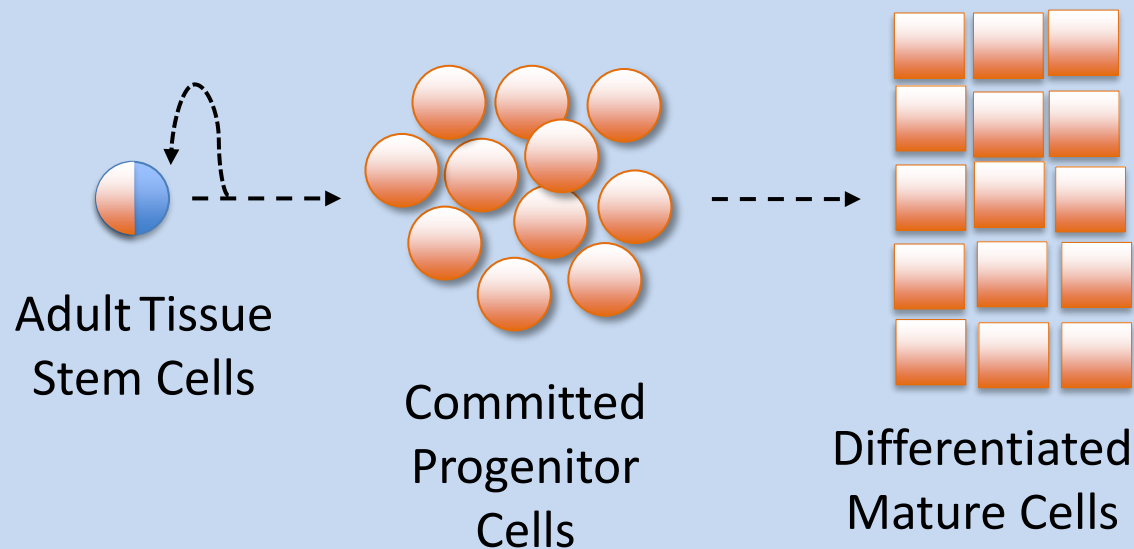


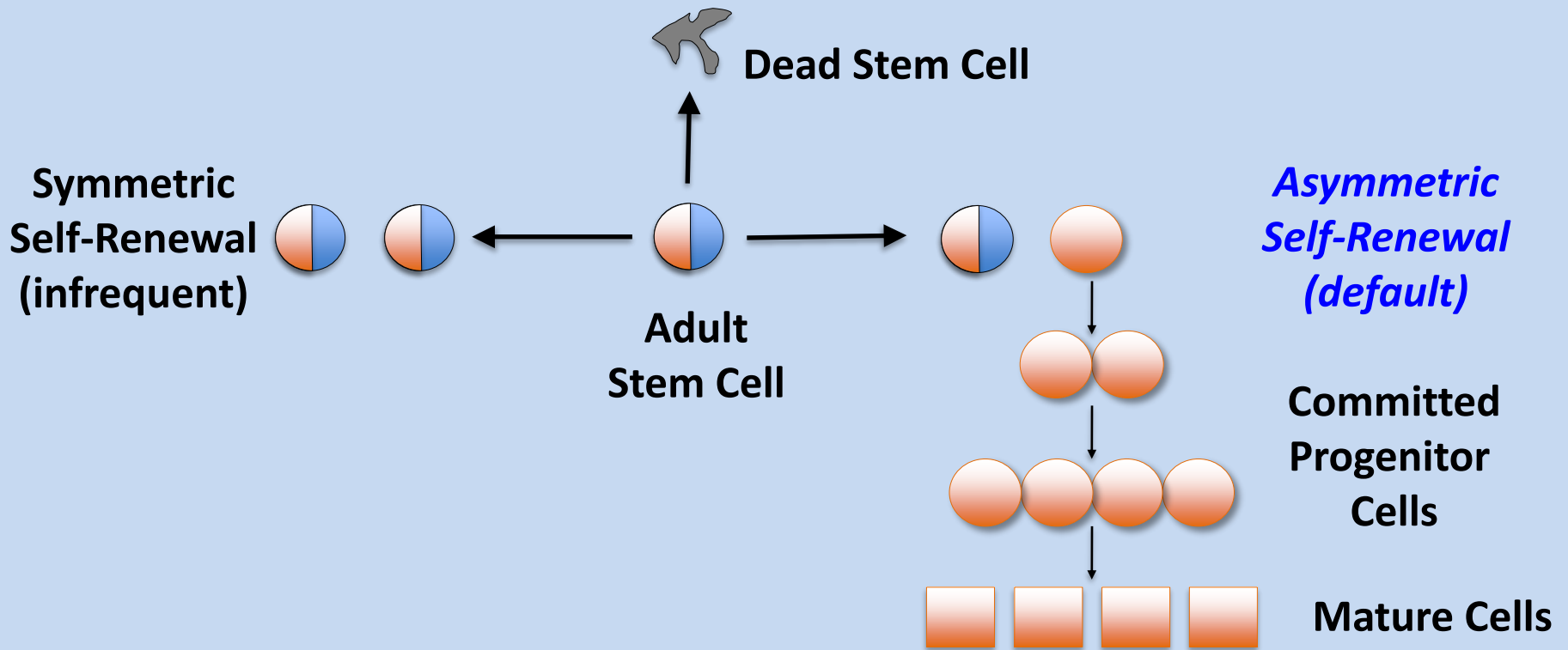
Kinetic Stem Cell Counting

*A new technology for
accurately counting therapeutic stem cells*





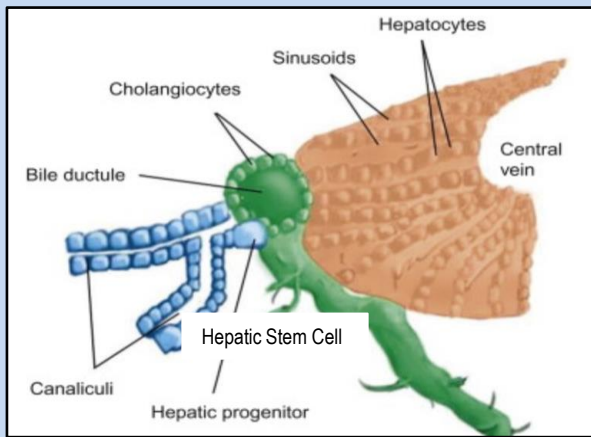
Adult stem cells (aka tissue stem cells) have the unique ability of **asymmetric self-renewal division**. This enables them to both maintain themselves and replace mature cells. No other cells in the human body have asymmetric renewal.





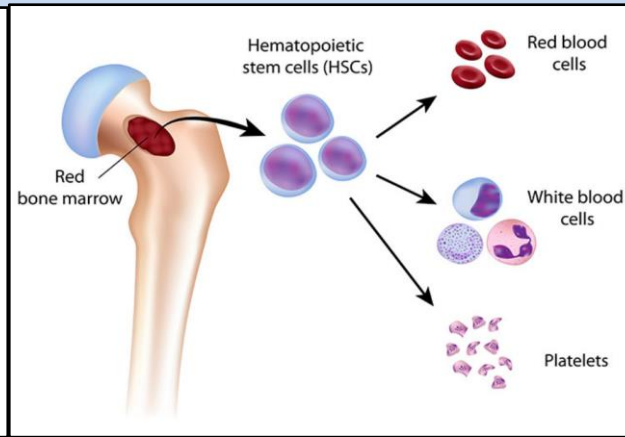
Adult stem cells are found in all the organs, tissues, and blood of adults, as well as in newborn babies, and in the blood and tissues of the afterbirth.

LIVER / HEPATIC organ-specific stem cells



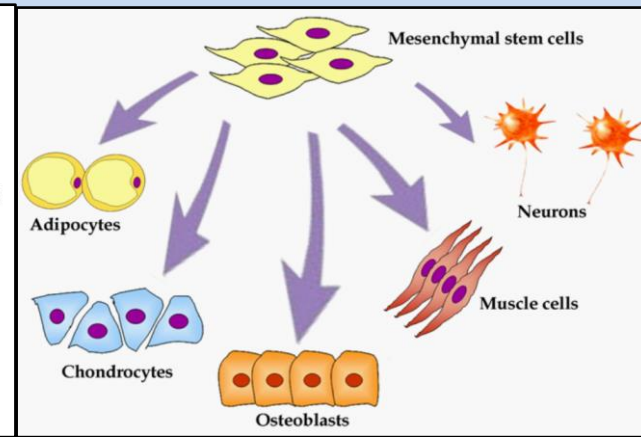
Donor Sources
specific organs and
tissues

HEMATOPOIETIC blood stem cells



Donor Sources
bone marrow, blood,
umbilical cord blood

MESENCHYMAL connective tissue stem cells



Donor Sources
bone marrow, fat,
umbilical cord tissue



After more than a half a century of medical therapies with adult stem cells, in both research and clinical studies, all doses have been uncertain because of an unmet fundamental need:

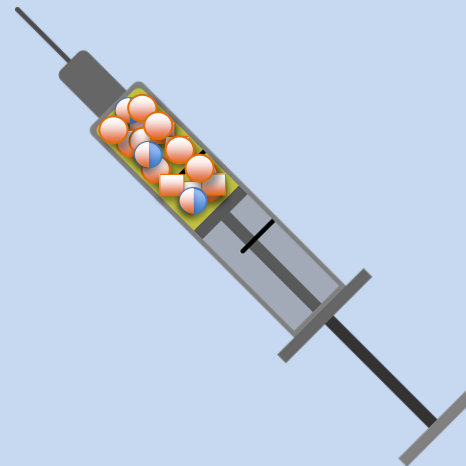
We did not have a technology to directly count stem cells!

All of the existing technologies in use to “count stem cells” (CD34⁺ counts, CFU, *etc.*) cannot discriminate between adult stem cells *versus* committed progenitor cells.

Drug Doses Are Known



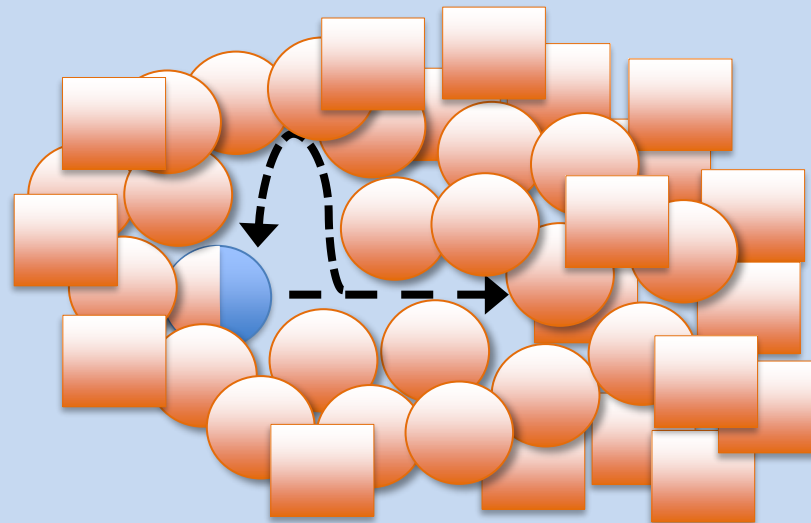
Stem Cell Doses Are Unknown!





Kinetic Stem Cell Counting from Asymmetrex finds the number of stem cells based on their asymmetric renewal during culture.

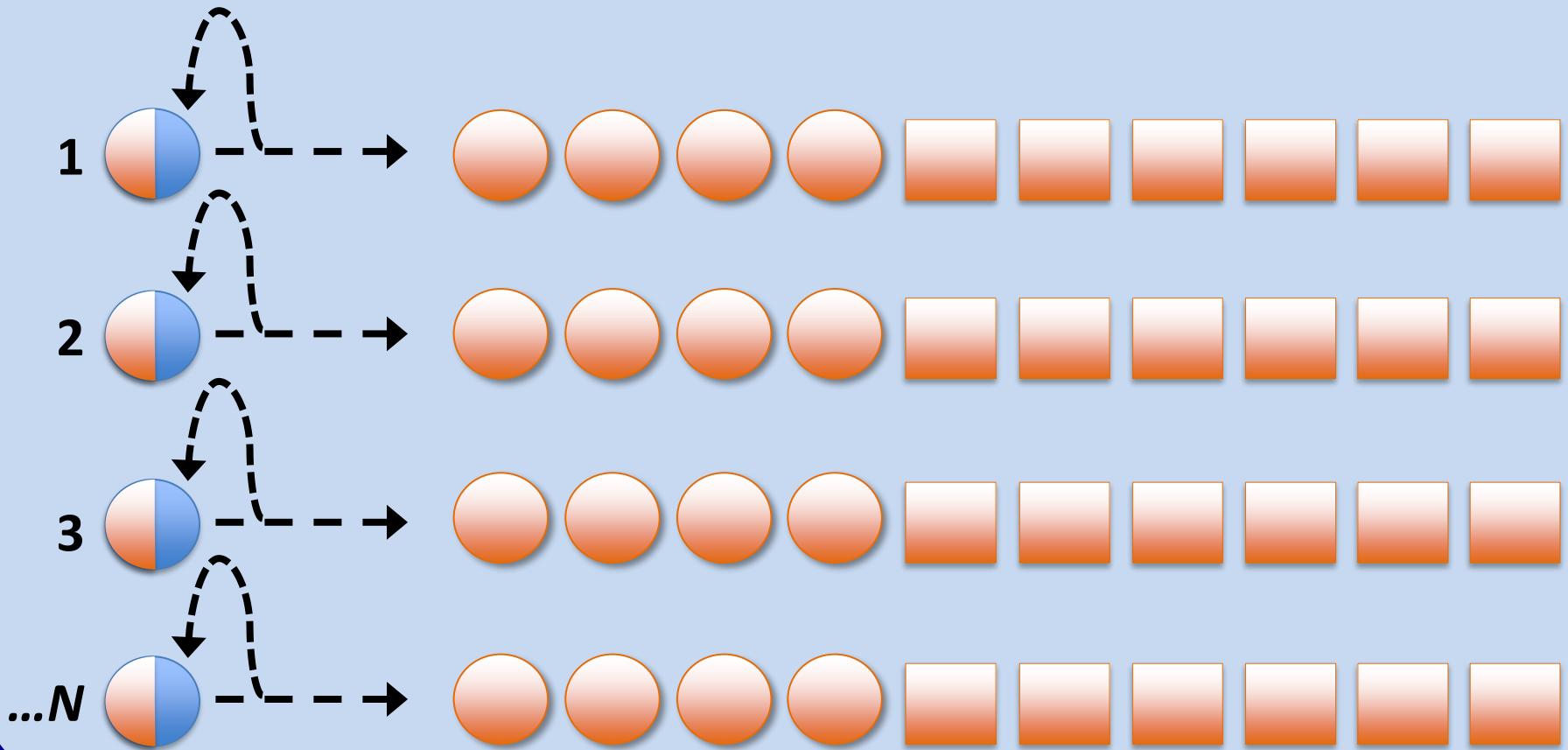
Although the committed progenitors look like stem cells, they don't act like stem cells. Over the course of a serial culture, the total cell population goes through repeated doublings, but the number of stem cells stays fixed.





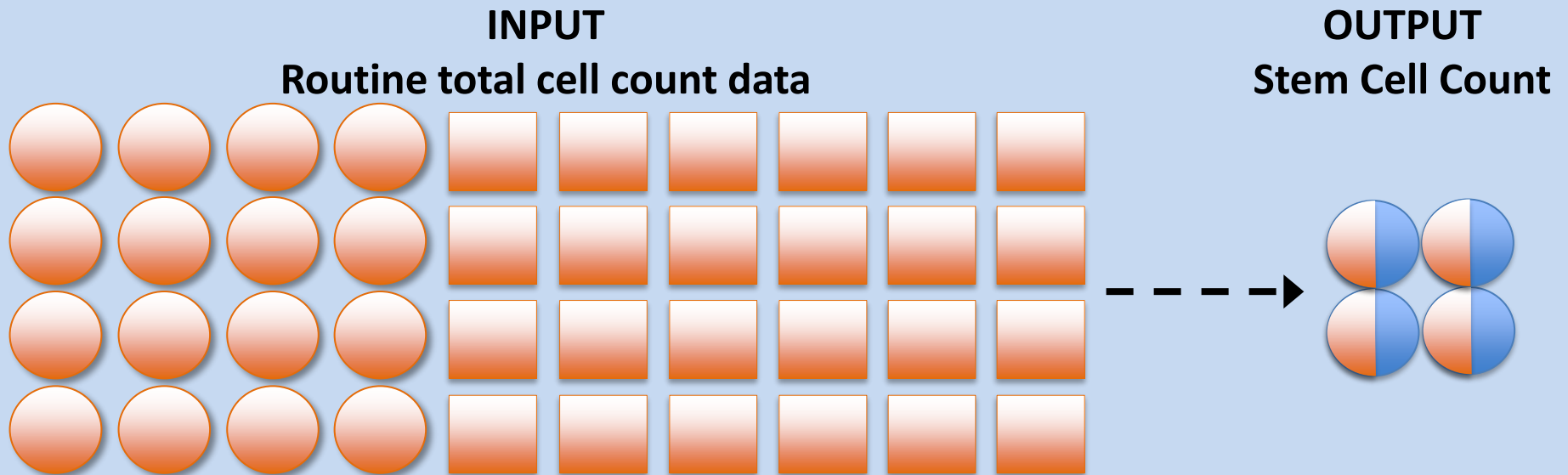
Kinetic Stem Cell Counting relies on

computational simulation to determine the number of stem cells present, based on how fast they produce other cells during serial culture. The calculation is based on the **kinetics** of asymmetric renewal. Thousands of simulations are run to converge to the solution of the number of responsible stem cells.





The **input** data for Kinetic Stem Cell Counting are **counts** of the total cells present, which can be determined in any cell research lab using conventional instruments. The **output** is the **number of adult stem cells** in the sample.

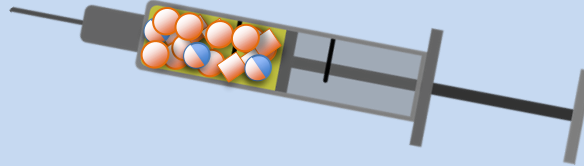


Once validated for a specified combination of cell types and culture conditions with Asymmetrex's "**TORTOISE Test**", then Asymmetrex's "**RABBIT Count**" technology provides a stem cell count after only **3 DAYS** of cell culture.



Benefits of Kinetic Stem Cell Counting

for both already approved stem cell therapies and new therapies under development.

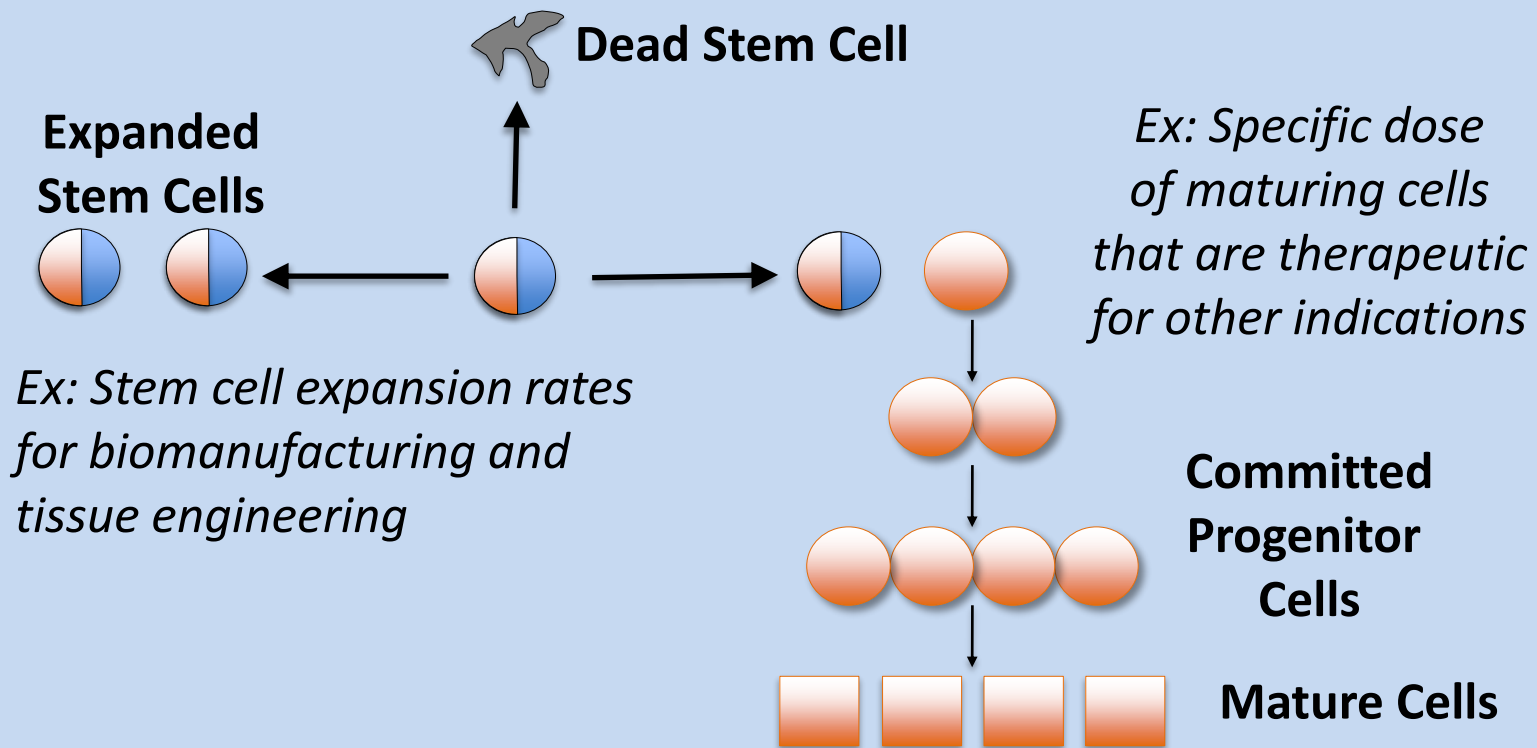


- **Hematopoietic Stem Cell Transplantation (HSCT) medicine**
 - Ensure dose is sufficient to guarantee engraftment
 - Enable multiple dosing with scarce donor samples
- **Cell & Gene Therapy (CGT) clinical trials**
 - Optimize dosage of biomanufactured therapies (*e.g.*, MSCs)
 - Ensure sufficient dosage of gene-engineered stem cells
- **Regenerative Medicine and Drug Development**
 - Distinguish dose variability from patient-response variability
 - Measure effects of cryopreservation and thawing on stem cells
 - Drug evaluations for stem cell effects – positive or negative



In addition to the number (or dose) of stem cells, the Asymmetrex **“TORTOISE Test”** kinetic stem cell counting software platform provides other parameters of the serial culture that were previously unknown.

Ex: Specific viability of stem cells under varied conditions









Kinetic Stem Cell (KSC) counting from Asymmetrex was first published In 2020:

Open Access

Research Article


A Computational Simulation Technology for Specific Counting of Perinatal and Postnatal Human Tissue Stem Cells for Transplantation Medicine

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Asymmetrex holds **issued patents** for KSC counting in the U.S. and the U.K., and the technology has now been **validated** for quantifying the dosage of **many different tissue stem cells** including:

- Liver hepatic stem cells
- Lung interstitial stem cells
- Corneal stem cells
- Bone marrow hematopoietic stem cells
- Mobilized peripheral blood hematopoietic stem cells
- Umbilical cord blood hematopoietic stem cells
- Umbilical cord tissue mesenchymal stem cells
- Bone marrow-derived mesenchymal stem cells
- Adipose-derived mesenchymal stem cells
- Oral-derived mesenchymal stem cells (bone, gingival, dental pulp)
- Amniotic membrane stem cells



How to access Kinetic Stem Cell (KSC) Counting:

- Currently, Asymmetrex offers KSC counting as a contract service.
- Later this year, Asymmetrex plans to make KSC counting available on-line as a software service. Users will be able to enter their cell count data and instantaneously obtain adult stem cell counts.
- Asymmetrex's long term vision is developing partnerships with manufacturers of automated electronic cell counters to produce the first **automated *stem* cell counters** for research, medicine, and drug discovery.
- Contact: James L. Sherley, M.D., Ph.D., CEO, Asymmetrex LLC
jsherley@asymmetrex.com
1-617-990-6819

For more information



<https://asymmetrex.com/>

Blog: *A stem cell count would have made it better*

<https://asymmetrex.com/a-stem-cell-count-would-have-made-it-better/>

Podcast Series: *Counting Stem Cells For A New Era of Medicine*

<https://asymmetrex.com/podcast-series/>