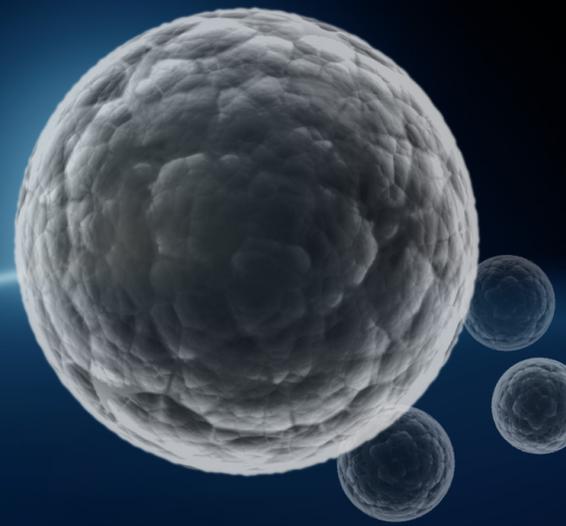


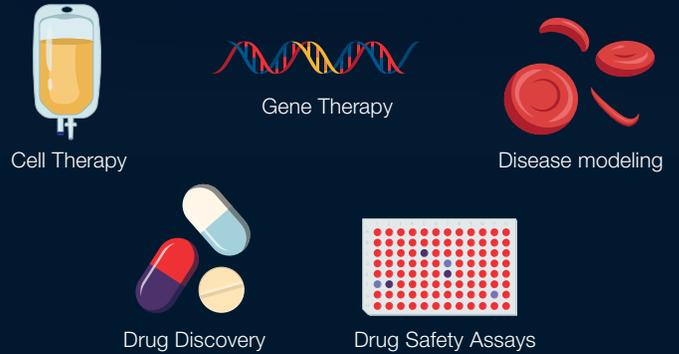
THE VALUE OF SCALING: PSC SUSPENSION CULTURES



Why is large-scale PSC culture important?

As research and therapeutic applications for pluripotent stem cells (PSCs) grow, so does the need to reliably and cost effectively generate large numbers of high quality cells. Current methods for expanding PSCs on adherent surfaces are laborious and expensive at high scale due to limited surface area for cells to grow and large volumes of cell culture media required. Growing PSCs in suspension allows for greater growth potential leading to lower cost per million cells and significant time saving.

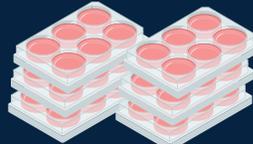
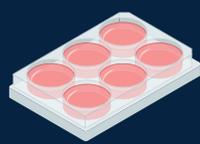
Suspension culture applications



Adherent Methods

Cost, space, and labor

Requires large volumes of cell culture media and multiple steps to produce workable cell numbers



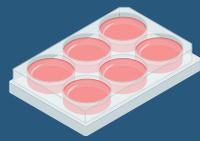
Scale-up involves the use of large quantities of dishes and plates, increasing plastics consumption

Variability between cell lines translates to increased routine care and media changes

Suspension Culture

Scale up without scaling-out

Allows researchers to scale-up from plates to culture vessels



Suspension culture is not restricted by surface area and therefore reduces the time needed to produce large quantities of cells

Reduces cost by requiring lower media volumes to achieve similar cell number

	Adherent Culture	Suspension Culture
Expansion capability	Restricted by confluency	Easily scalable, higher fold-expansion
Cost per million cells	\$\$-\$\$\$\$ (e.g. labor, footprint, media, plasticware)	\$-\$\$ (e.g. labor, footprint, media, plasticware)
Media and reagents	Growth medium, small molecules, extracellular matrix substrates or "ECM components"	Growth medium, small molecules
Culture vessel compatibility	Plates, flasks	Plates, shaker flasks, spinner flasks, bioreactors
Maintenance	Increased handling time leads to increased potential for contamination	Less daily handling, greater passaging schedule flexibility

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