2023年8月9日

第1回
資料2

第1回「多能性幹細胞等からのヒト胚に類似した構造の作成等に関する検討」に係る作業部会

幹細胞由来初期胚様細胞の研究背景

阿久津英憲

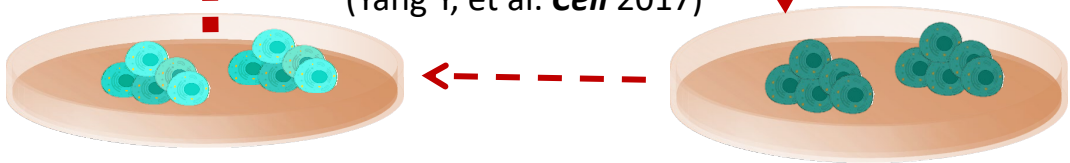
初期発生と分化多能性

マウス

疑似胚盤胞

(Yang J, et al. ***Nature*** 2017)

(Yang Y, et al. ***Cell*** 2017)



extended/expanded PS細胞
(EPSCs)
分化能高めた細胞

ES細胞

Sozen B, et al (2018) Nat Cell Biol, 20: 1229

マウスモデルでBlastoidの成功

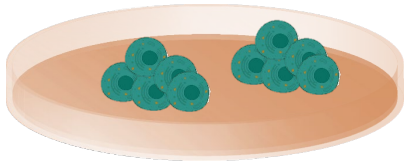
- Rivron NC, et al. ***Nature*** 2018

- Li R, et al. ***Cell stem cell*** 2019

- Sozen B, et al. ***Dev cell*** 2019

ES細胞
＋
TS細胞

マウス：幹細胞から作製する着床周辺期～初期胚発生モデル



ES細胞

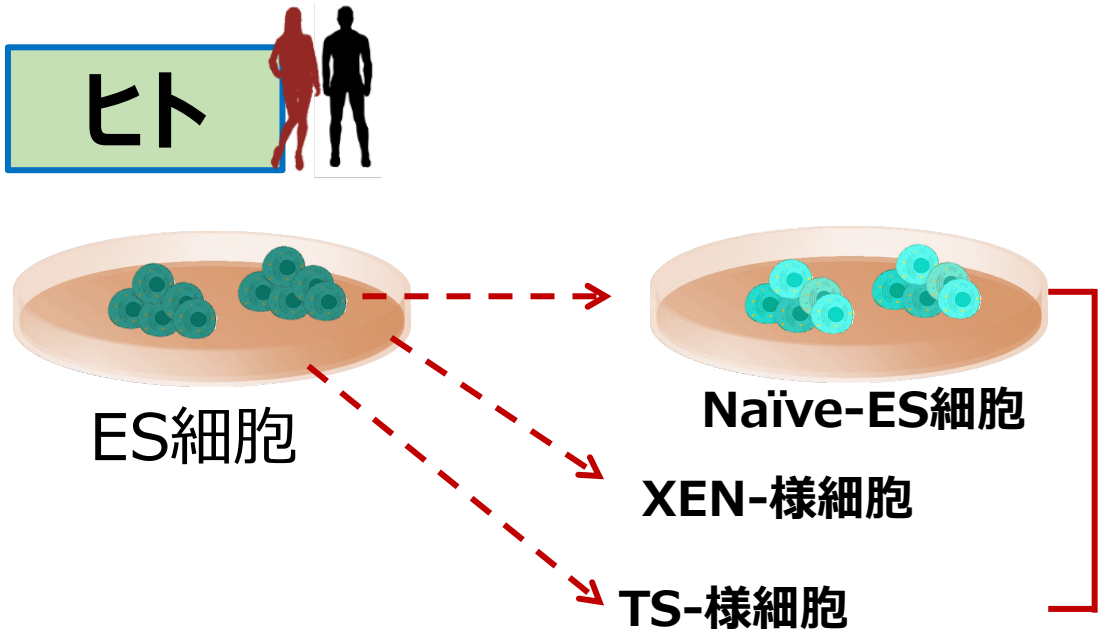
(Tarazi S, et al. ***Cell*** 2022)

Blastoid作製

(Amadei G, et al. ***Nature*** 2022)

E8.5相当の胚：神経溝, 非対称性･拍動する心臓, 腸

ヒト疑似胚盤胞（Blastoid）モデル報告



ヒトモデルでBlastoidの成功

Nature. 2021 Mar;591(7851):620-626. doi: 10.1038/s41586-021-03356-y. Epub 2021 Mar 17.

Blastocyst-like structures generated from human pluripotent stem cells

Leqian Yu [#1,2], Yulei Wei [#1,3,4], Jialei Duan [#5], Daniel A Schmitz [1,2], Masahiro Sakurai [1], Lei Wang [5], Kunhua Wang [6], Shuhua Zhao [7], Gary C Hon [8,9,10], Jun Wu [11,12]

Affiliations + expand

PMID: 33731924 DOI: 10.1038/s41586-021-03356-y

https://pubmed.ncbi.nlm.nih.gov/33731924/

Modelling human blastocysts by reprogramming fibroblasts into iBlastoids

Xiaodong Liu, Jia Ping Tan, Jan Schröder, Asma Aberkane, John F. Ouyang, Monika Mohenska, Sue Mei Lim, Yu B. Y. Sun, Joseph Chen, Guizhi Sun, Yichen Zhou, Daniel Poppe, Ryan Lister, Amander T. Clark, Owen J. L. Rackham, Jennifer Zenker & Jose M. Polo

Nature **591**, 627–632 (2021) | Cite this article

https://www.nature.com/articles/s41586-021-03372-y

引用：Nature

ヒト幹細胞–胚モデル研究の進展

Article | Open access | Published: 27 June 2023

Pluripotent stem cell-derived model of the post-implantation human embryo

Bailey A. T. Weatherbee, Carlos W. Gantner, Lisa K. Iwamoto-Stohl, Riza M. Daza, Nobuhiko Hamazaki, Jay Shendure & Magdalena Zernicka-Goetz

Nature **622**, 584–593 (2023) | Cite this article

https://www.nature.com/articles/s41586-023-06368-y

Dissecting peri-implantation development using cultured human embryos and embryo-like assembloids

Zongyong Ai, Baohua Niu, Yu Yin, Lifeng Xiang, Gaohui Shi, Kui Duan, Sile Wang, Yingjie Hu, Chi Zhang, Chengting Zhang, Lujuan Rong, Ruize Kong, Tingwei Chen, Yixin Guo, Wanlu Liu, Nan Li, Shumei Zhao, Xiaoqing Zhu, Xuancheng Mai, Yonggang Li, Ze Wu, Yi Zheng, Jianping Fu, Weizhi Ji & Tianqing Li

Cell Research **33**, 661–678 (2023) | Cite this article

4459 Accesses | **6** Citations | **17** Altmetric | Metrics

https://www.nature.com/articles/s41422-023-00846-8

Establishment of a novel non-integrated human pluripotent stem cell-based gastruloid model

Gege Yuan, Jiachen Wang, Zhaode Liu, Mengqi Chen, Pinmou Zhu, Hao Zhang, Zhibin Hu, Yiqiang Cui, Yan Yuan, Jiahao Sha

doi: https://doi.org/10.1101/2023.06.28.546720

https://www.biorxiv.org/content/10.1101/2023.06.28.546720v1.full

Self-patterning of human stem cells into post-implantation lineages

Monique Pedroza, Seher Ipek Gassaloglu, Nicolas Dias, Liangwen Zhong, Tien-Chi Jason Hou, Helene Kretzmer, Zachary D. Smith & Berna Sozen

Nature **622**, 574–583 (2023) | Cite this article

https://www.nature.com/articles/s41586-023-06354-4

Modelling Human Post-Implantation Development via Extra-Embryonic Niche Engineering

Joshua Hislop, Amir Alavi, Qi Song, Rayna Schoenberger, Kamyar Keshavarz F., Ryan LeGraw, Jeremy Velazquez, Tahere Mokhtari, Mohammad Nasser Taheri, Matthew Rytel, Susana M Chuva de Sousa Lopes, Simon Watkins, Donna Stolz, Samira Kiani, Berna Sozen, Ziv Bar-Joseph, Mo R. Ebrahimkhani

doi: https://doi.org/10.1101/2023.06.15.545118

This article is a preprint and has not been certified by peer review [what does this mean?].

https://www.biorxiv.org/content/10.1101/2023.06.15.545118v2.full

Transgene-Free Ex Utero Derivation of A Human Post-Implantation Embryo Model Solely from Genetically Unmodified Naïve PSCs

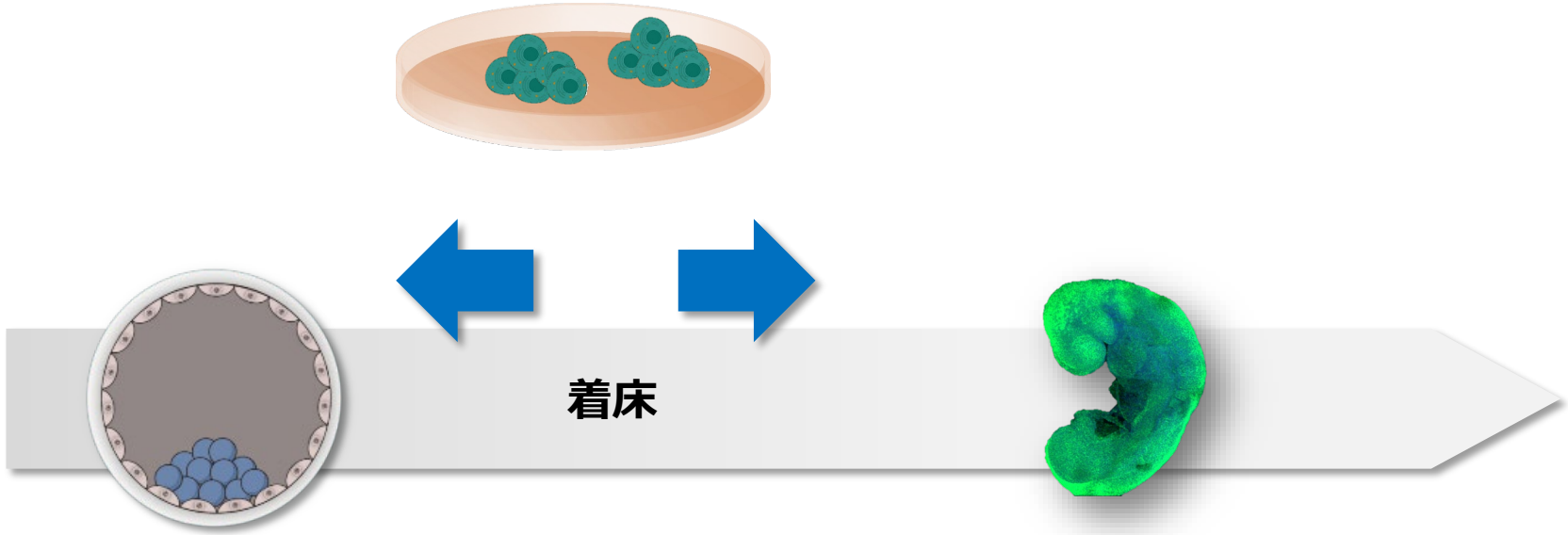
Bernardo Oldak, Emilie Wildschutz, Vladyslav Bondarenko, Alejandro Aguilera-Castrejon, Cheng Zhao, Shadi Tarazi, Mehmet-Yunus Comar, Shahd Ashouokhi, Dmitry Lokshtanov, Francesco Roncato, Sergey Viukov, Eitan Ariel, Max Rose, Nir Livnat, Tom Shani, Carine Joubran, Roni Cohen, Yoseph Addadi, Merav Kedmi, Hadas Keren-Shaul, Sophie Petropoulos, Fredrik Lanner, Noa Novershtern, Jacob H. Hanna

doi: https://doi.org/10.1101/2023.06.14.544922

https://www.biorxiv.org/content/10.1101/2023.06.14.544922v1.full

引用：Nature, Nature Cell Research,bioRxiv

幹細胞由来初期胚様細胞研究に個人的見立て



生体の胚盤胞に近いというデータ蓄積
個体作成を行わない研究ルール

D14ルールに
かかわる可能性

胚
- 「個体に成長する可能性のあるもの」→移植しないと判断できない。現実的に不可能な検証。

14日ルールと移植（生殖目的あるいは胚発生を検証目的）はしない、というルール。
何に依拠し審査するか。ES細胞以外の細胞使用する際、審査体制をどうするか。