The Obokata Downfall: The Misery of Misconduct

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Assignment Acknowledgement

This assignment has a Turnitin originality score of 21%. The assignment used Grammarly, a generative artificial intelligence, to ensure grammatical correctness of the assignment.

1. **What are the main findings of the prominent Nature article Obokata published?**

The primary conclusions of Obakata's published article surround the hypothesis that different environmental stimuli, specifically low pH triggers the reprogramming of somatic cells into stem cells (Obokata et al. 2014). The article coins the term STAP – "stimulus triggered acquisition of pluripotency" to refer to these novel cells (Obokata et al. 2014). To test low pH as a stimulus, postnatal spleen cells of 1-week old mice carrying Oct4-gfp transgene were subjected to this environmental condition (Obokata et al. 2014). The Oct4-gfp transgene is used to observe the regulation and expression of the Oct4 gene, which is an indicator of stem cell pluripotency (Obokata et al. 2014). Additionally, the study compared the spleen cells to embryonic stem cells to measure for true pluripotency. On day 7 of exposure to low pH conditions the spleen cells, specifically Oct4-gfp spheres expressed Oct4, a marker of pluripotency, like expression in embryonic stem cells (Obokata et al. 2014). Obokata further studied the fate of different somatic cells and subjected them to low pH conditions to examine whether these cells would express pluripotency (Obokata et al. 2014). The different somatic cells were derived from the brain, skin, lung, liver, muscle, fat and bone marrow. The results being of differing efficacies revealed that a low pH condition triggered expression of Oct4, an indicator of pluripotency (Obokata et al. 2014). The results of the study conclude that by exposing the somatic cells to strong environmental stimuli, specifically low pH, they can be converted to acquire pluripotency (Obokata et al. 2014).

2. **What was the promise of this work and why was it exciting?**

This work revealed novel mechanisms to convert somatic cells to acquire pluripotency. This reprogramming of somatic cells can be done by simple exposing these cells to a low pH environment. This easy mechanism promises to be efficient as there through the perspective of the article there is no additional need for external modifications or genetic alterations. Moreover, using low pH environments as a method to induce pluripotency in somatic cells presents as an efficient option. The primary reason for why this work was exciting is due to its implications in medicine. Using simple methods to induce pluripotency in somatic cells can lead to great feats in regenerative medicine. Moreover, the STAP methods can pioneer many therapies in personalized medicine. This work can bridge the gap between personalized and regenerative medicine. For example, if there is an injury that results in a permanent loss of a specific cell type, STAP can be used to replace these cells. A specific example can be heart disease, induced pluripotent stem cells (iPSCs) are being examined to understand potential implications of repair to damaged cardiac tissue in patients suffering from heart failure or myocardial infarctions. STAP could have proved to be a more effective method of acquiring pluripotency in comparison to iPSC, as iPSC requires transcription factors, whereas STAP does not (Ngai, Nograles, Alhaji, Abdullah, & Alhaji, 2020).

3. **What caused the downfall of the prominent paper published by Obokata?**

Upon publication, this research was accessible by scientists around the world, which resulted in high-level scrutiny of the presented images and facts. The saga of allegations began against Obokata, and it was announced that the paper had falsified and fabricated data (Rasko & Power, 2015). Moreover, it was also found that there were no STAP cells, in fact the reported STAP cells were embryonic stem cells (Rasko & Power, 2015). Following the allegations, Obokata came to light and apologized for many different aspects of the paper including mistakes in the methodology, however denied the allegations around misconduct with the data (Rasko & Power, 2015). Scientists began to recreate the study and could not produce the same results. Furthermore, when genetic sequencing confirmed that the STAP cells were embryonic stem cells, Obokata's paper lost all credibility (Rasko & Power, 2015). The downfall of

Obokata's prominent paper not only Obokata's fault, but also the fault of co-authors, the institution and the peer reviewers of Nature.

4. What are the negative costs associated with the downfall of this work?

The primary negative cost associated with the downfall of this work is Yoshiki Sasai, Obokata's supervisor, losing their life to suicide driven by depression with a primary factor being the backlash received from this paper (Rasko & Power, 2015). Additional costs associated with the downfall of this work include the loss of reputation, the lack of credibility in other papers funded by the institution and the loss of funding that this work required. The money provided can be from a private institute, like Riken, or from funded by the government or publicly through a university. Obokata received funding in both scenarios, from Riken, where she worked, and from her university where she completed her PhD. In both cases, there was unjust use of invaluable resources that results in a lack of trust in the institutions.

5. What is the perception of this case within the scientific community?

When Obokata released this article, it caught the attention of the scientific community due to the notable claims the paper held. Researchers of the same field and passions may have had much interest in reading such groundbreaking research with interdisciplinary potential. However, they quickly realized the gaps in the research. The scientific community today perceives this case as a lesson to learn from and uses it as a prime example when explaining misconducts in research to new science professionals. A specific instance is the use of this article in the IMS9505 class to explain the gravity of misconduct and its lasting impact.

6. What do you think make Obokata do it?

I believe that Obokata had some primary drivers leading to the publishing of the article. The primary reason being that she and her colleagues truly believed in the science behind their researcher. An example of this belief is in one of Sasai's suicide notes which stated, "be sure to reproduce Stap cells" (Rasko & Power, 2015). Moreover, Obokata had a lot of pressure as a young female scientist in a primarily male-dominated field. She could have felt the urge to create a reputation for other scientists to take her seriously. Another reason could be that Obokata could be too deep into the research to go back, work may have gone around about some groundbreaking research being produced and when she realized that the science was not there, she could see other scientists being submissive towards her. I can understand the pressure that Obokata may have felt that resulted in this article being published, however the path of misconduct she chose proved more detrimental to her career then taking the time to establish her name.

Work Cited

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