



Session on Life Sciences: Research on the Lunar Surface or in Transit to the Moon

Stem Cells, Organ Chip Systems and Cell Manufacturing on the Moon

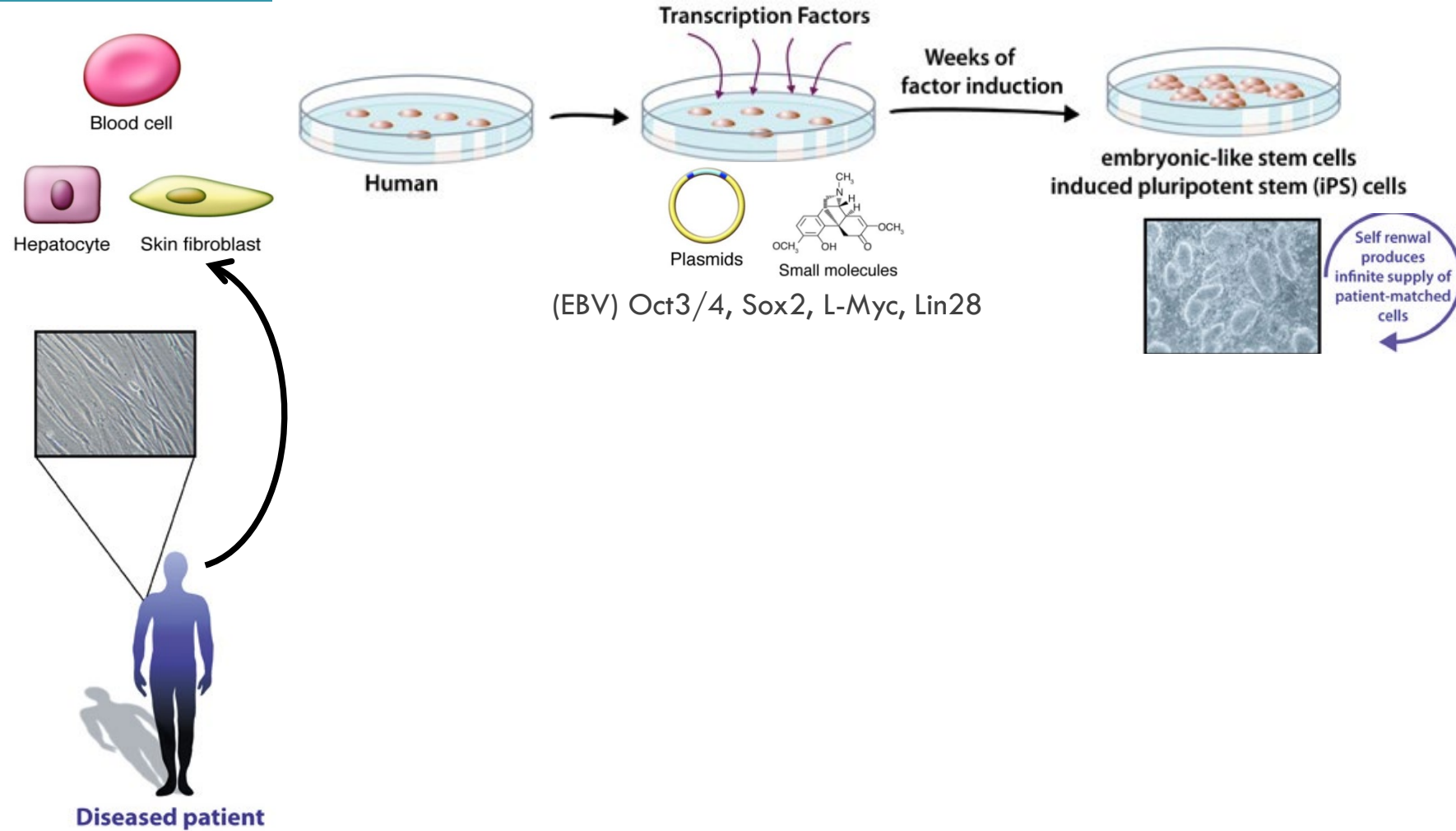
Outline

- Induced Pluripotent Stem Cells – a unique human resource
- Making the petri dish more like a human for space travel
- Scaling up and increasing stem cell production on the moon

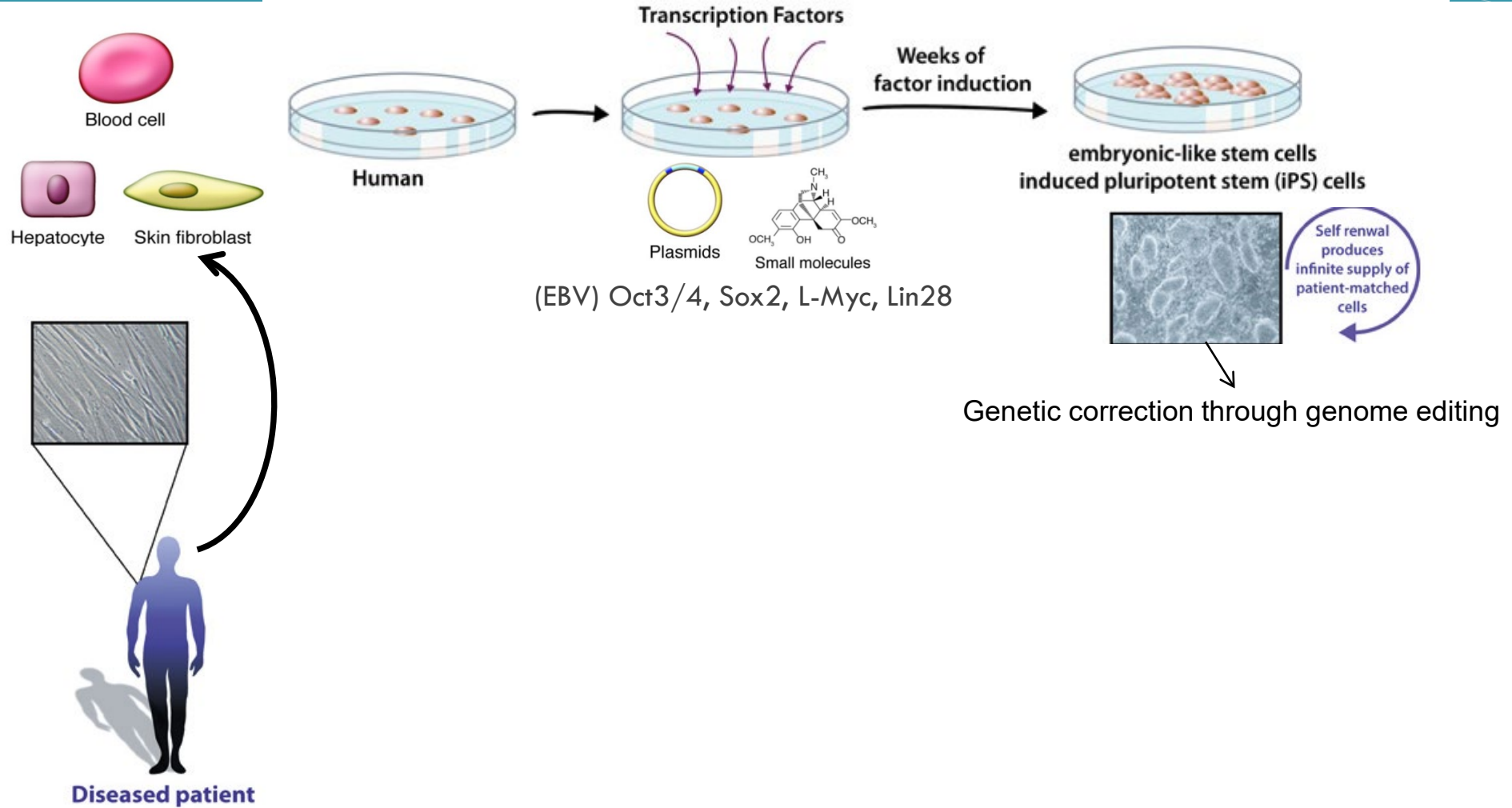
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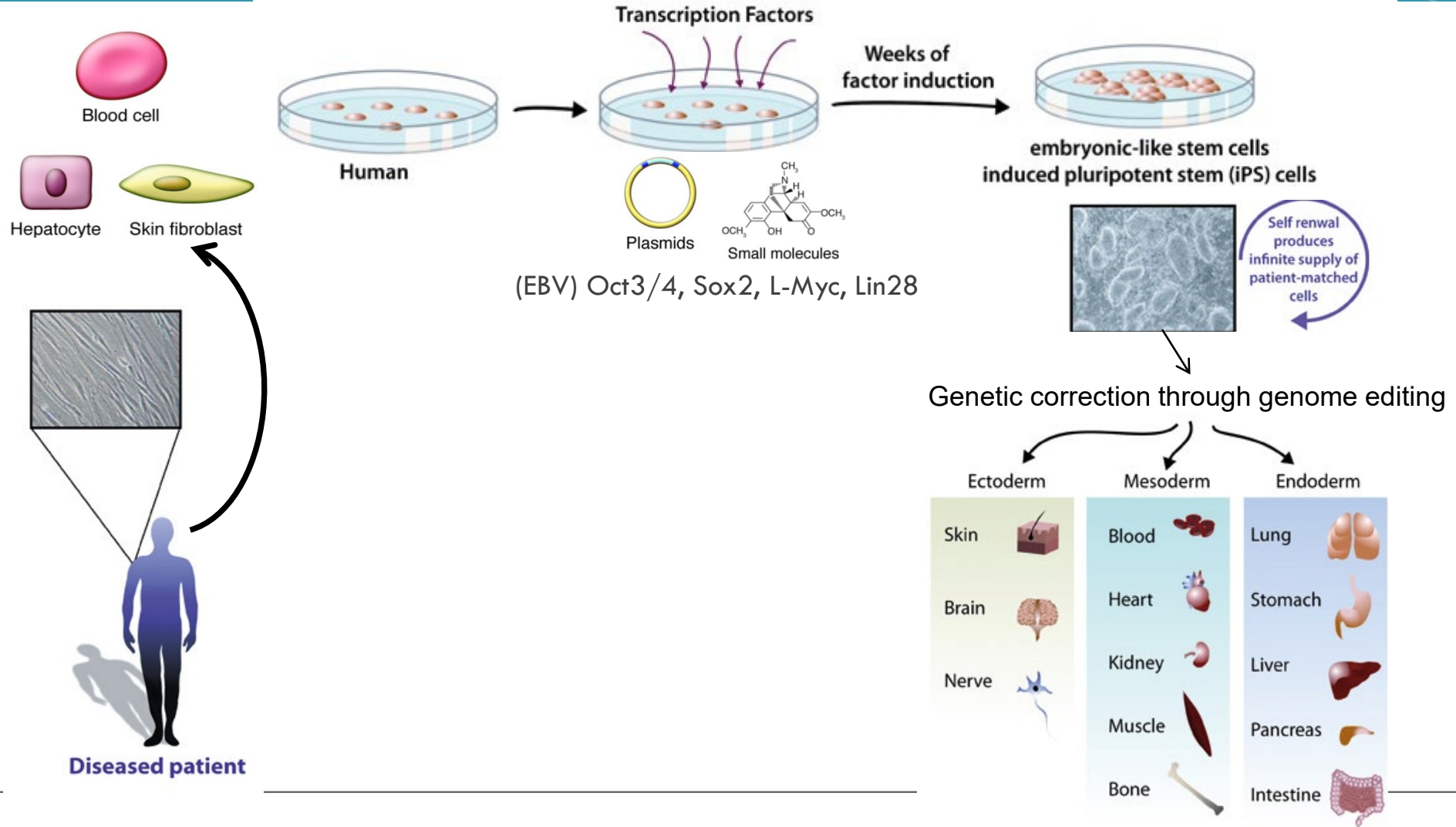
Induced Pluripotent Stem Cells



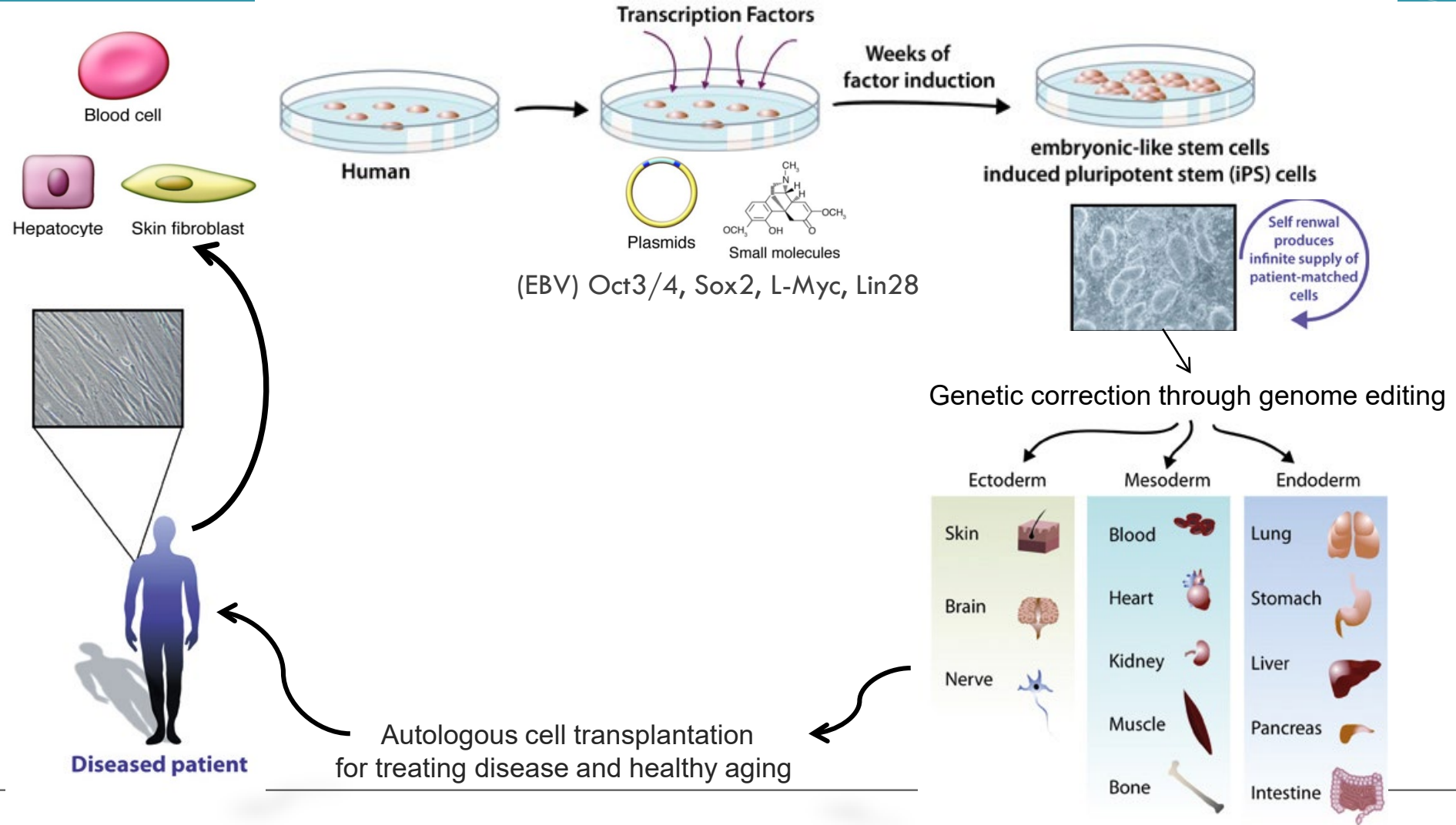
Induced Pluripotent Stem Cells



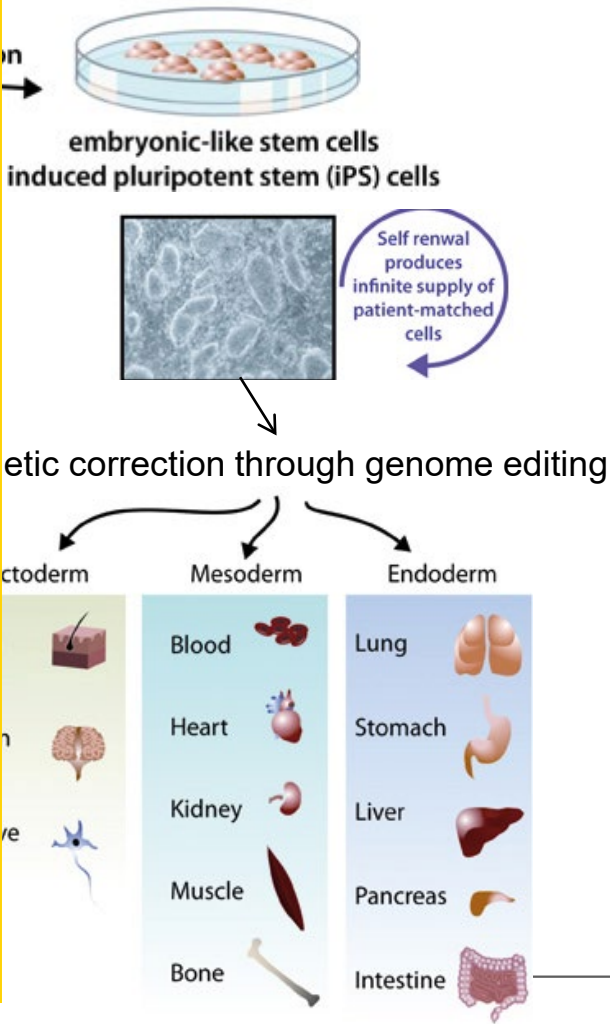
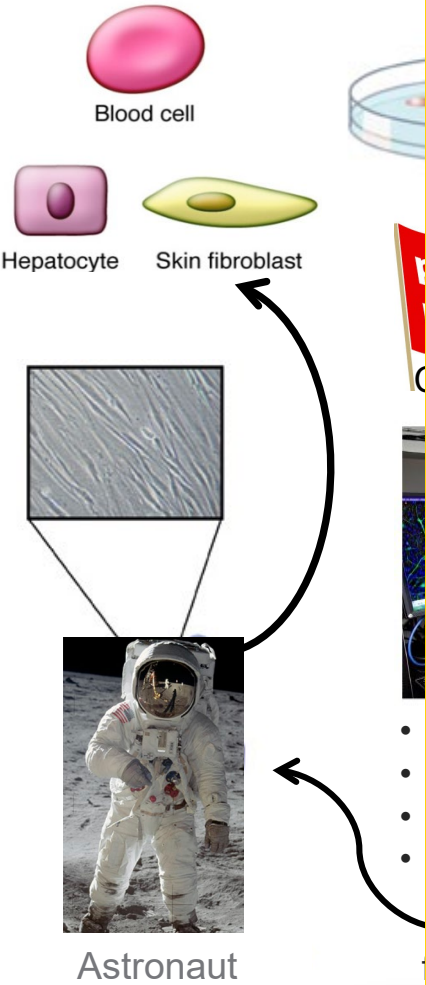
Induced Pluripotent Stem Cells



Induced Pluripotent Stem Cells



Induced Pluripot



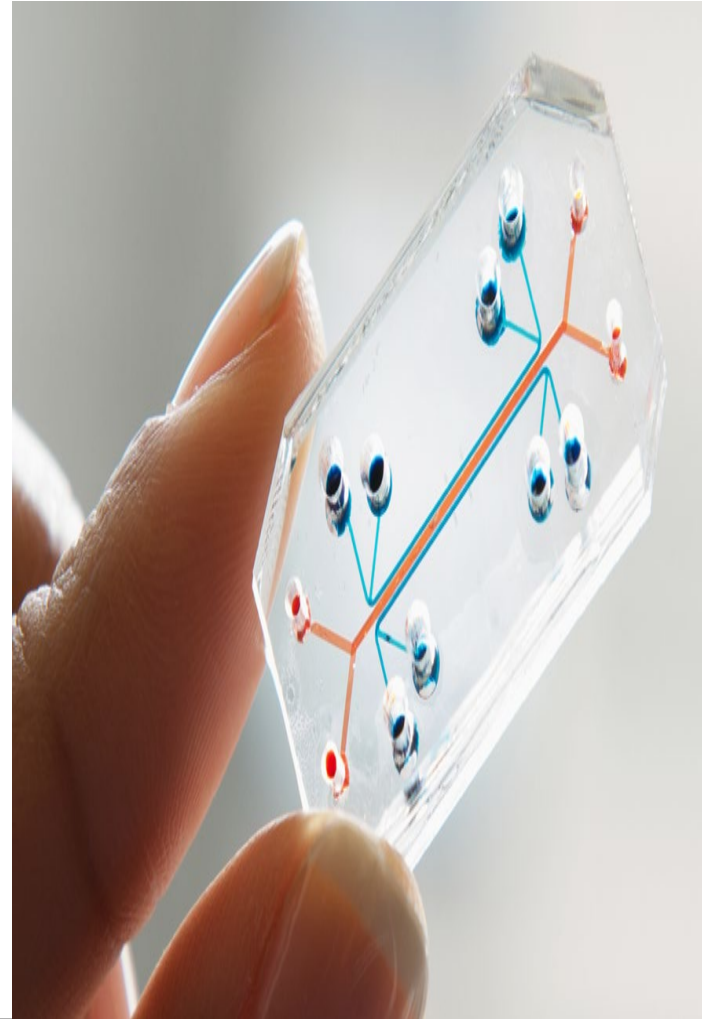
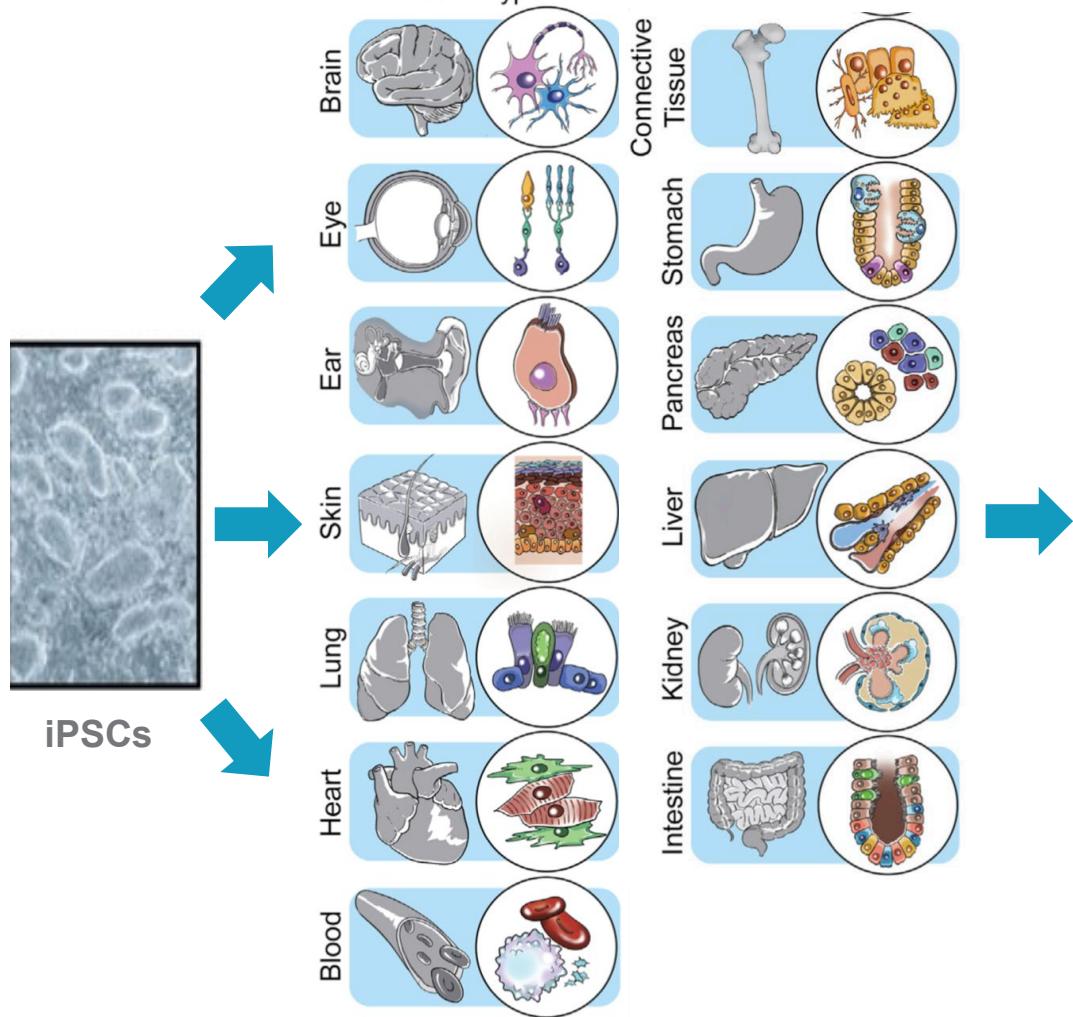
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Taking cells to the moon (and back)



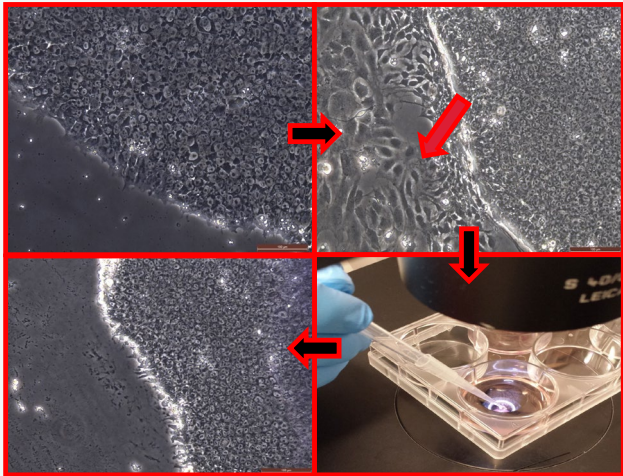
- Automate system for maintaining during flight
- Establish self sustaining system on the moon
- Use astronaut specific iPSCs as “avatar” for mission

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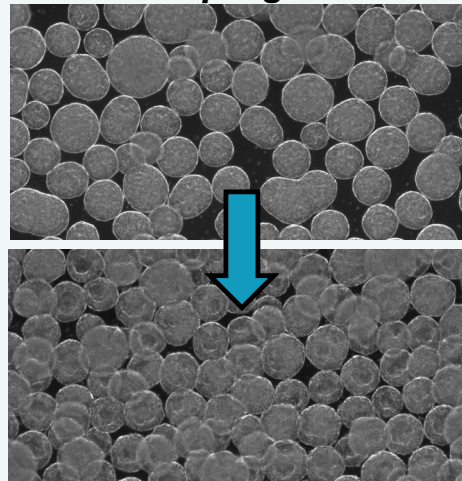
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Other benefits of LEO and the reduced gravity on the moon

2D iPSCs **Better Quality** **3D iPSCs and neural progenitors**



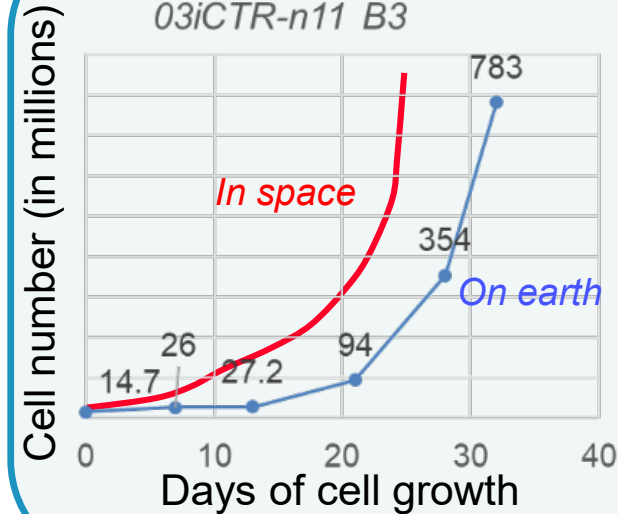
Less unwanted differentiation



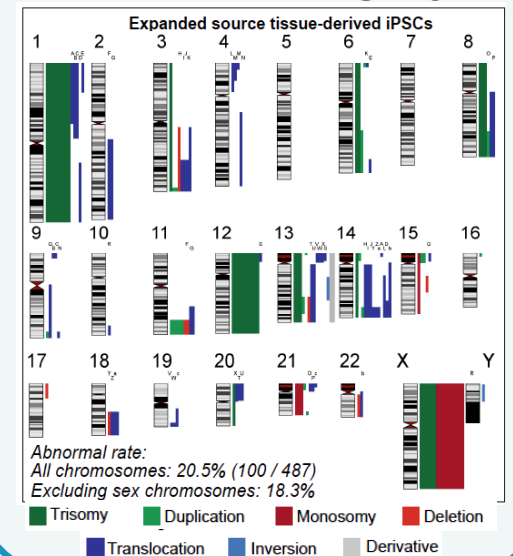
More uniform

Faster Scale-up

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Genetic integrity



Other benefits of LEO and the reduced gravity on the moon

Cleaner & automated cGMP environment



Conclusions

- Induced Pluripotent Stem Cells represent an important resource for understanding the effects of space flight and living on the moon on the human body
- Organ-Chip technology is allowing miniaturization, automation and increased physiological relevance
- A lab in orbit or on the moon could be manufacturing stem cells in low gravity and at scale for clinical trials on earth