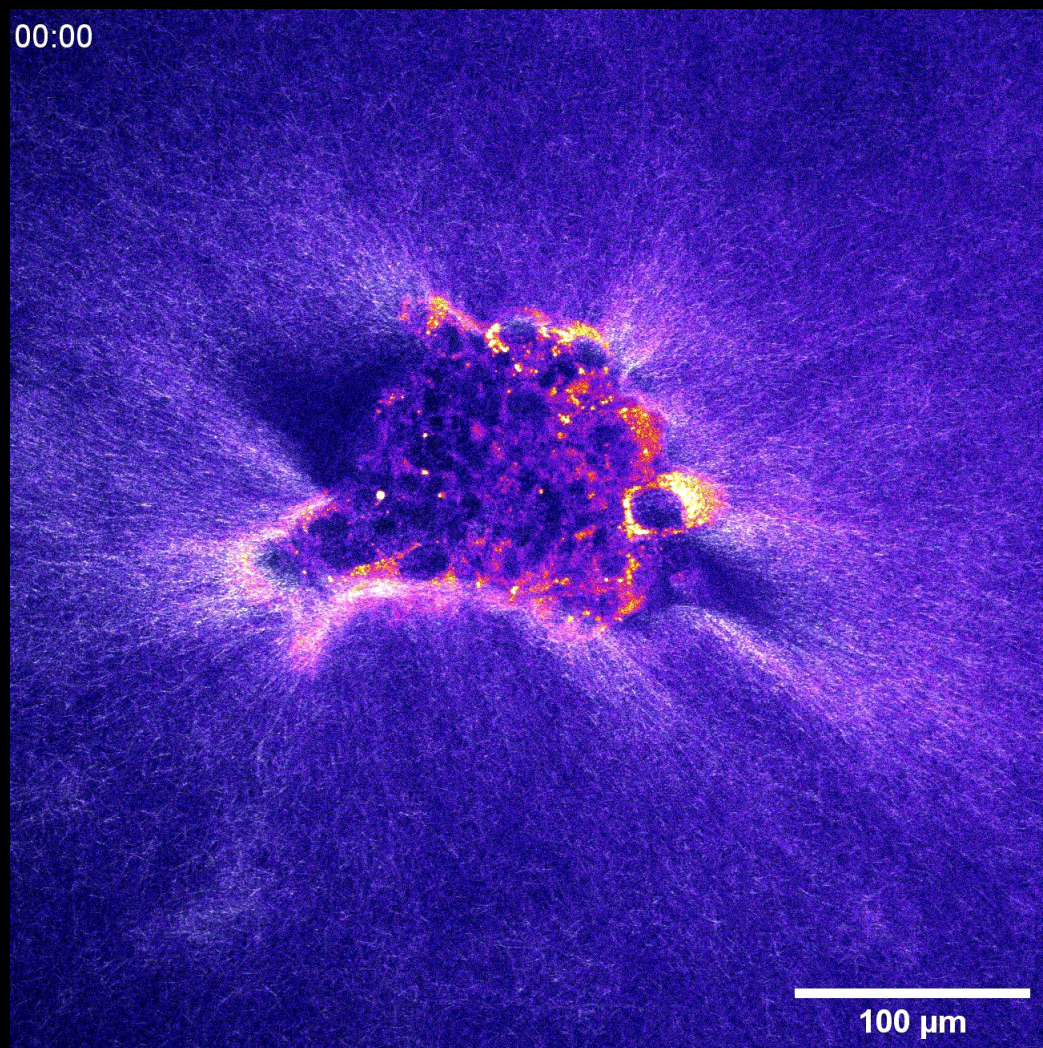
Traction force microscopy of implanting mouse embryos



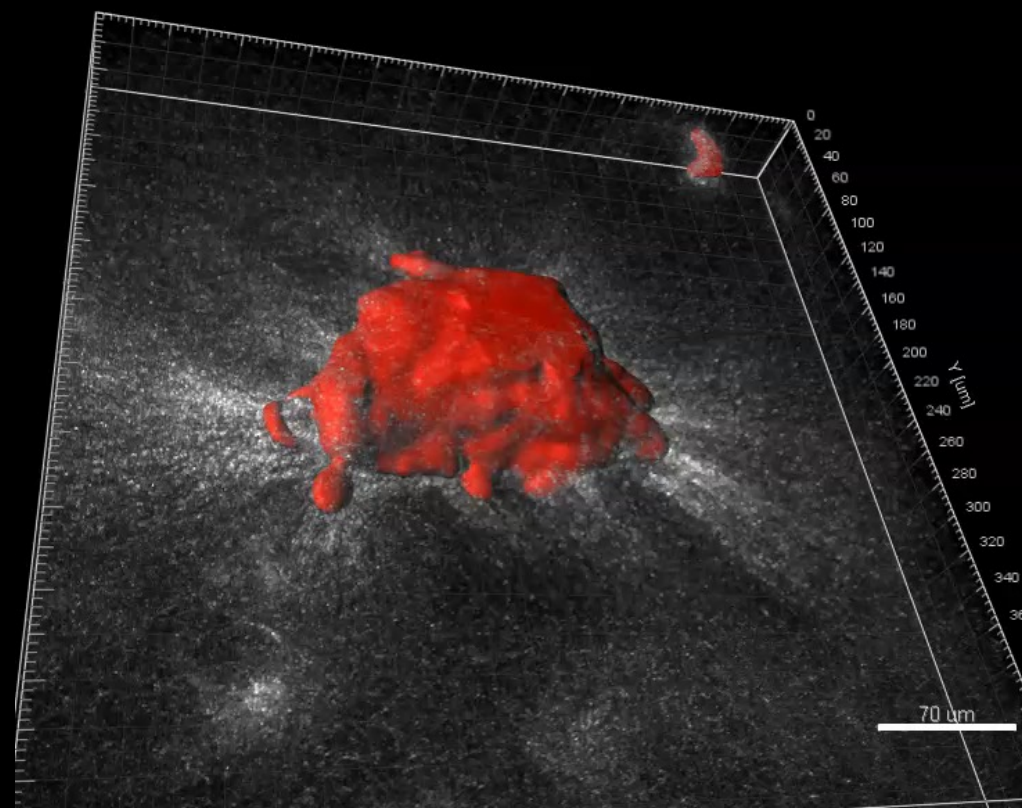
Single z slide
2D System
Time in hh:mm

Label-free imaging of mouse embryos

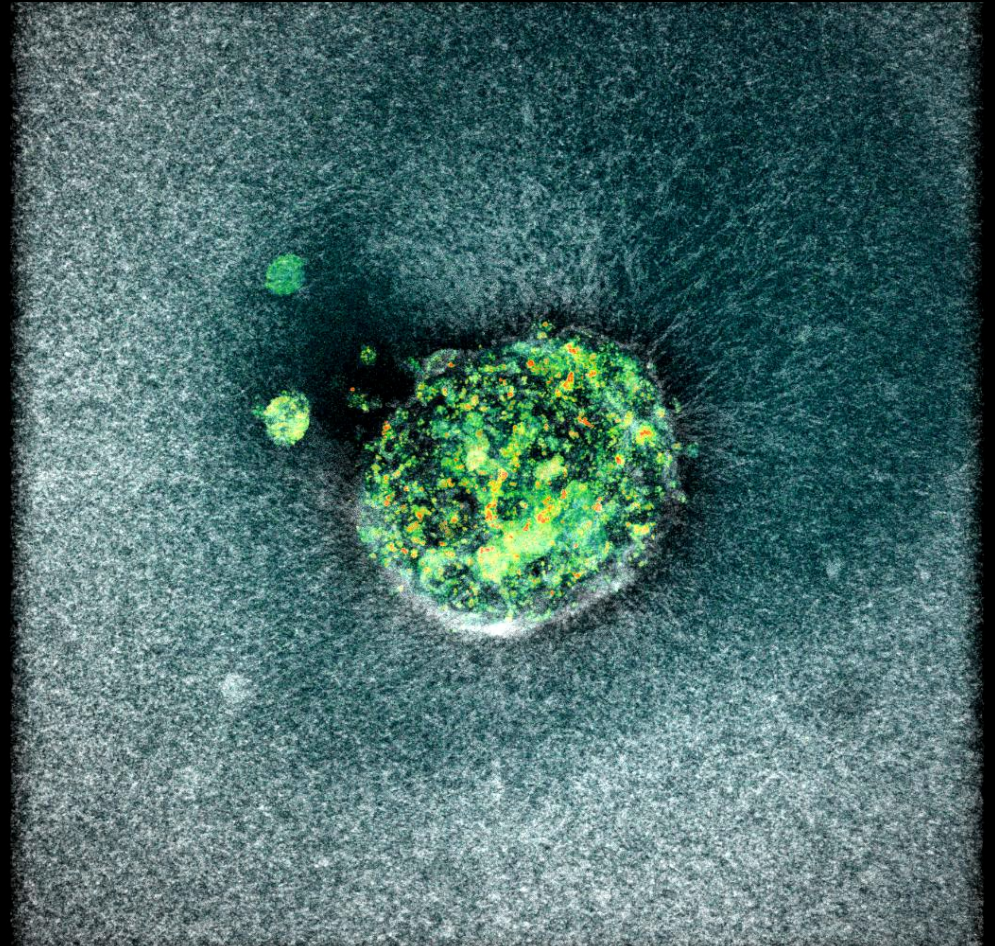
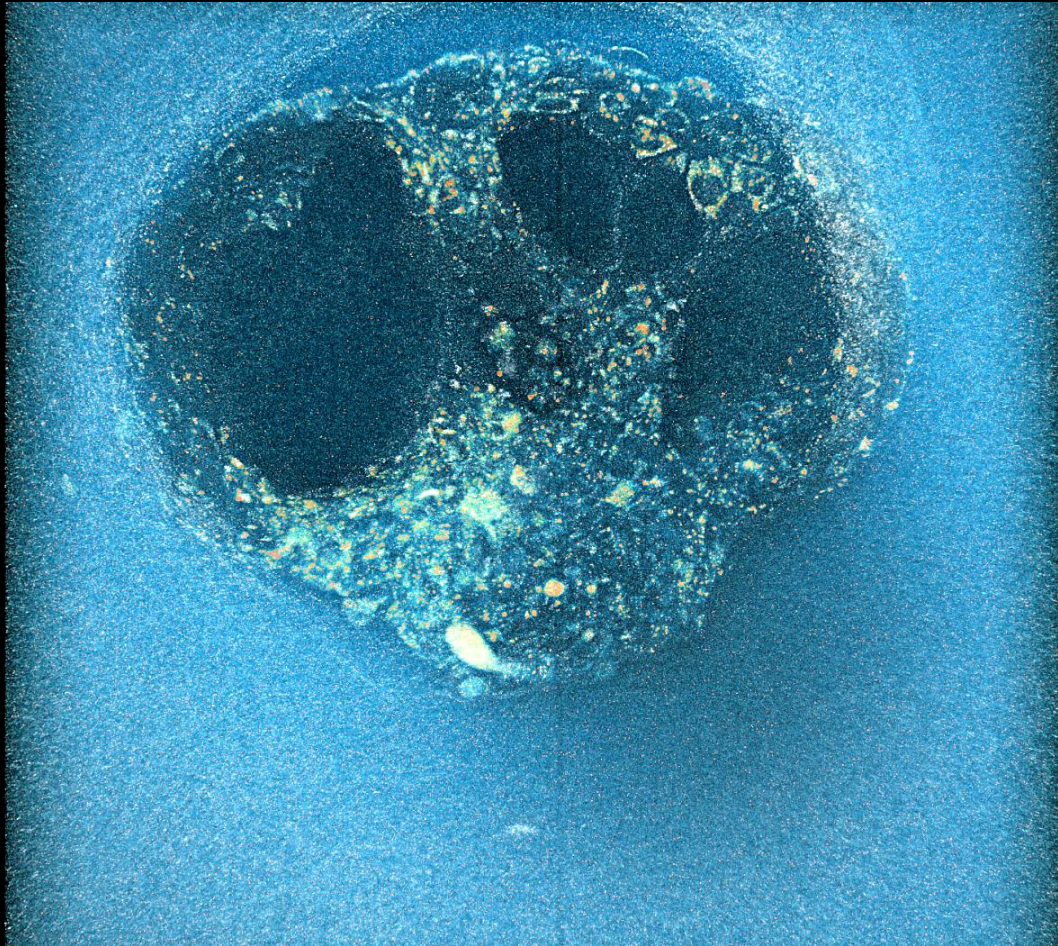
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Time in hh:mm Sum projection



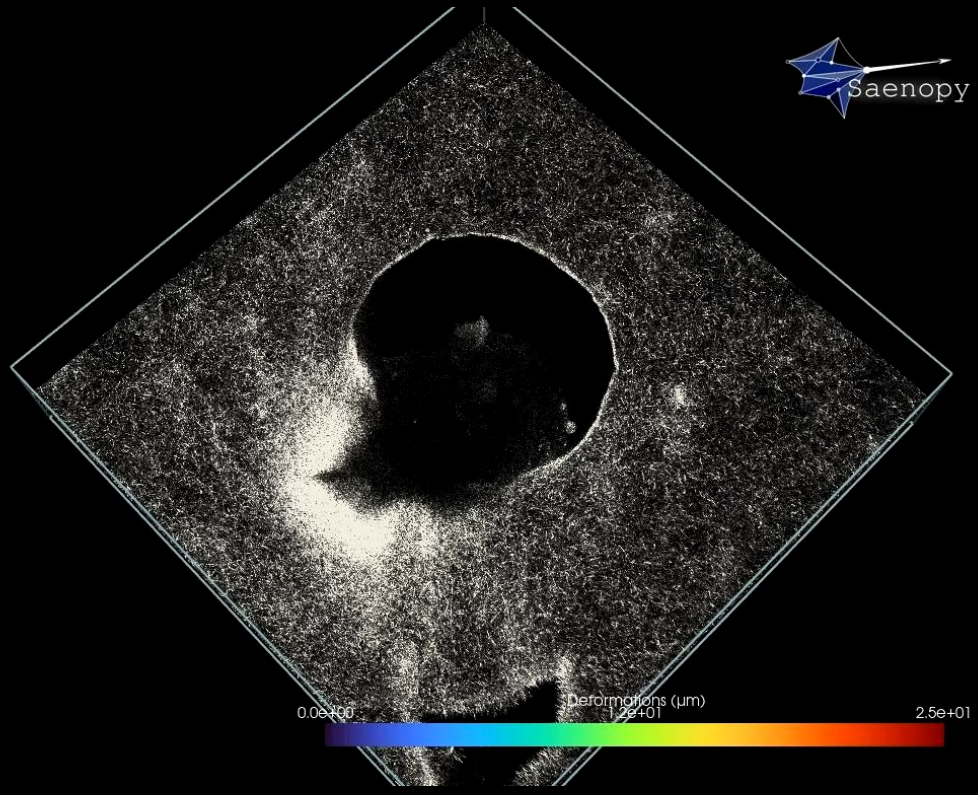
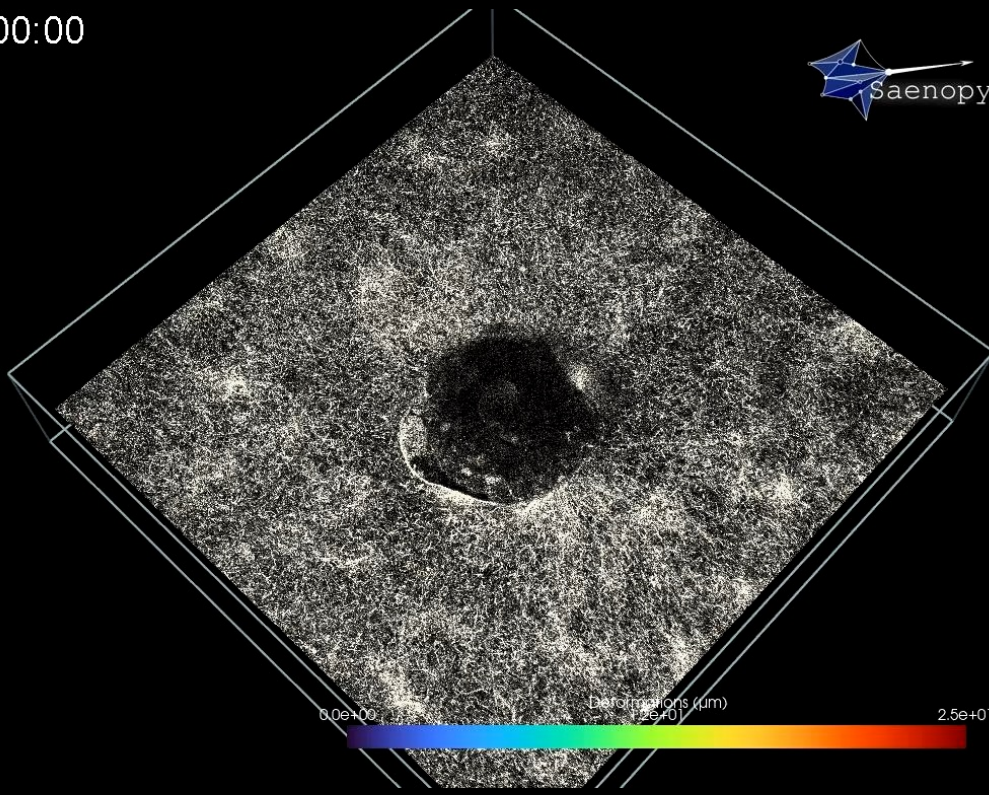
Label-free human embryos: 2nd compaction and invasion

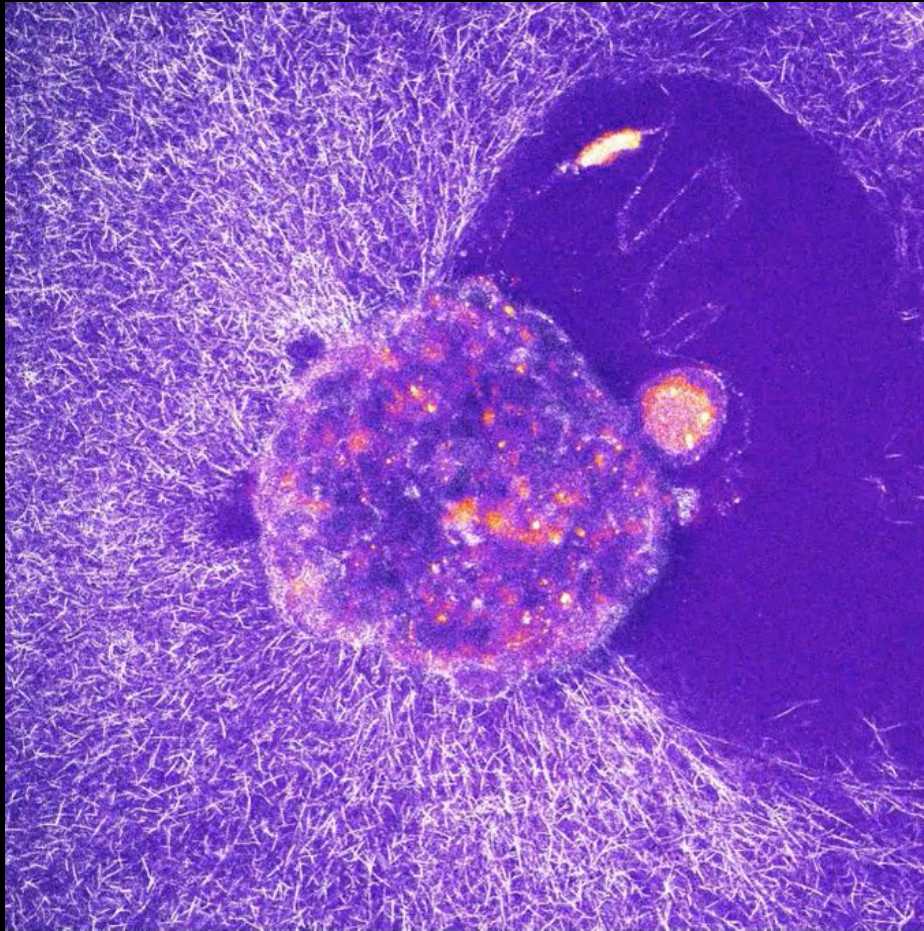


Godeau, Seriola et.al SCI ADV (2025)

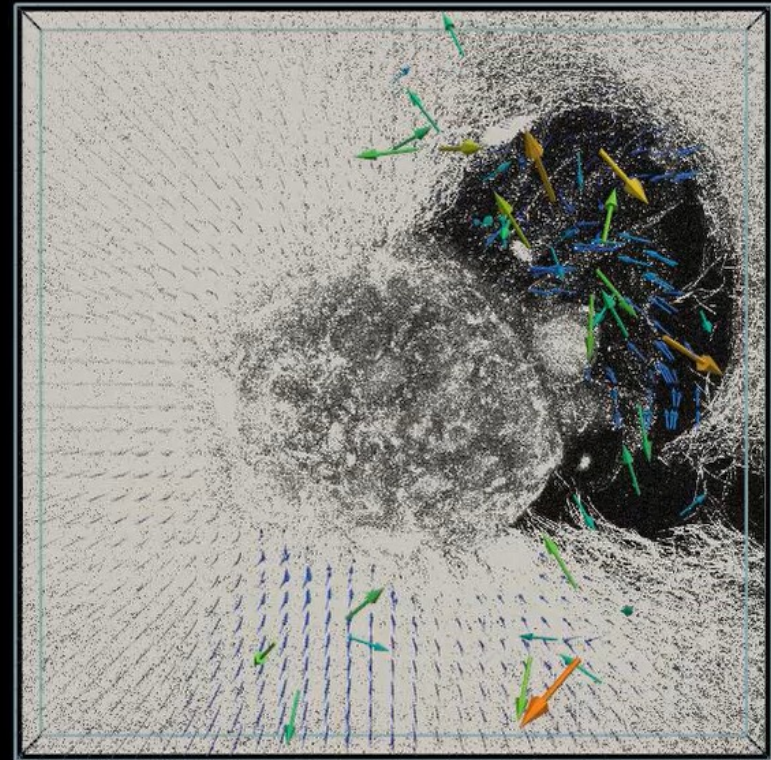
SAENOPY – (Ben Fabry lab algorithm)

00:00

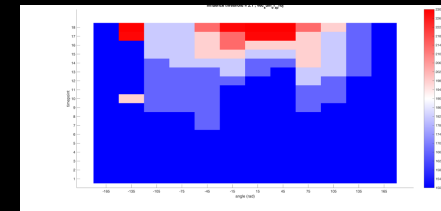
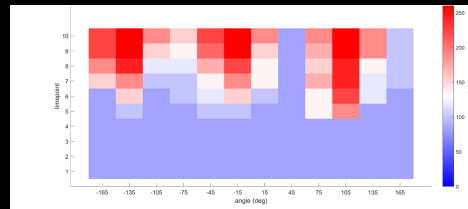
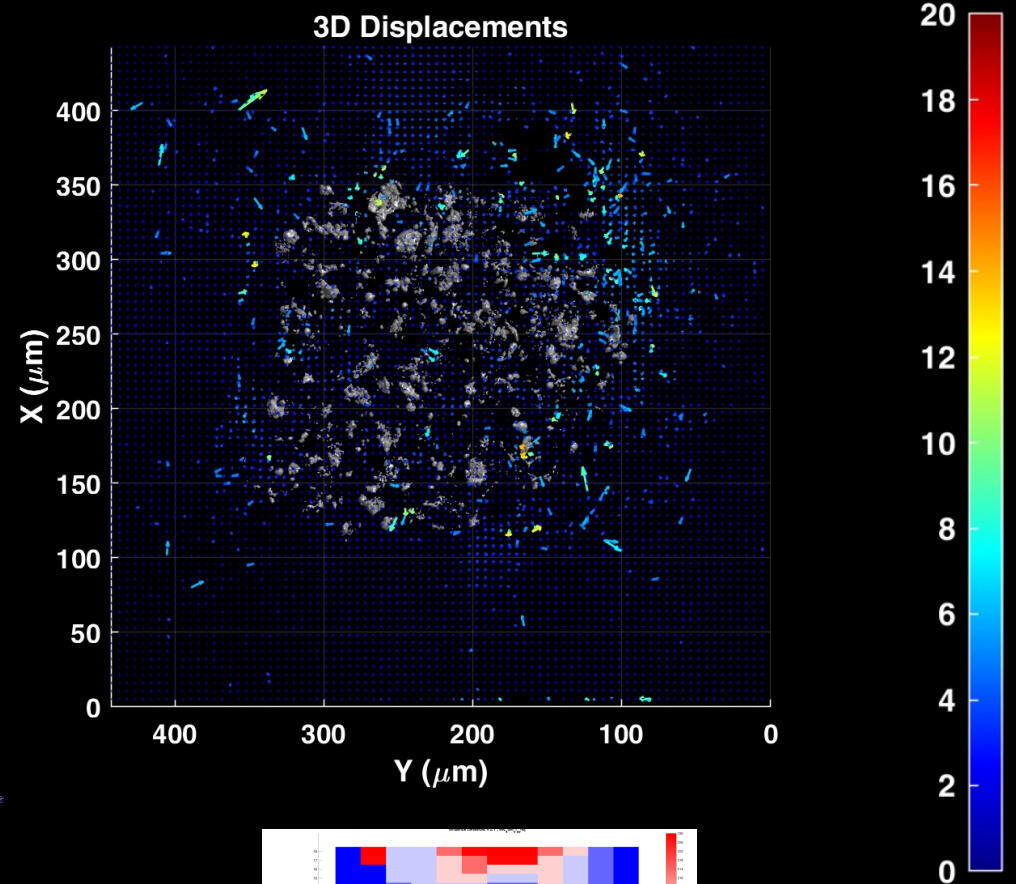
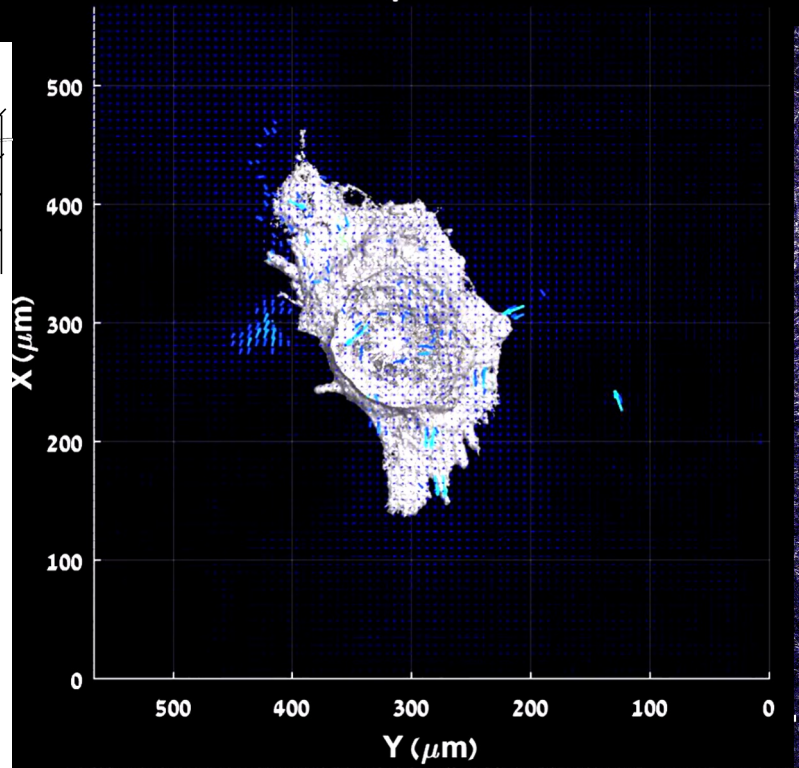
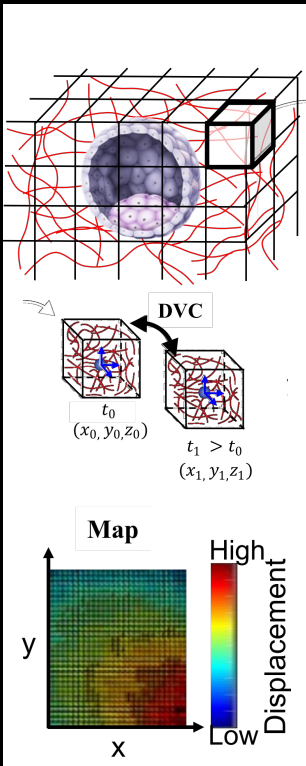




Deformations (μm)
0.0e+00 1.8e+01 3.5e+01

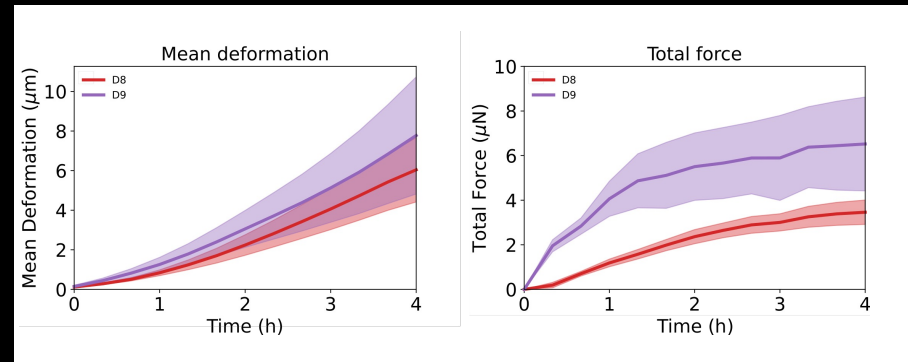
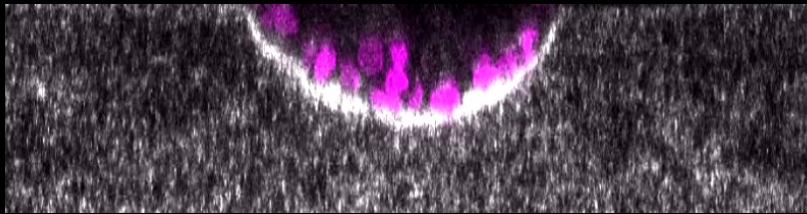
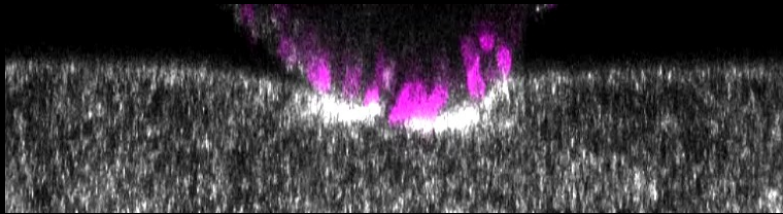
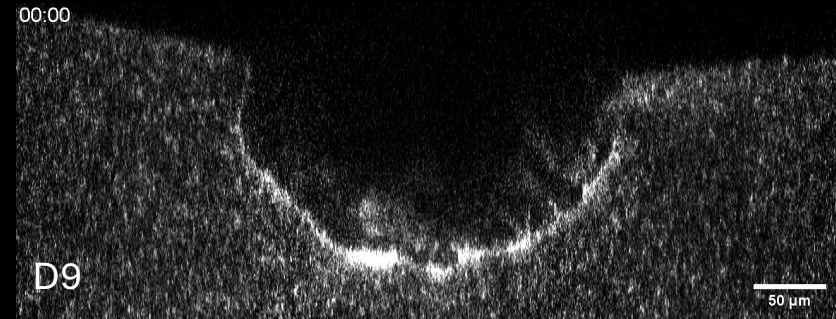
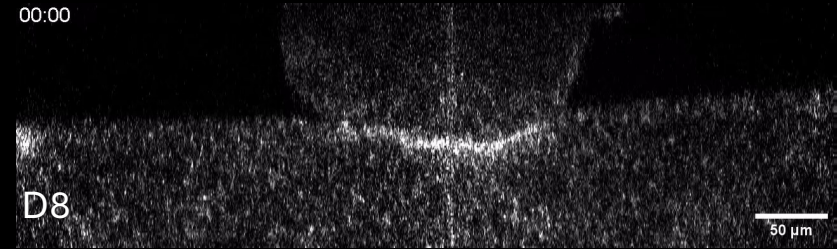
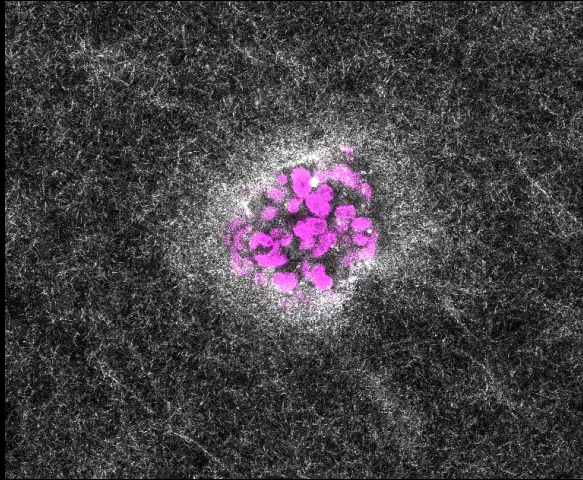


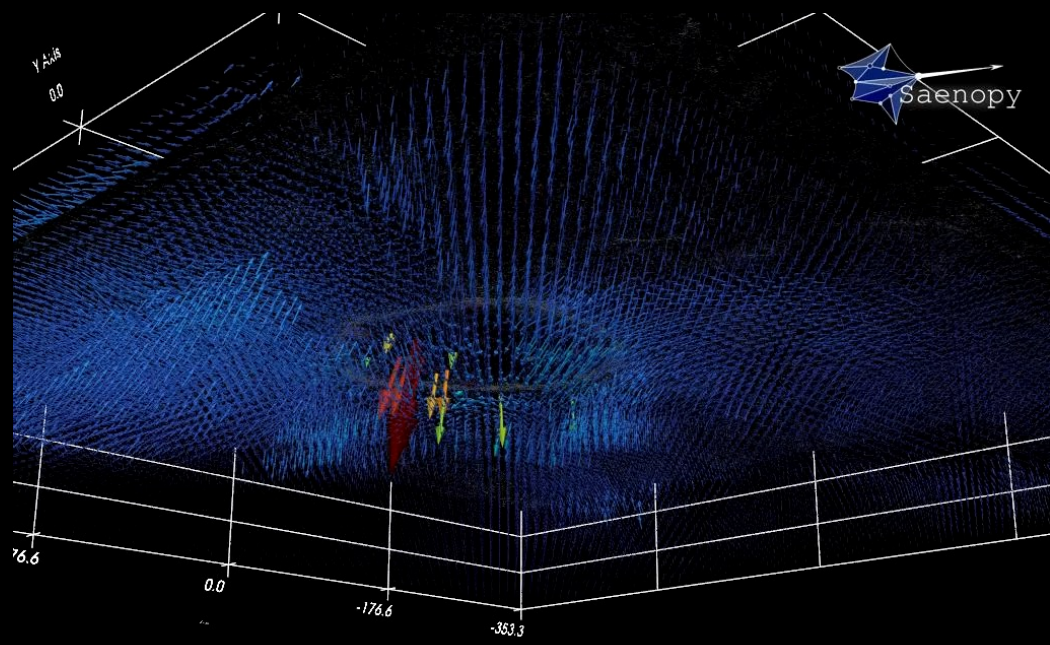
Traction force microscopy of mouse vs human embryos



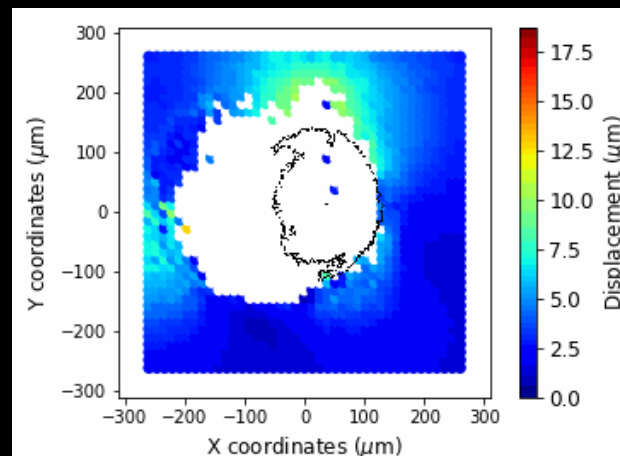
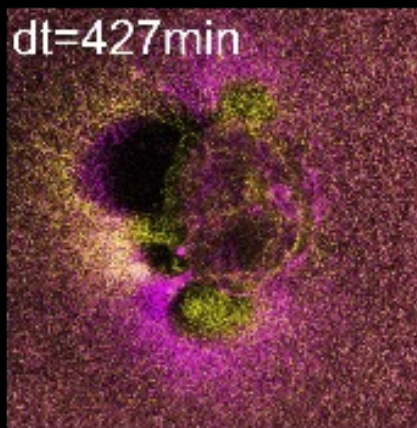
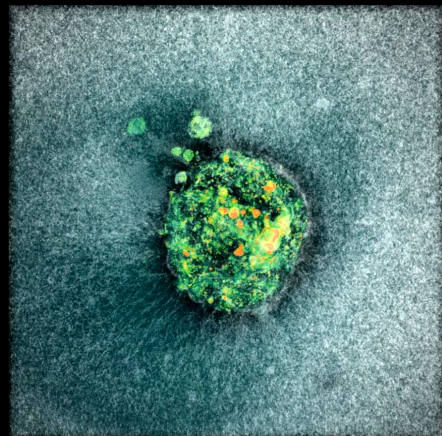
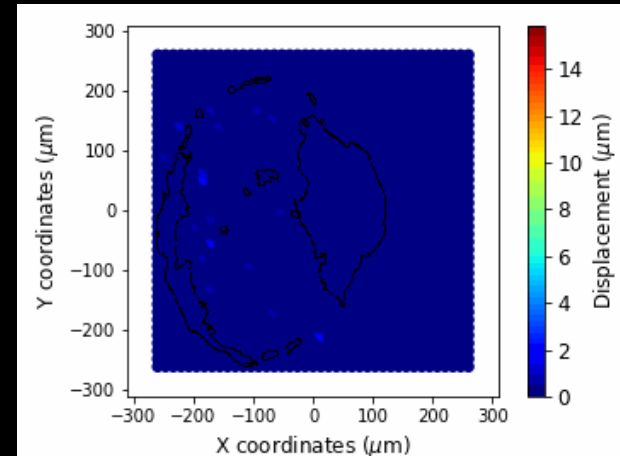
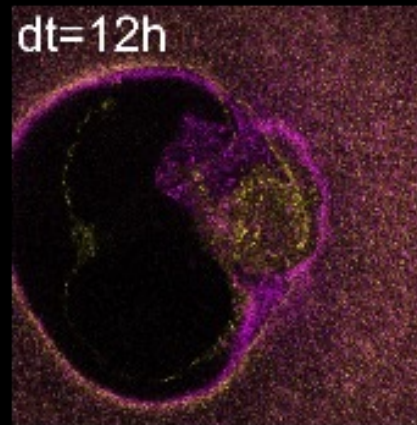
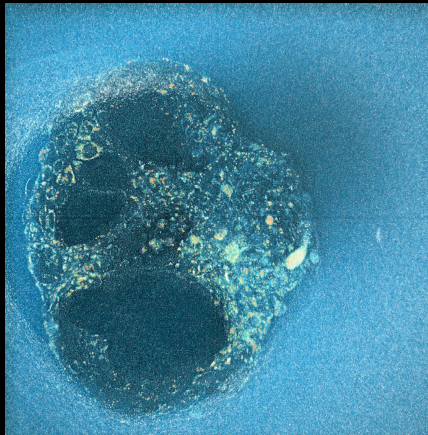
Single z slide
2D System
Time in hh:mm

Change of invasion dynamics of human embryos in ex vivo matrix over time

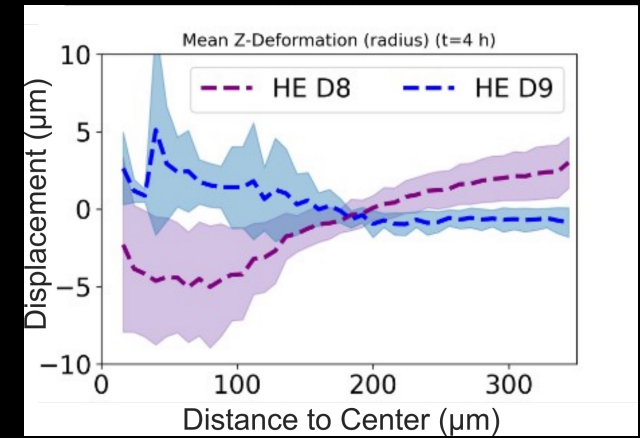
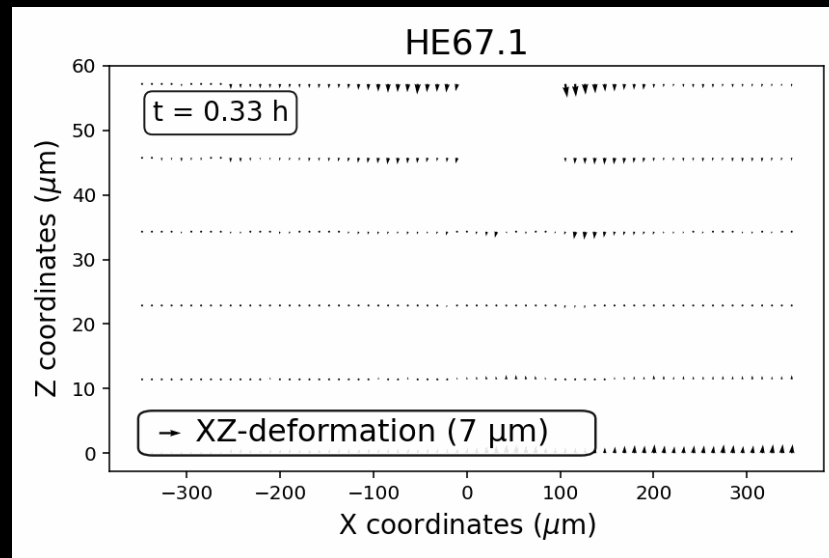
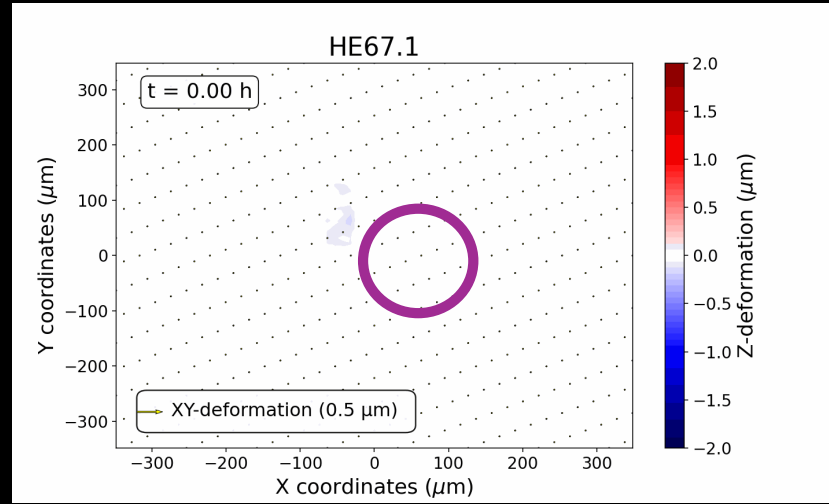




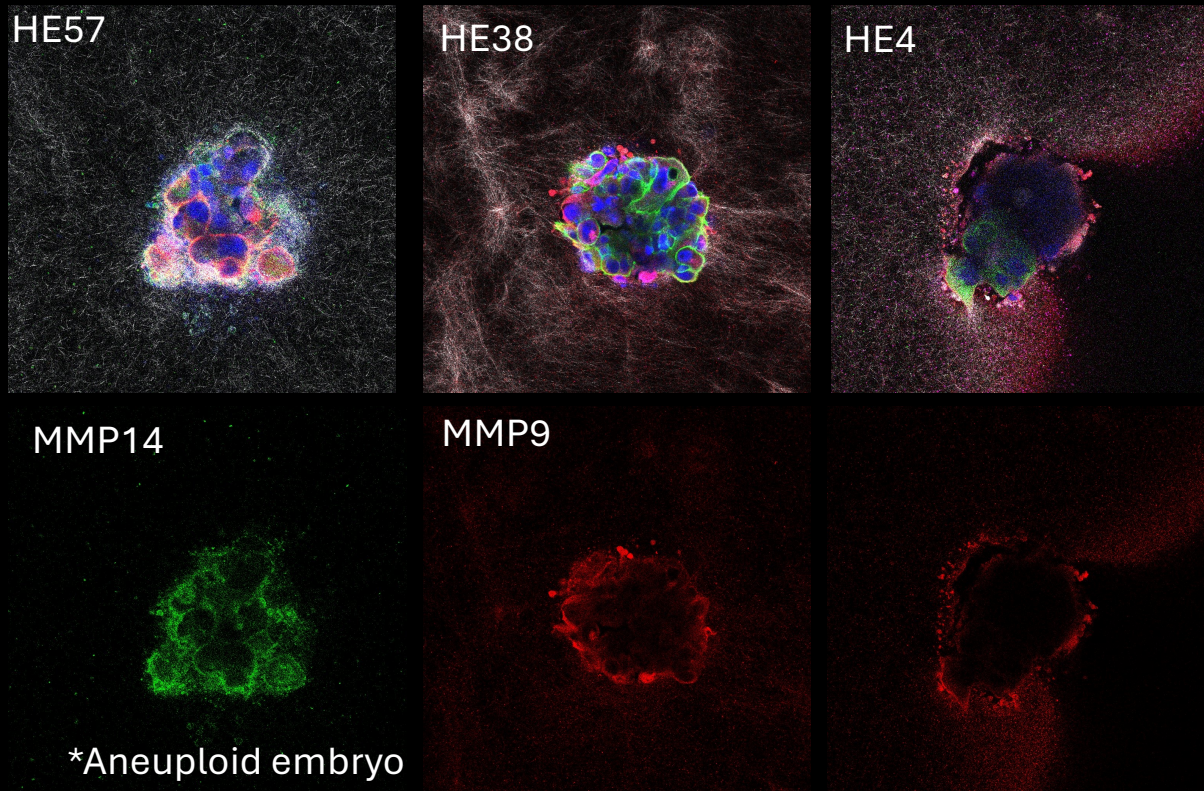
Displacement distribution at polar trophectoderm supporting embryo migration in 3D platform



Displacement fluctuation over time

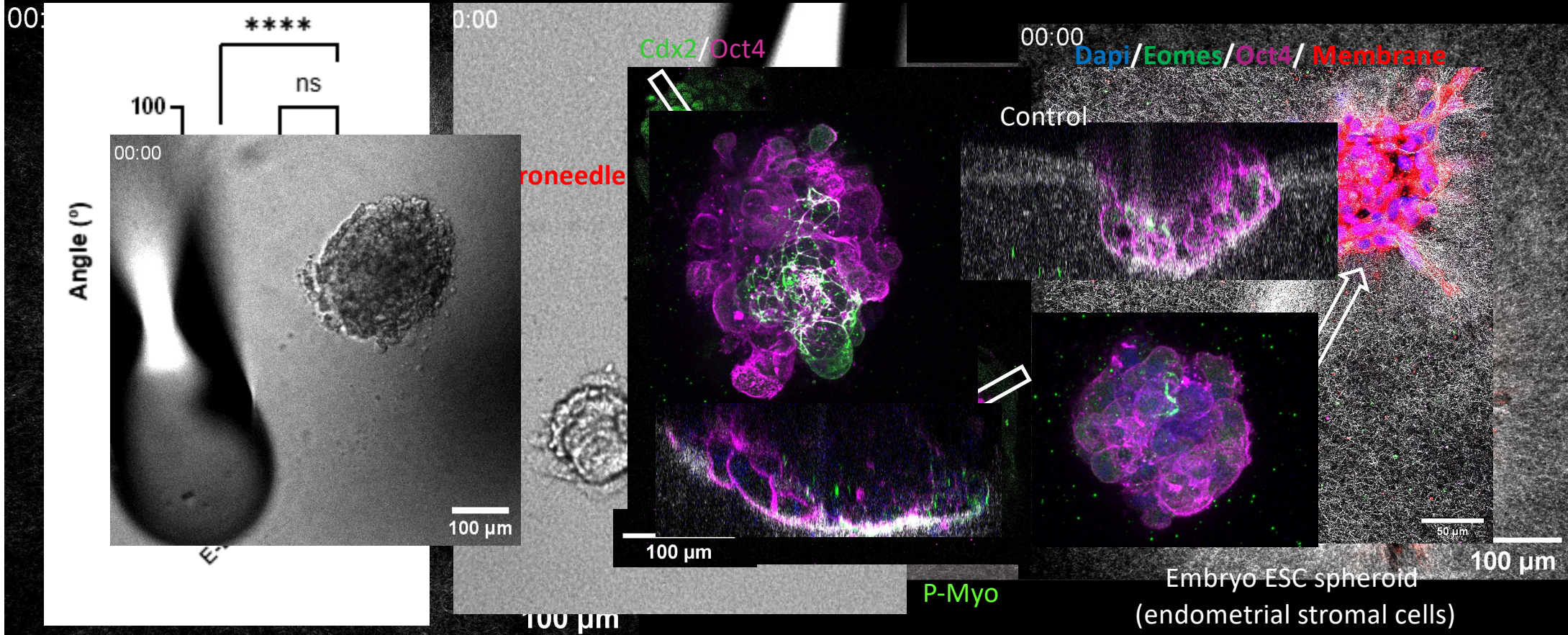


Matrix degradation by metalloproteinases (MMPs)



MMP14 (MT-MMP1) and MMP9

Traction force microscopy of implanting embryos 3D: mechanical bridge formation



Time in hh:mm

The thing went viral

38 K

Me gusta



nature

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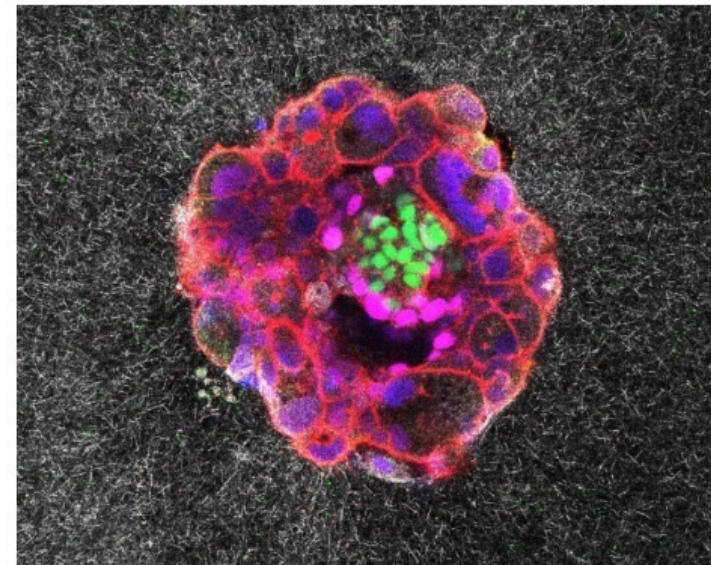
nature > news > article

NEWS | 15 August 2025

Watch a human embryo implant itself – with brute force

Video provides an up-close look at a human embryo plunging into tissue that simulates the uterine lining.

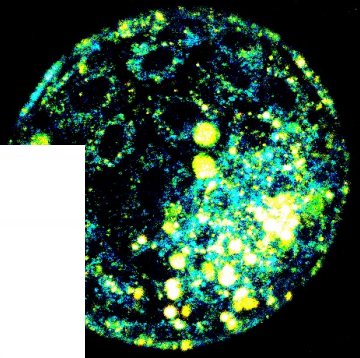
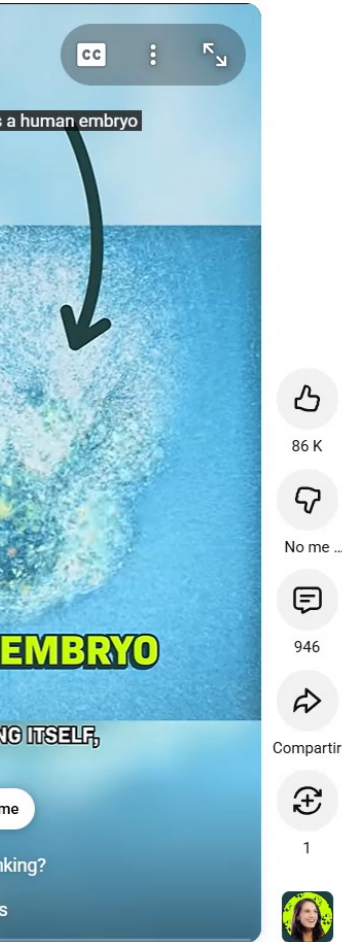
By Jenna Ahart



A microscopic view of a nine-day-old human embryo shows a protein found in embryonic stem cells in green, developing tissue in magenta and DNA in blue. Credit: Institute for Bioengineering of Catalonia (IBEC)

1.588.779

Visualizaciones



lumiris
Reliable embryo selection

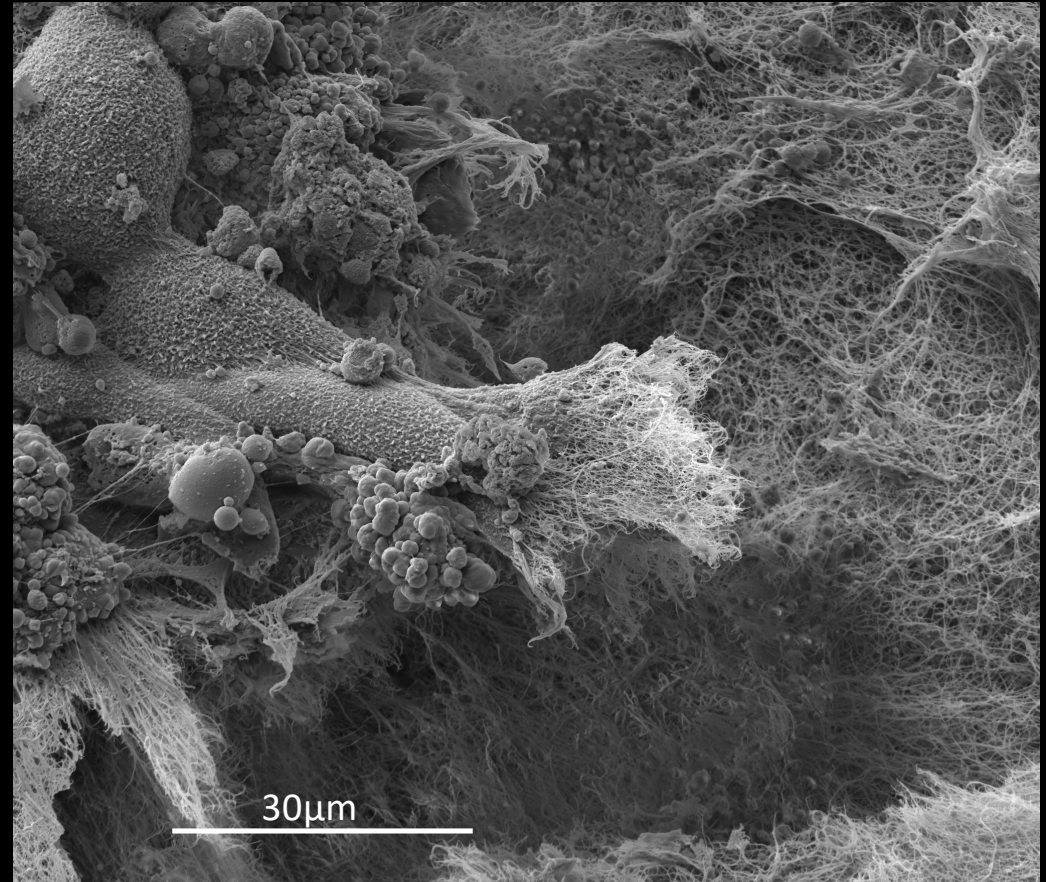
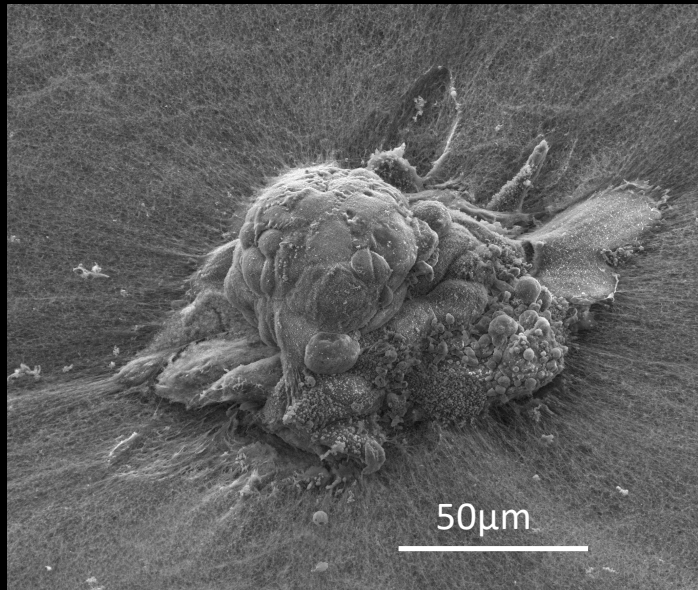
SERABIOTICS
PLASMA SOLUTIONS

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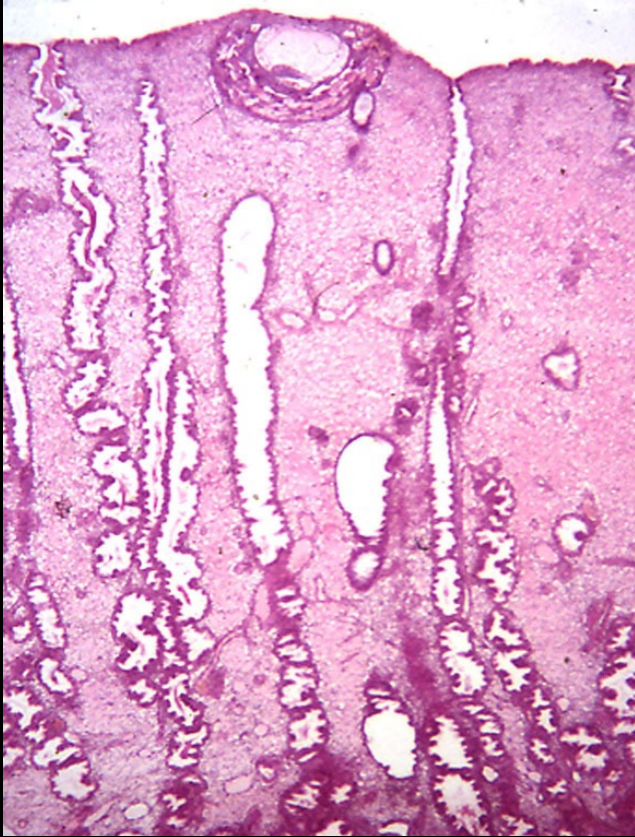
IBEC^R

CI ADV (2025)

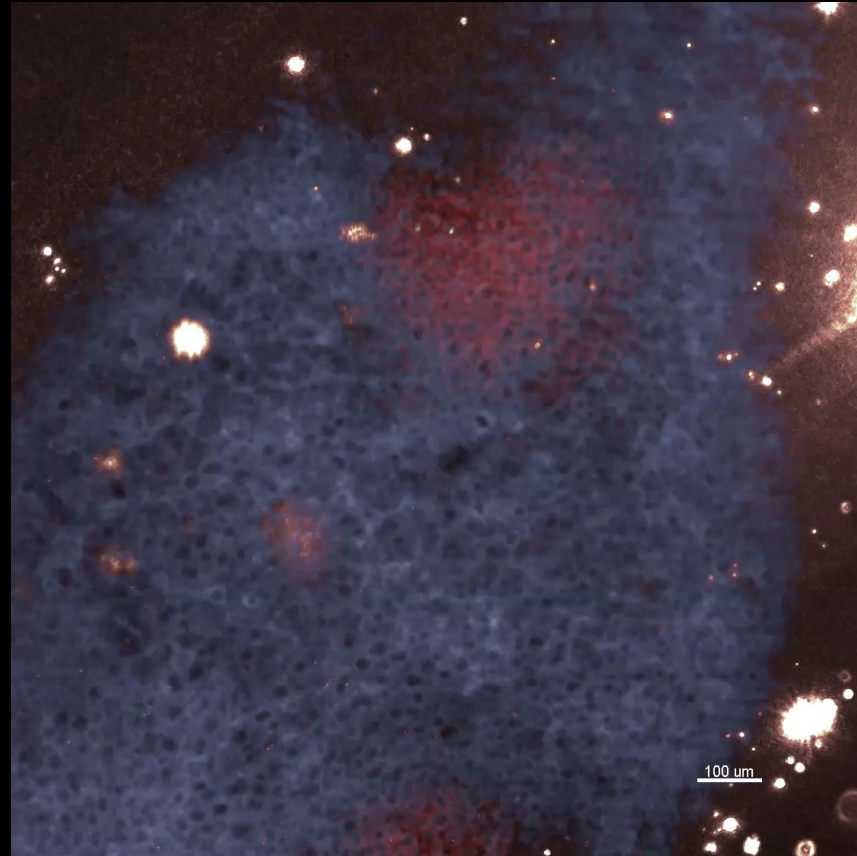
SEM images reveal complex embryo-ECM interactions



Axes of embryo implantation

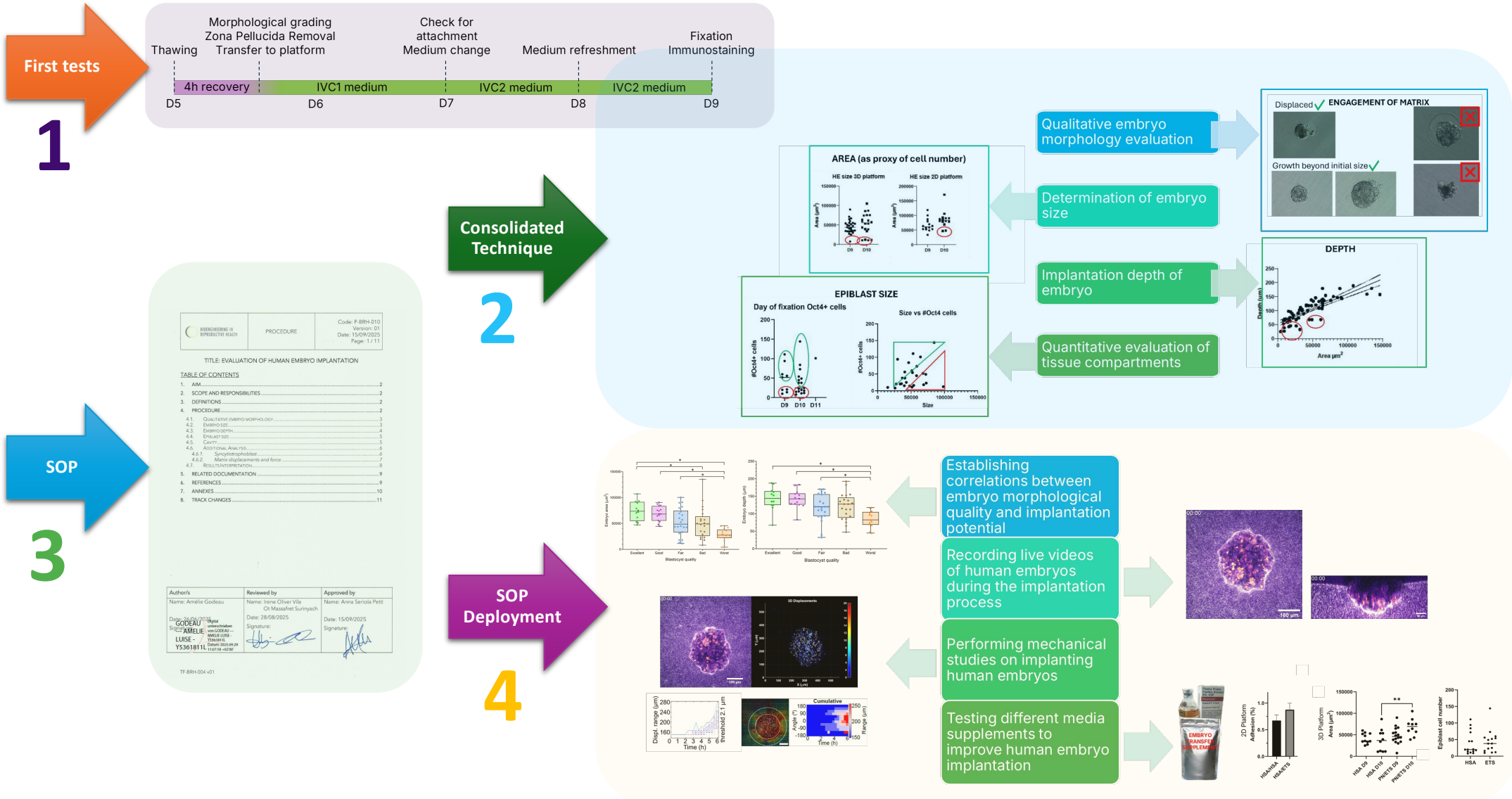


Lacunar stage 5C, Enders AC, Carnegie collection. Center for Trophoblast Research resources, Cambridge,

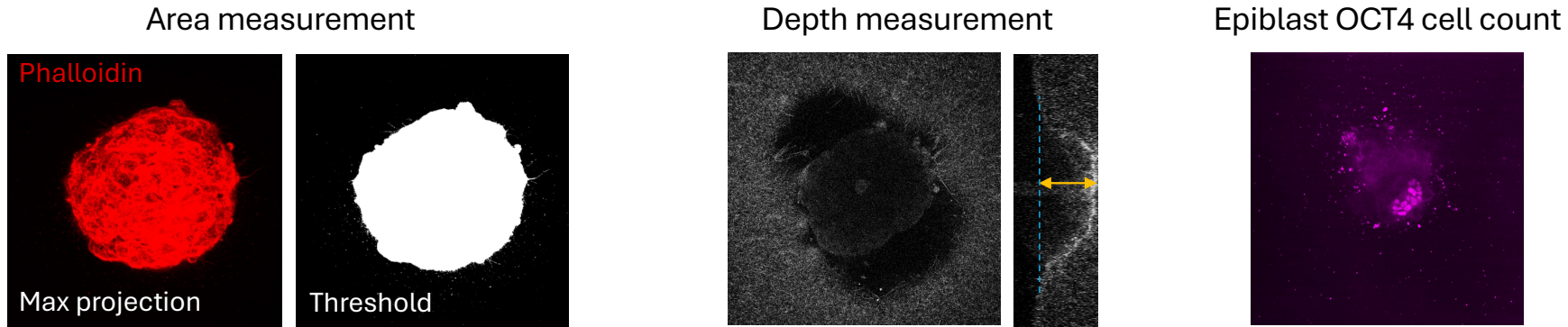


BL/6 x tdTomato mouse, whole mount decidua, E6.5
Autofluorescence, tdTomato- by Julien Collumbelli

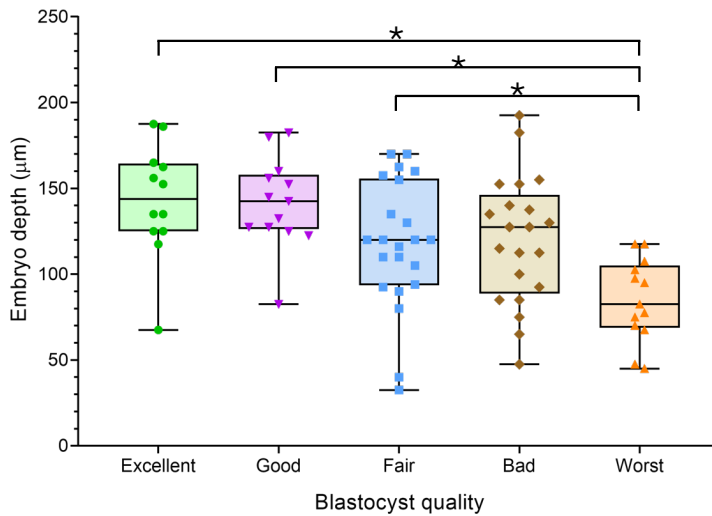
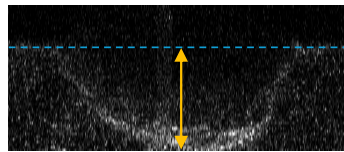
BEYOND THE MEA TEST: Quality in experimental research: embryo implantation



Poor correlation between morphology and implantation capacity

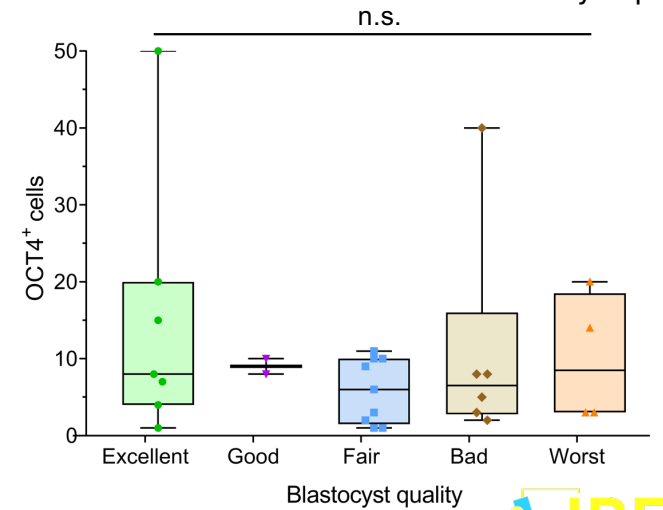
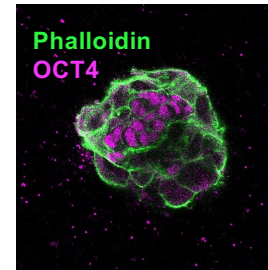


Embryo implantation depth on D9 are marginally correlated with blastocyst morphology on D5





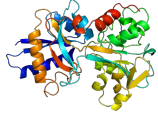

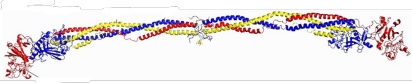
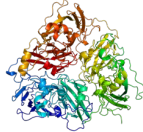
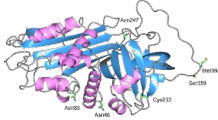
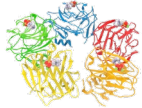
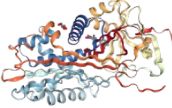



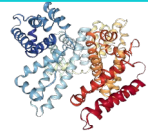
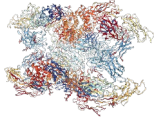

* $p < 0.05$

The number of OCT4⁺ cells on D9 is not correlated to blastocyst quality



The rich plasma diversity of α & β globulins (and others)

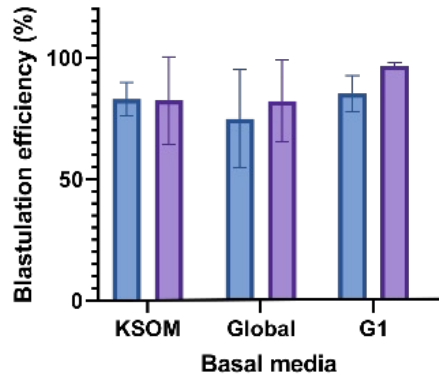


 β-LIPOPROTEIN	 PROTHROMBIN	 TRANSFERRIN	 HAPTOGLOBIN
 FIBRINOGEN	 CERULOPLASMIN	 α-1 ANTITRYPSIN	
 C-REACTIVE PROTEIN	 TBG	 HEMOPEXIN	 COMPLEMENT PROTEINS
 α-1 ACID GLYCOPROTEIN	 ALBUMIN	 α-2 MACROGLOBULIN	 PLASMINOGEN

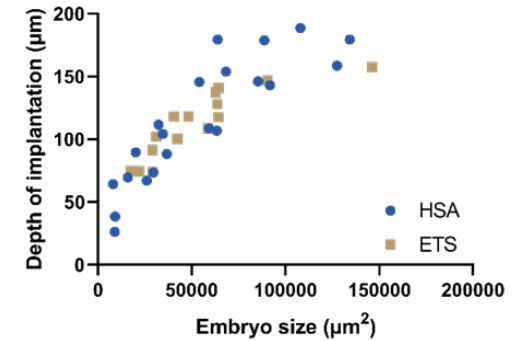
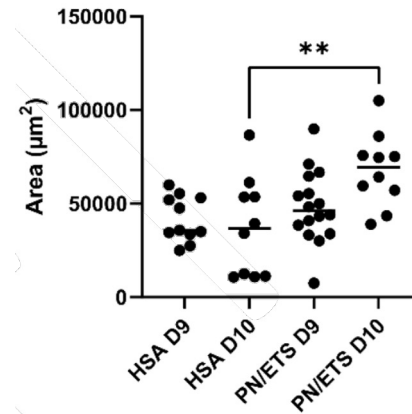
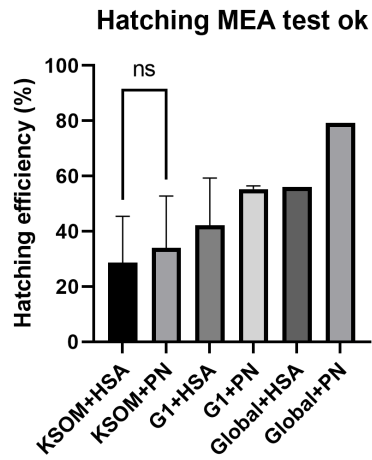
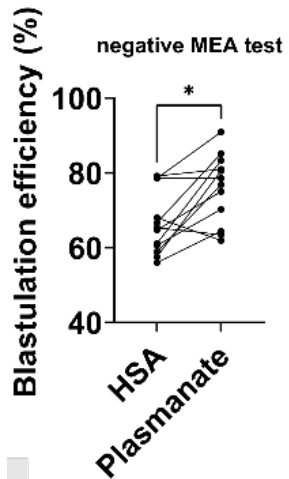
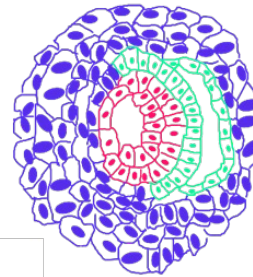
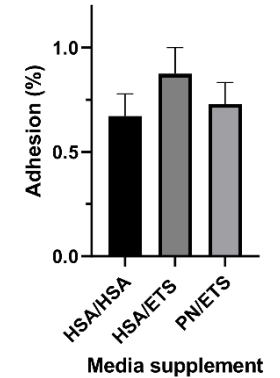
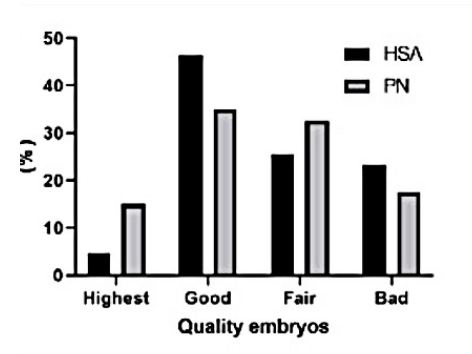
<https://biochemden.com/plasma-proteins/>

Clinical grade globulin-rich protein supplements improve mouse and human embryo implantation *in vitro*

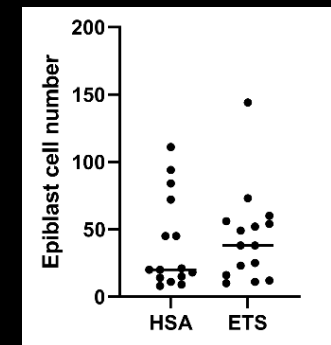
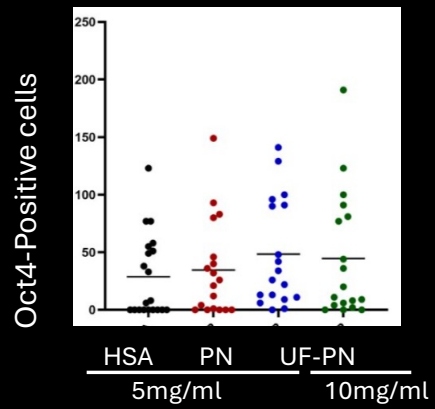
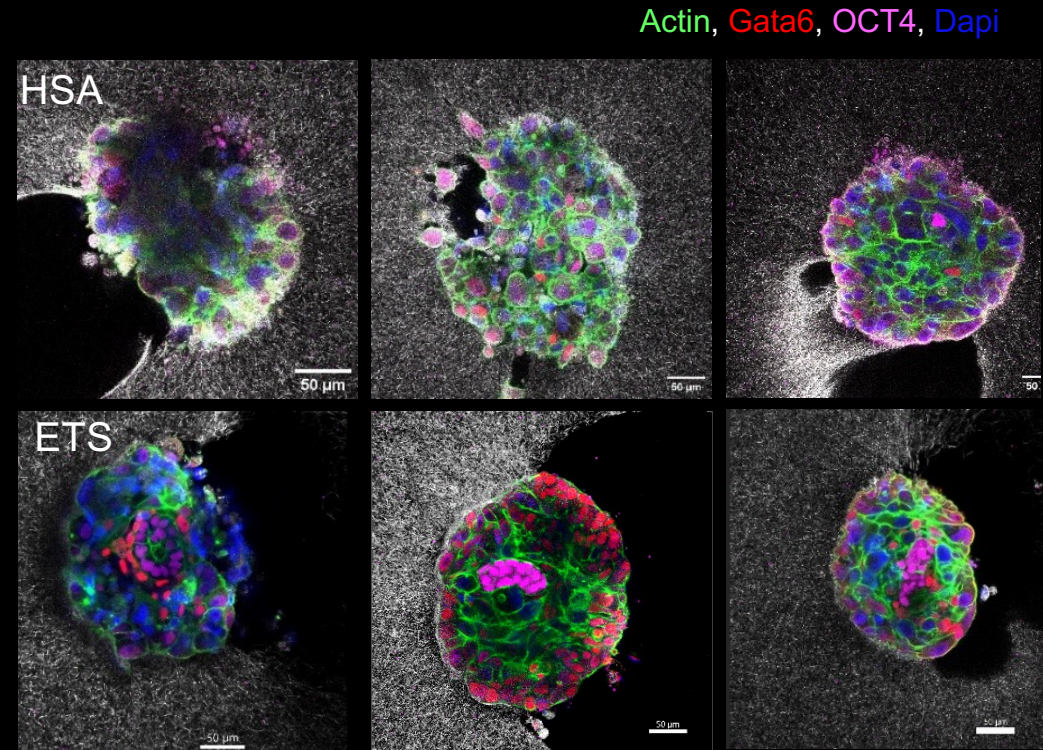
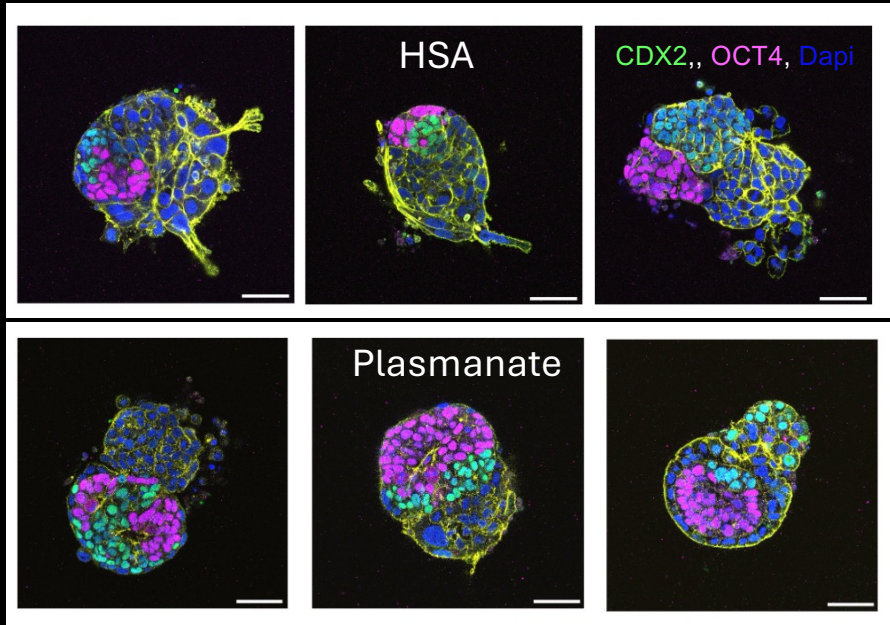
Mouse Embryos



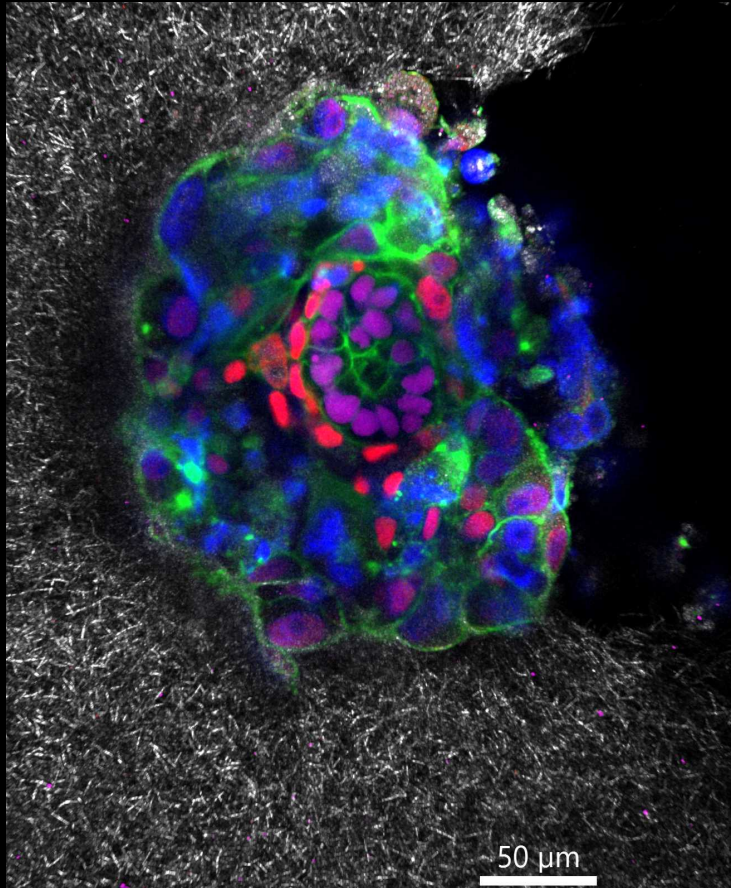
Human Embryos



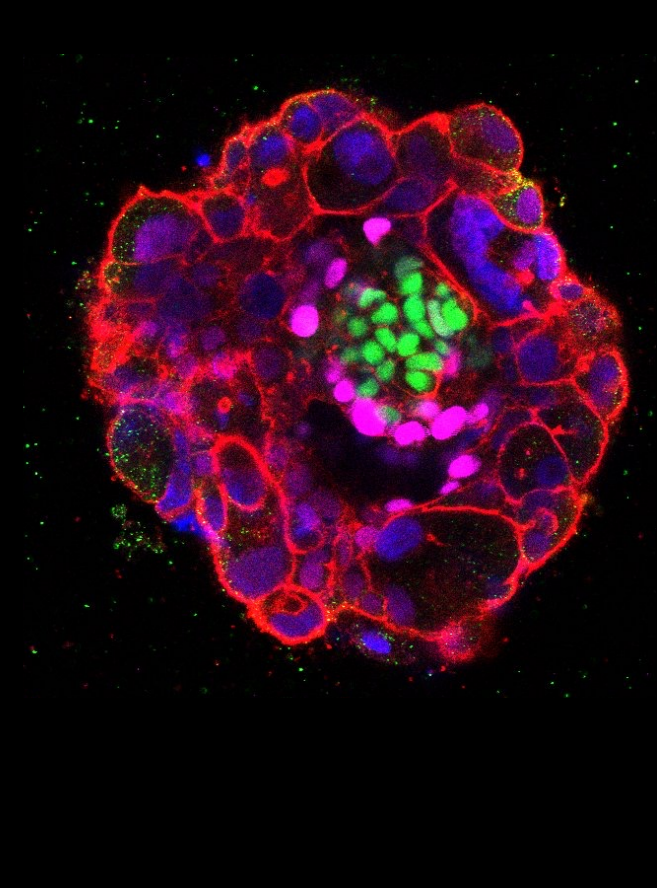
Globulins have a protective effect on the epiblast



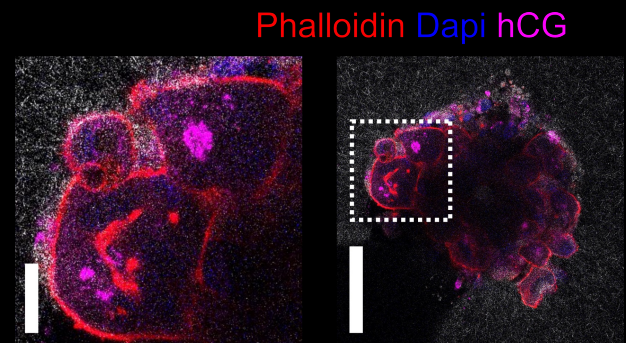
Physiological implantation using human plasma-derived serum



Actin, Gata6, OCT4, Dapi



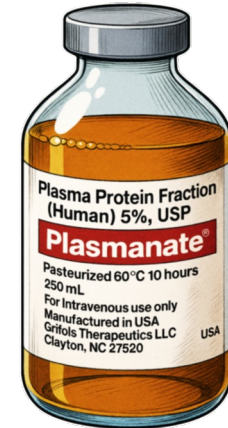
CDX2, tdTomato, OCT4, Dapi



IBEC/ Serabiotics a link between plasma fractionation and IVF



- GRIFOLS HIGH STANDARDS ON PLASMA PROTEIN PURIFICATION
- SERABIOTICS/IBEC RESEARCH CAPACITY TO TEST/DEVELOP NEW SUPPLEMENTS



EMA

EUROPEAN MEDICINES AGENCY



SERABIOTICS
PLASMA SOLUTIONS

20
YEARS **IBEC**[®]

Institute for Bioengineering of Catalonia

GRIFOLS

Thank you!

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Albert Parra
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Amélie Godeau
Marc Casals
Anna Ferrer-Vaquer
Miguel Ares
Denitza Denkova
Maria Demestre
Eduardo Sesma
Xavier Burgos
Ester Aroca
Ot Massafret
Julia Fabà
Laasya Dhandapani
Sasha Sadowy
Laura Parra

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LUMIRIS

Robert Forster
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Xavier Samso
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Elena Rebollo

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MicroFab
Sandra García
Teresa Galán
Judith Linacero

Esta presentación es parte del proyecto PDC2022-133587-I00, financiado por MCIN/AEI/10.13039/501100011033 y por la Unión Europea "NextGeneration EU"/PRTR



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