

A brain organoid created from my cells? Perspectives of potential donors to brain organoid research

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Clinical potential and ethical challenge of brain organoids

- Multi-cellular, 3D structures derived from induced pluripotent stem cells (Di Lullo, 2017)
- Amenable to gene editing and drug treatment with potential to advance precision medicine
- Ethical issues identified (Hyun et al. 2020; Bredenoord, 2017; Farahany, 2018; Greely 2021) related to:
 - Regulatory review
 - Procurement of human biospecimens
 - Translational delivery
 - Animal research
 - Consciousness and moral status
- Gap addressed by this project:** What are preferences of people who may/have donated biospecimens for brain organoid research?

Methods

- Semi-structured interviews conducted with 24 individuals with MCI or AD risk:
 - Age range: 35 -75
 - 18 Female, 5 Male, 1 Non-binary
 - 1 Black/African American, 2 Hispanic/Latino
 - 15 with graduate degrees
- Provided brief description of brain organoids
- Queried feelings of connection/attachment to organoids, attitudes towards broad consent, stewardship, privacy, and results disclosure

Preliminary results from potential donors

No personal attachment

It's some cells in a dish has nothing to do with me. Fingernail clippings are good analogy for the brain organoid. I got my DNA in 'em you know.

I just think when you donate something, you're donating it, you're giving it away. And it's no longer yours, or you. You can feel some connection to it, but...you're really feeling a connection to an idea, not to a little lump of brain tissue

I mean, if when I donated blood, I said, you can use it for Purpose A and you decide to use it for Purpose Z...you would ethically be required to come back to me and say, this is what's going to happen. Unless I donate it, and say "do whatever you want with it" and then you would not have to contact me.

Broad consent, within limits

But if those organoids are alive for like 100 years, then maybe there should be a timeline...and at the point where you start getting close...that cell line needs to be discontinued and some other donor comes on, that's willing to take it to the next step.

Trust in researchers

I'd be comfortable with letting them decide. I wouldn't need updates, really. It'd be great if there were some but I wouldn't expect that. I mean yeah, I have a huge trust in medical research.

Not for profit

I'm making a donation for the community good when I give blood or spit or whatever. So some portion of that profit that I contributed to should benefit the community, just not a private company.

Personalization > privacy

I think the personalization is absolutely key. Because one of the big problems with a lot of brain treatments and things like that is that it isn't personalized...and not having it personalized has caused so much harm, you know, to people, especially neurodivergent people who do not fit into those boxes very well.

I'm ok with it. And partly because I'm an older, not important person. So my data is so over everywhere that I, I'm not really worried about being private

Interim conclusions

- Unlike prior work on intestinal organoids (Boers et al., 2018) participants did not anticipate feeling personally connected to brain organoids
- Most participants supported broad consent and researcher-led stewardship of organoids
- Higher value placed on potential for return of clinical results vs. privacy/anonymity

Future directions

- Semi-structured interviews with prior donors:
 - older adults with genetic risk for AD
 - parents of children with autism
 - parents of children with Joubert syndrome
- Expand to participants with diverse racial/ethnic, religious, and educational backgrounds

Long-term project goal:

Help ensure that the **creation, management, and clinical application** of donor-derived brain organoids can proceed in accordance with donor beliefs and values

References

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