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FIRST PERSON

First person – Sapna Chhabra

First Person is a series of interviews with the first authors of a selection of papers published in Biology Open, helping early-career researchers promote themselves alongside their papers. Sapna Chhabra is first author on 'BMP-treated human embryonic stem cells transcriptionally resemble amnion cells in the monkey embryo', published in BiO. Sapna is a postdoc in the lab of Alexander Aulehla at EMBL Heidelberg, Germany, investigating how organisms develop robustly in a variable environment.

What is your scientific background and the general focus of your lab?

I am a developmental biologist by training. Currently, I am studying the role of Wnt and Notch signalling on the robustness of somite formation in variable temperatures. The general focus of my current lab is understanding the role of signalling dynamics in somite formation. Somites are the progenitors of the vertebrae, ribs and parts of the skeletal muscles.

How would you explain the main findings of your paper to non-scientific family and friends?

Human embryonic stem cells (hESCs) hold immense potential for basic biology and regenerative medicine. But to harness their full potential, it is necessary to carefully determine the identity of cell types they form in the dish by comparing them to cells in the embryo. We show that hESCs treated with the chemical BMP4 for 2 days, form extra-embryonic amnion-like cells. This result is intriguing because hESCs are derived from the 'embryonic part' of the human embryo and so they were expected to form only embryonic cell types. But previous studies have shown that BMP4 treatment for ∼4 days leads to formation of extra-embryonic trophectoderm (placental) cells. Together with our results, this means that hESCs not only form an extra-embryonic cell type (placental) but also pass via a state that resembles another extra-embryonic cell type (amnion). It will be interesting to see if this happens in the embryo!

What are the potential implications of these results for your field of research?

I think the implications are twofold. Firstly, our results add to the growing evidence that hESCs can form extra-embryonic cell types, unlike mouse embryonic stem cells (mESCs). This raises a fundamental question of why hESCs can do so and why mESCs cannot. Specifically, it opens an exciting opportunity to study the fundamental properties of amnion, amnion to placental and maybe placental to amnion transition? Secondly, we show that the inclusion of pseudogenes leads to the misclassification of certain cell types, thereby highlighting the need to carefully examine gene lists used for cell type classification.

What has surprised you the most while conducting your research?

The role (or lack thereof) of pseudogenes! During analyses of one of the published datasets, we found that certain cells carry a disproportionally high number of pseudogenes and including these genes leads to a different cellular classification than excluding these. Given the absence of any functional role of pseudogenes in mammalian embryonic development, we thought it was better to exclude them. But maybe it's not? More experimental work is needed to clarify this.

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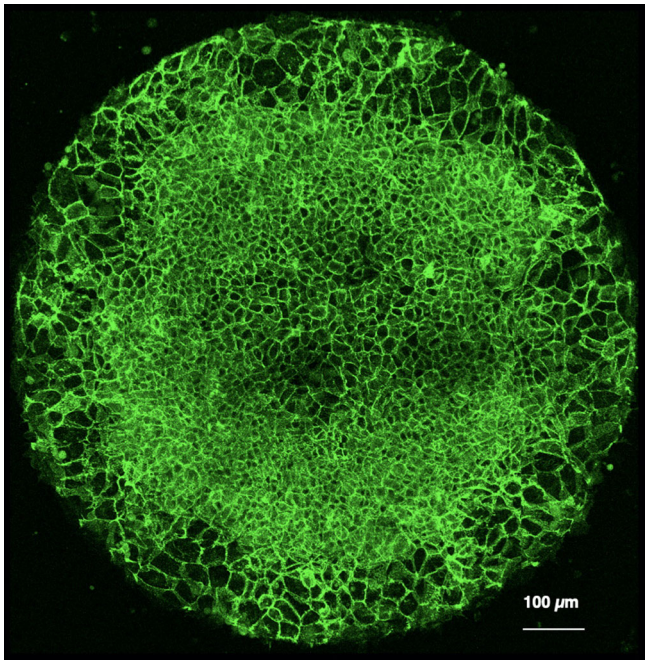

When the imaging finally worked (took about 2 years)! Wnt signalling in 2D human gastruloids (see Chhabra et al. 2019). Endogenous beta-catenin labelled with GFP (green label).

What, in your opinion, are some of the greatest achievements in your field and how has this influenced your research?

The ability to study early human development using either human embryos grown *ex vivo* or stem cell-based model systems have opened entire new avenues to examine our own development in a direct manner. My own PhD research was possible because of the invention of an hESC based gastruloid system by my advisor during his postdoc.

> **"My own PhD research was possible because of the invention of an hESC based gastruloid system by my advisor during his postdoc."**

What changes do you think could improve the professional lives of early-career scientists?

Having institutional mechanisms to assess and improve mental health of scientists. I have been very lucky to have supportive mentors and lab mates. But I have heard many horror stories of PIs putting a lot of work pressure on their trainees. Maybe they are themselves stressed but the power dynamics often works disproportionately against the trainee. Sadly, it is seldom acknowledged, let alone addressed.

What's next for you?

I have been doing a postdoc since November 2020. I have moved away from human developmental biology and I am now exploring the robustness of development using the Japanese rice fish (Medaka) as a model system.

What do you like doing outside of science?

I love reading history and poetry, hiking in the woods, and sitting by the sea.

Reference

Chhabra, S. and Warmflash, A. (2021). BMP-treated human embryonic stem cells transcriptionally resemble amnion cells in the monkey embryo. *Biol. Open* **10**, bio058617. doi:10.1242/bio.058617