

Current driving factors in stem cell-based regenerative medicine

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Director

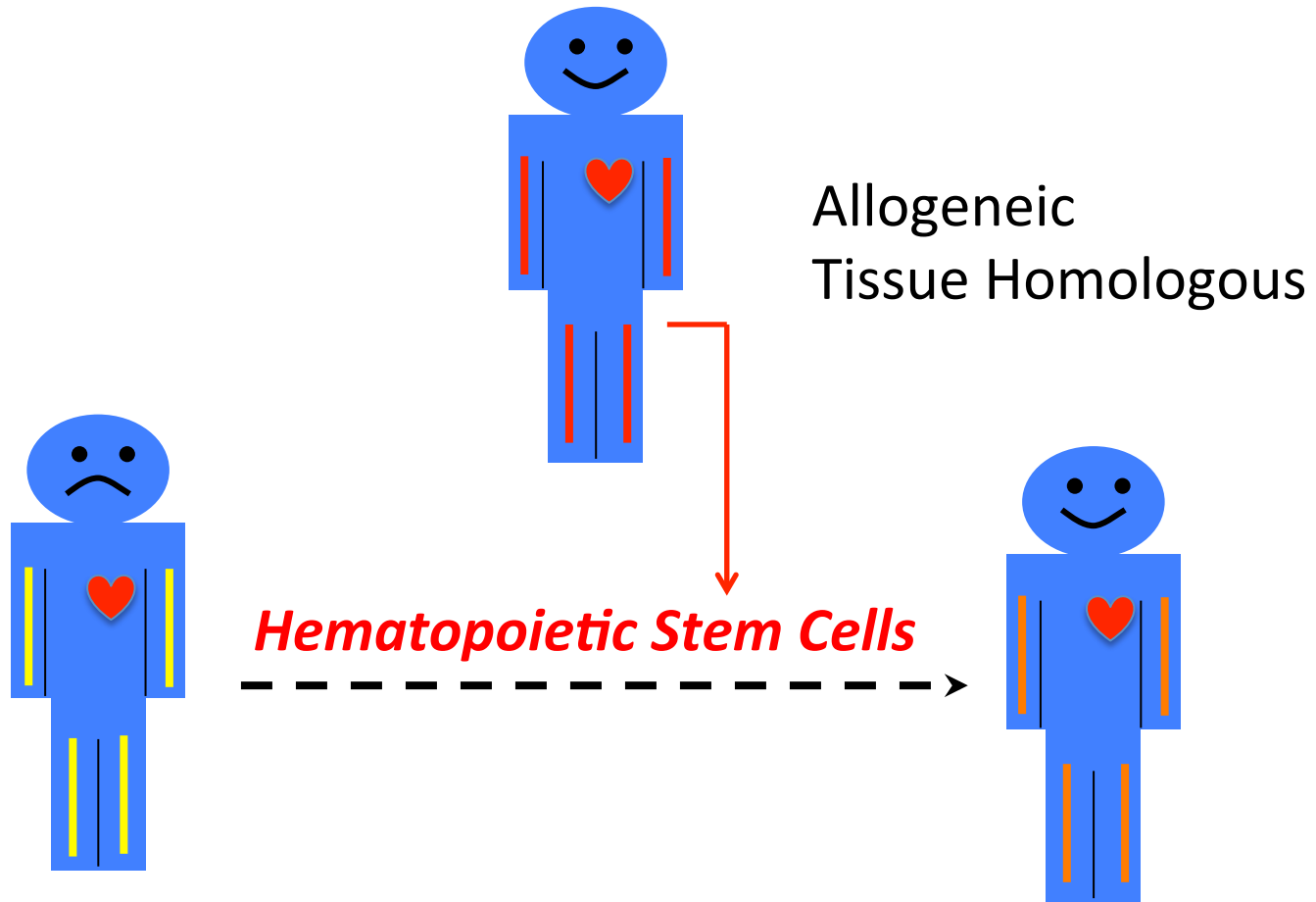
Asymmetrex, LLC

Boston, Massachusetts

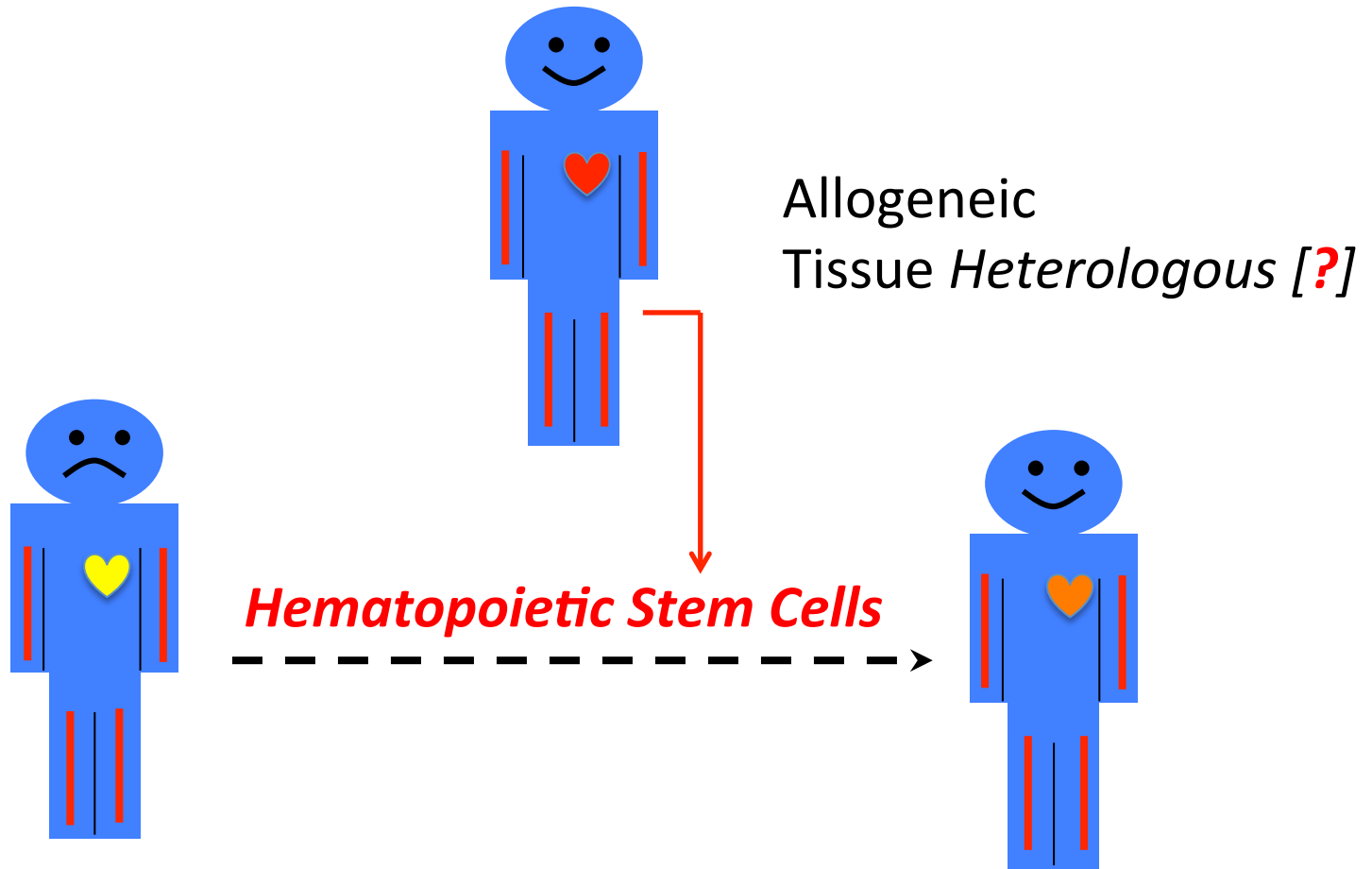
<http://asymmetrex.com>

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“stem cell-based regenerative medicine”



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Autologous
Tissue *Heterologous* [?]

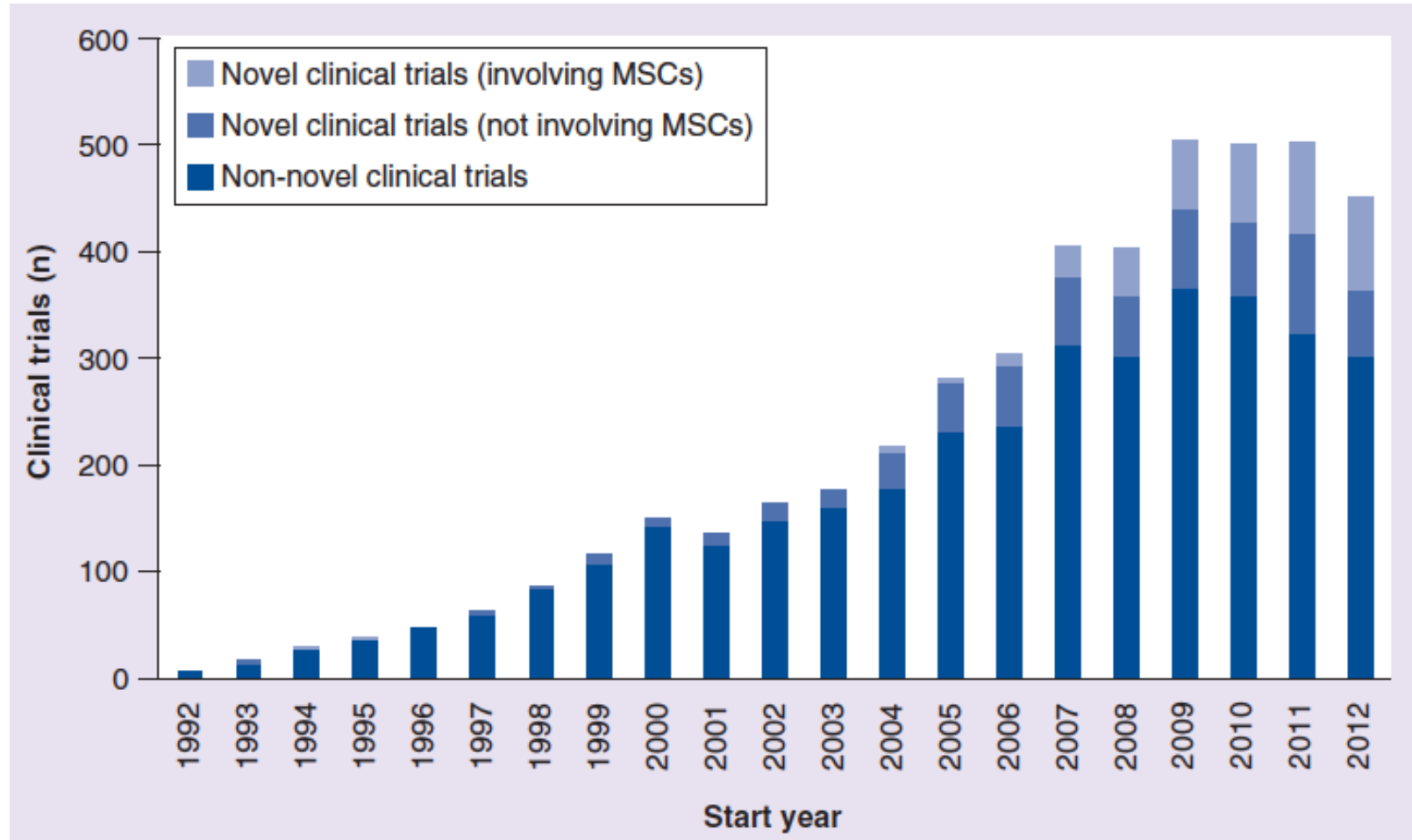


The Emerging Global Landscape of Stem Cell Clinical Trials

Mathew D. Li, Harold Atkins, and Tania Bubela (2014)
Regen. Med. 9 (1), 27-39

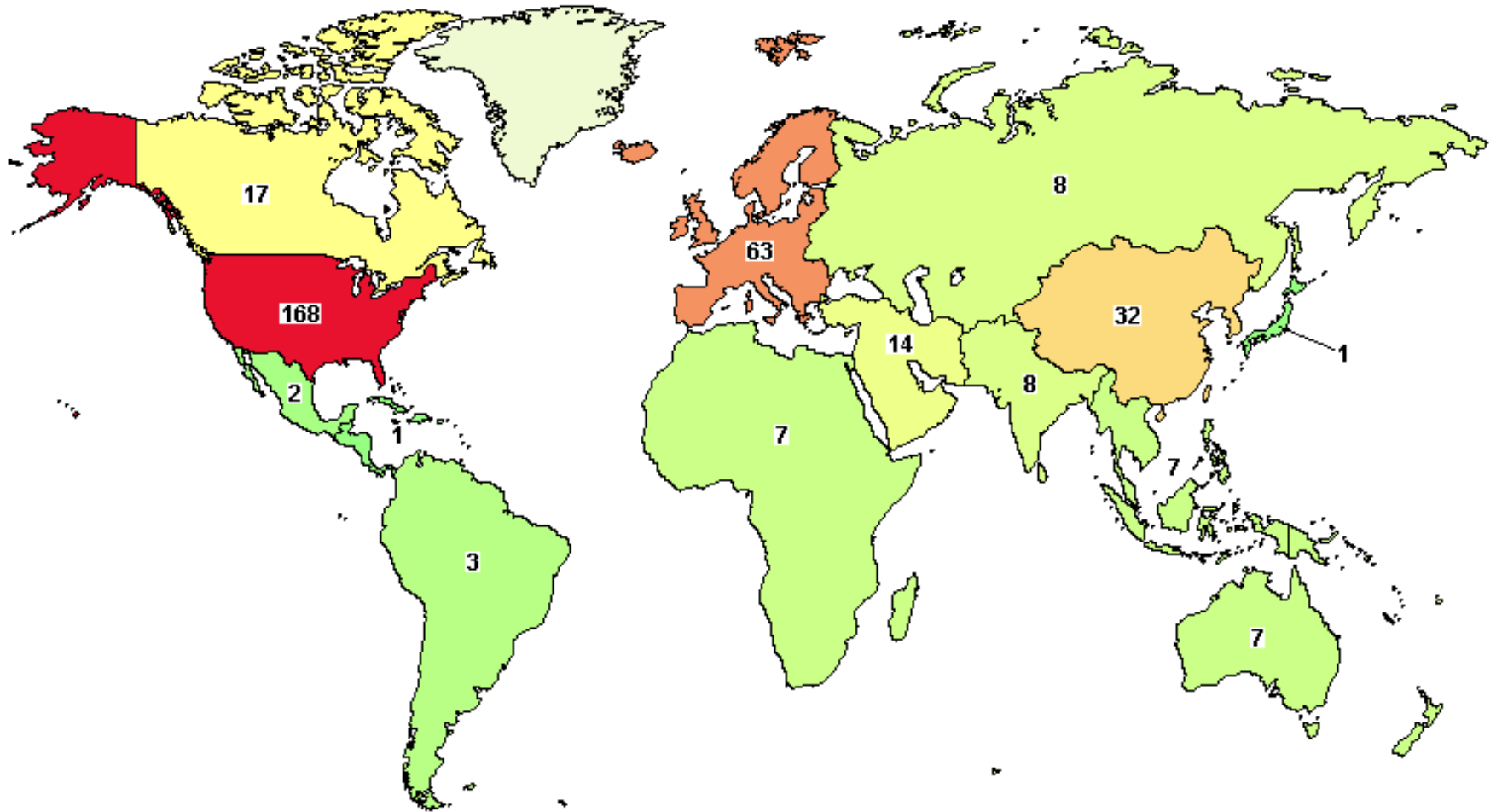
1992-2013 – data set of 4749 stem cell clinical trials
– defined 1058 as novel with therapeutic goal

Total Emerging Global Stem Cell Clinical Trials



Emerging Global Stem Cell Clinical Trials

Global Distribution of 300 New “Stem Cell Transplant” Trials in 2014



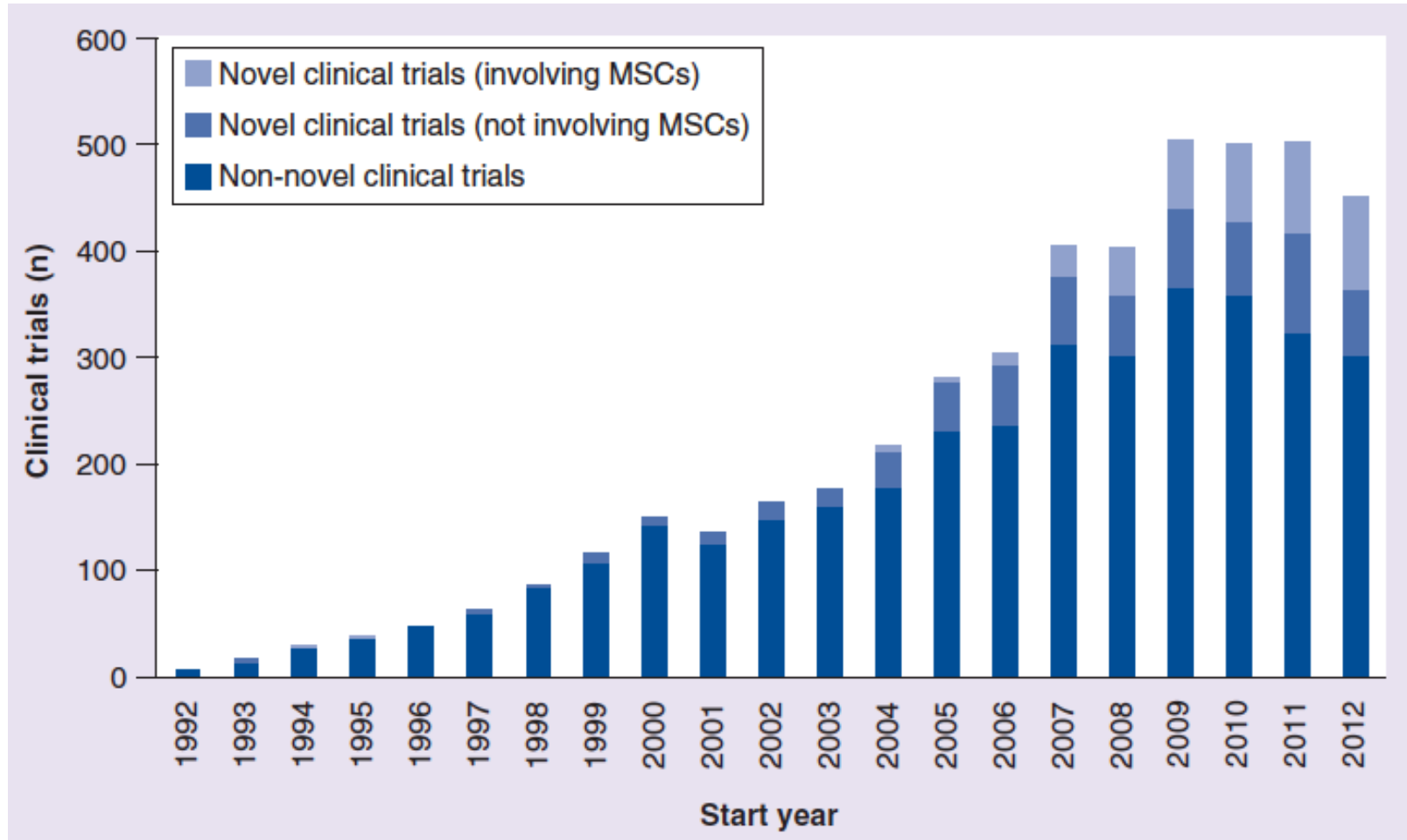
Colors indicate number of studies with locations in that region

Least  Most

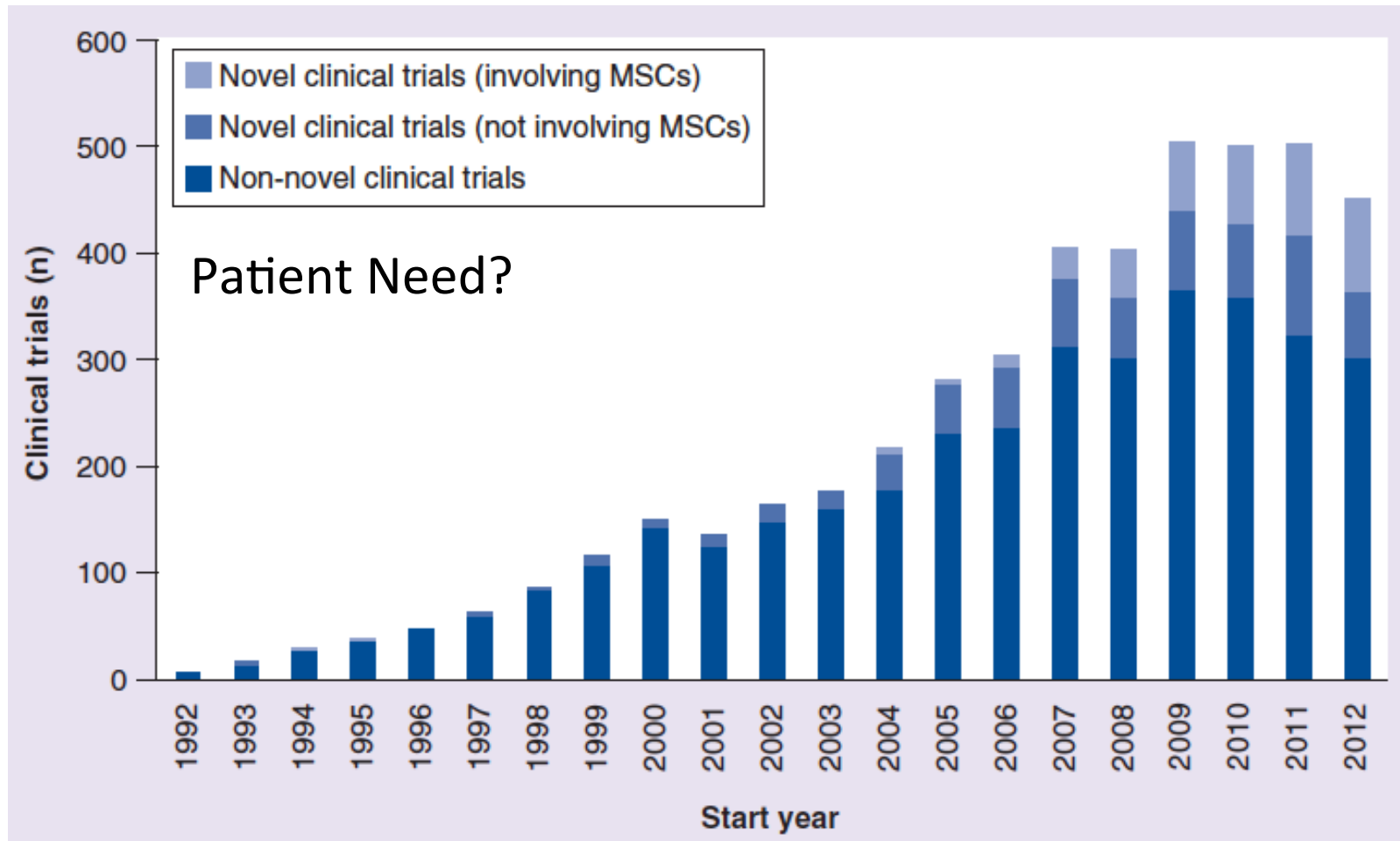
Labels give exact study count

<http://ClinicalTrials.gov>

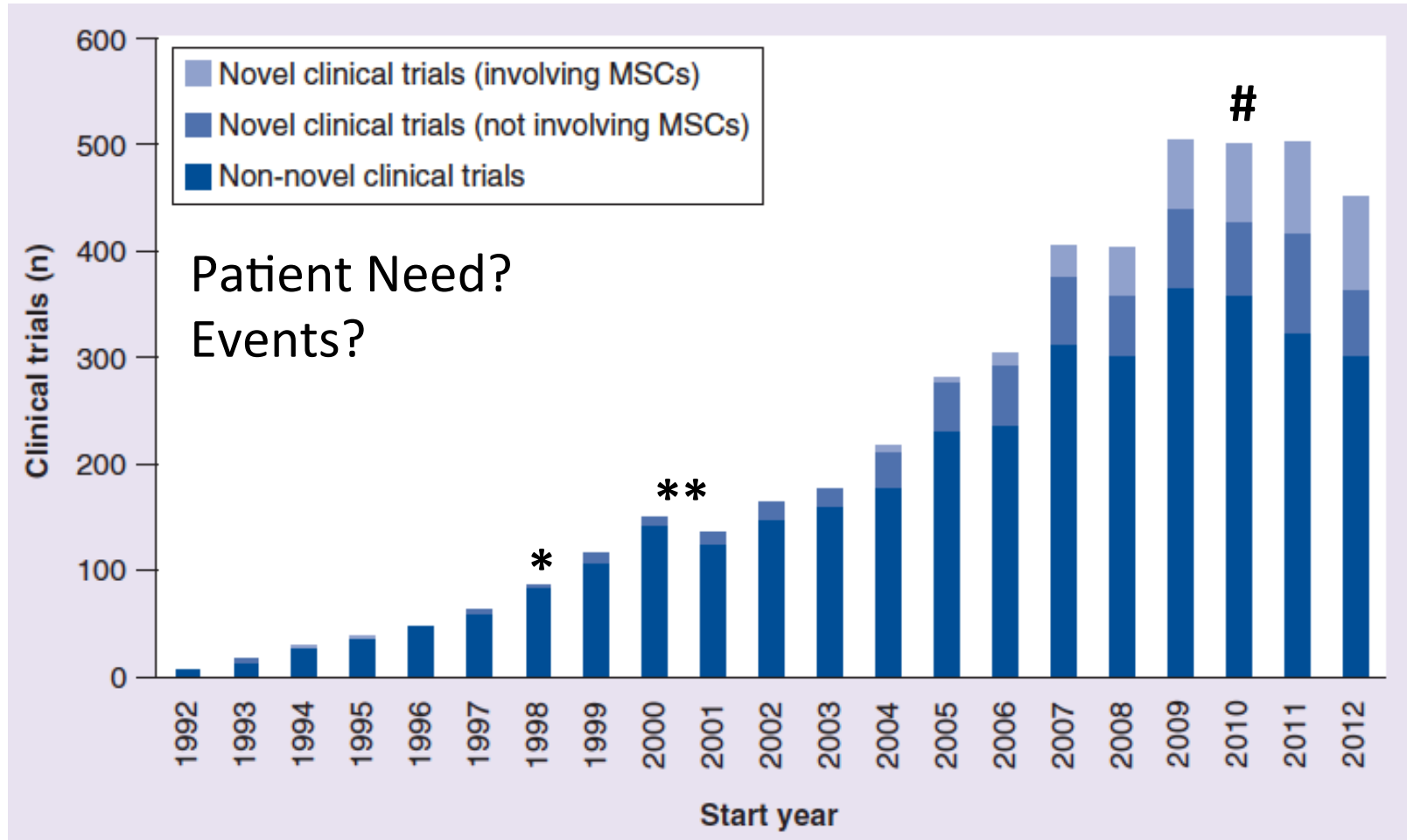
What Factors are Driving the Increase?



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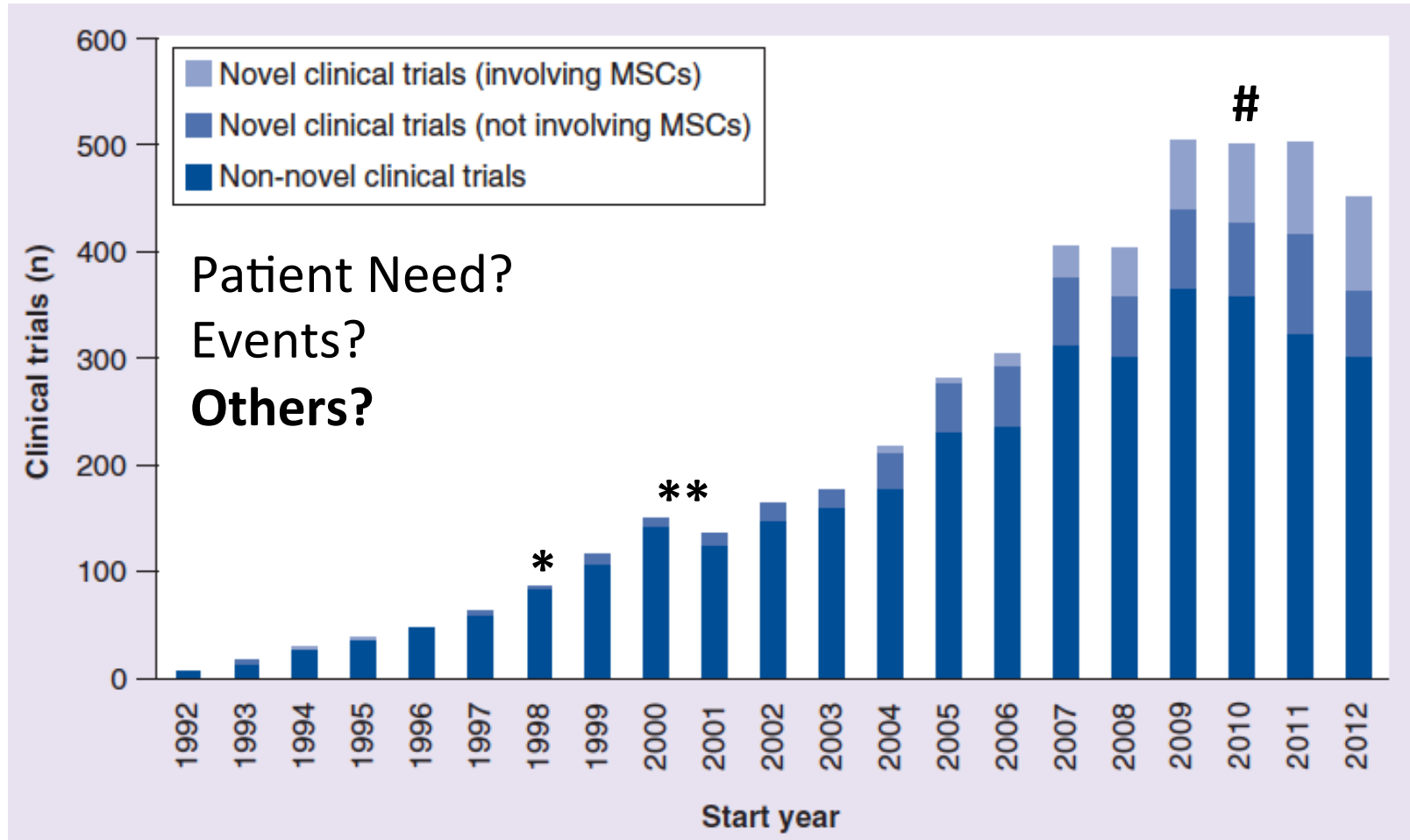
What Factors are Driving the Increase?



* human ESCs; ** human ESC debate; # U.S. human ESC funding

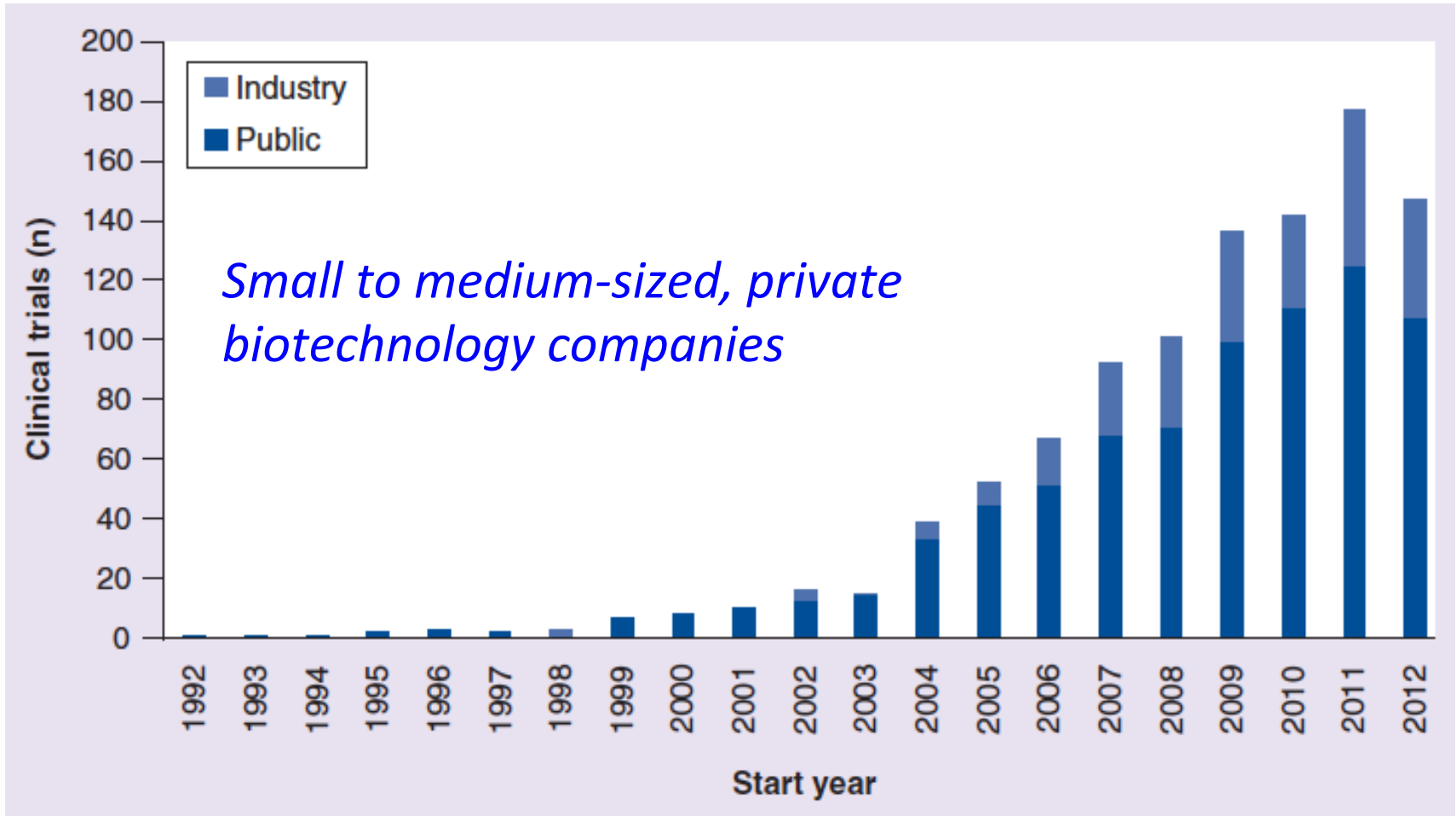
Li, et al., 2014

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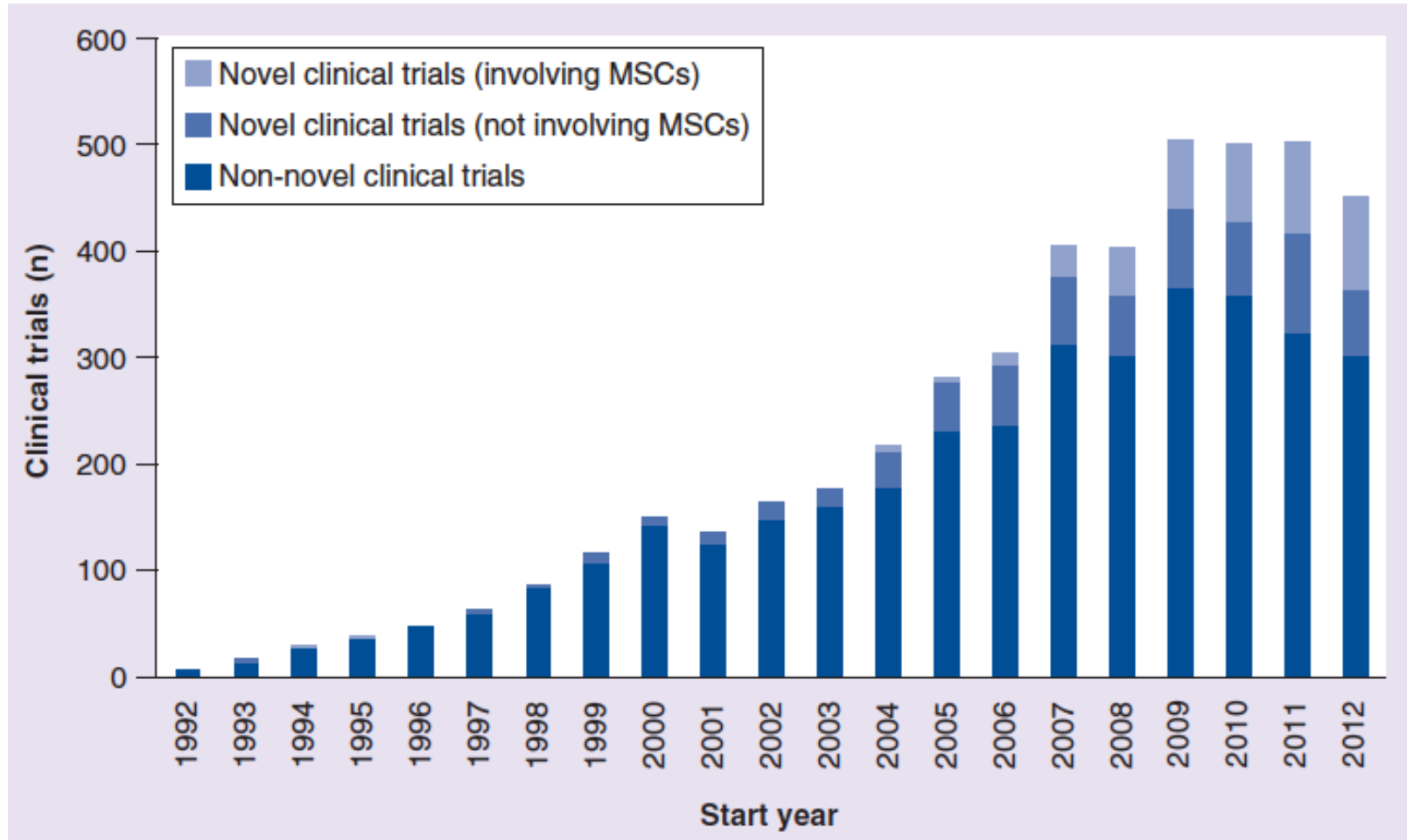


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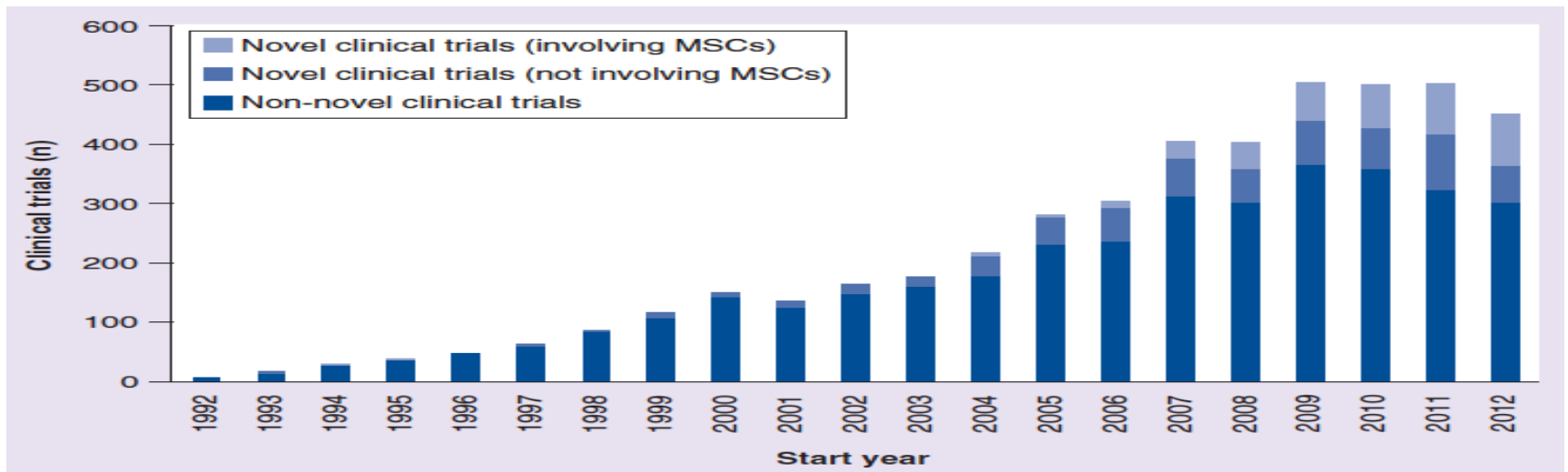
Others: Industry Investments



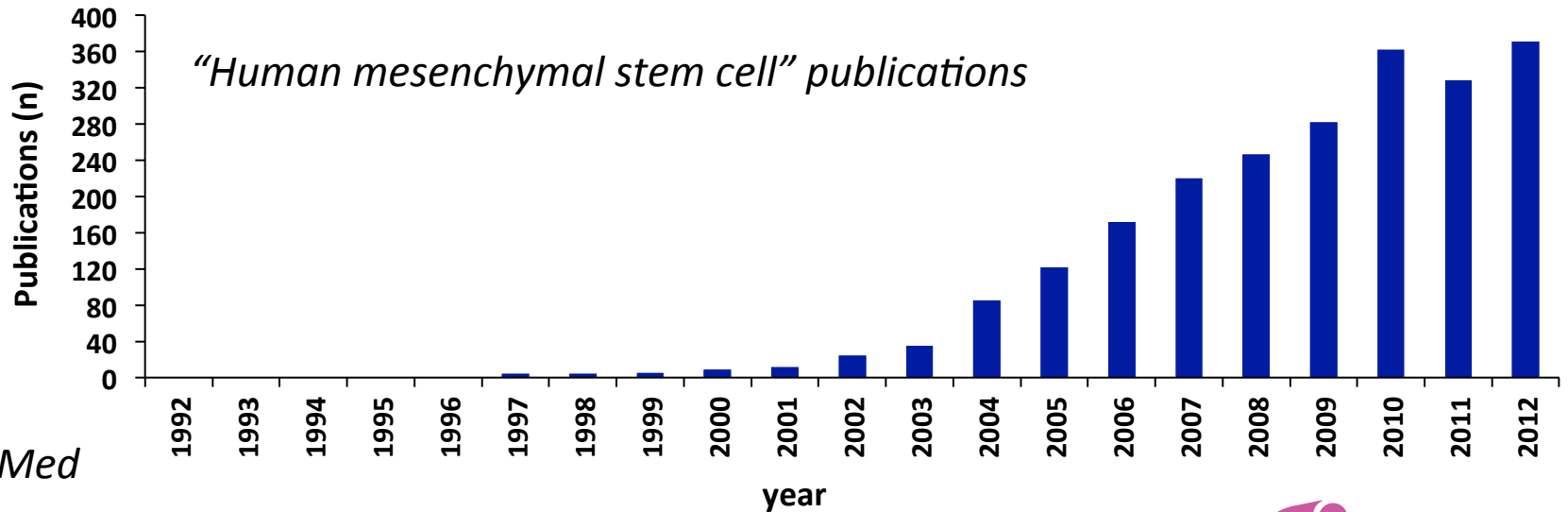
Others?



Others: *Stem Cell Availability*



Li, et al., 2014



PubMed

Others: *Stem Cell Availability is a Major Factor*

Stem cell type

- Hematopoietic (whole marrow, CD34+, CD133+ or mononuclear fractions) (432)
- Mesenchymal (432)
- Endothelial progenitor cells (69)
- Other (69)
- Neural (22)
- Unspecified (20)
- Limbal (16)
- Embryonic (6)
- Cardiac (6)

Stem cell tissue source†

- Bone marrow (439)
- Peripheral blood (170)
- No sampling (112)
- Umbilical cord (99)
- Unspecified (95)
- Adipose tissue (92)
- Eye (16)
- Brain (12)
- Placenta (9)
- Heart (6)
- Embryo (6)

But, Heterologous Stem Cell Clinical Trials

Goal of stem cell therapy

- Regeneration (916)
- Cell therapy (nonregenerative) (126)
- Gene therapy (96)
- Stem cell collection/mobilization (30)
- Bioscaffold (15)
- Immunotherapy (13)

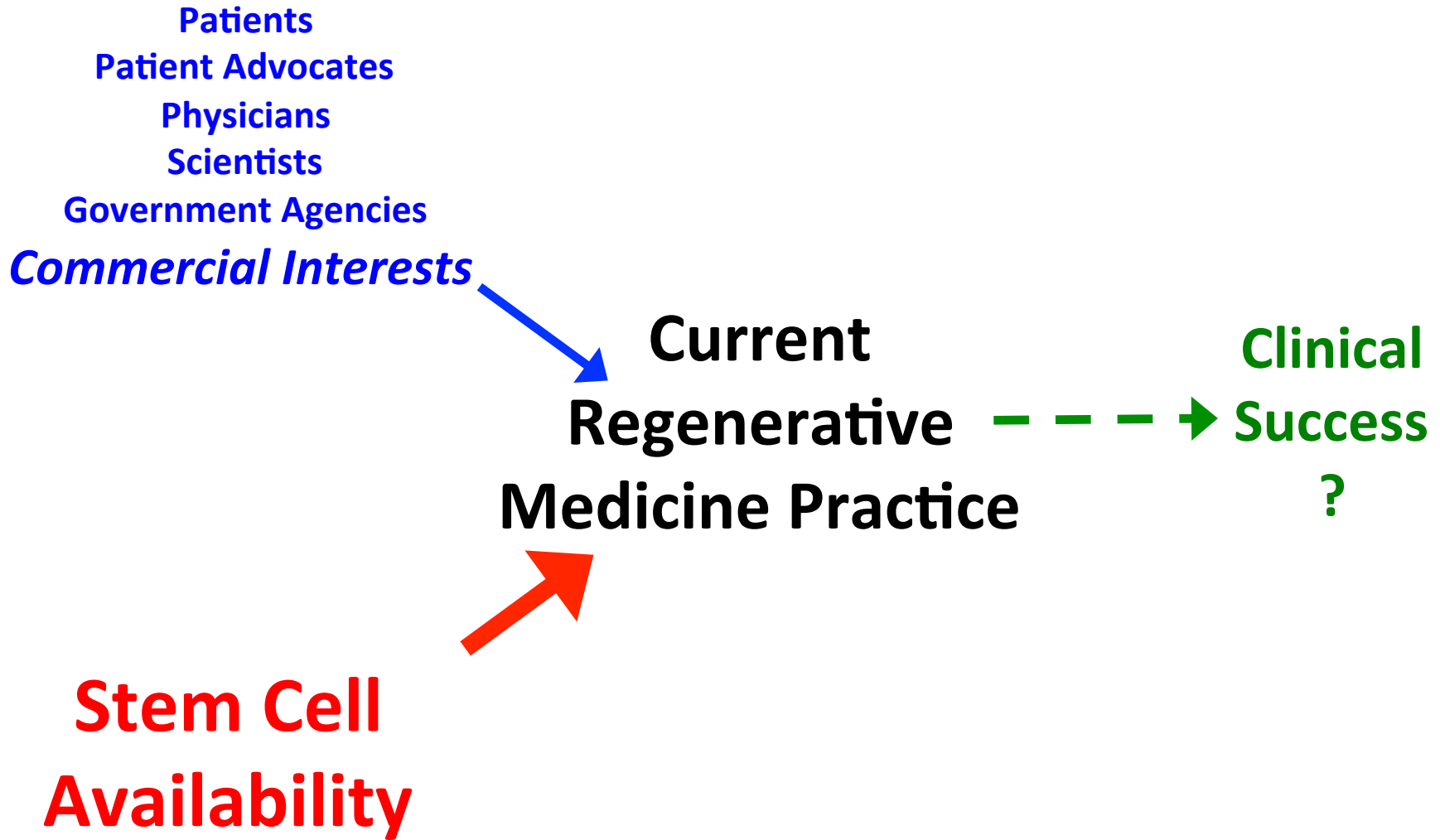
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Target of stem cell therapy[†]

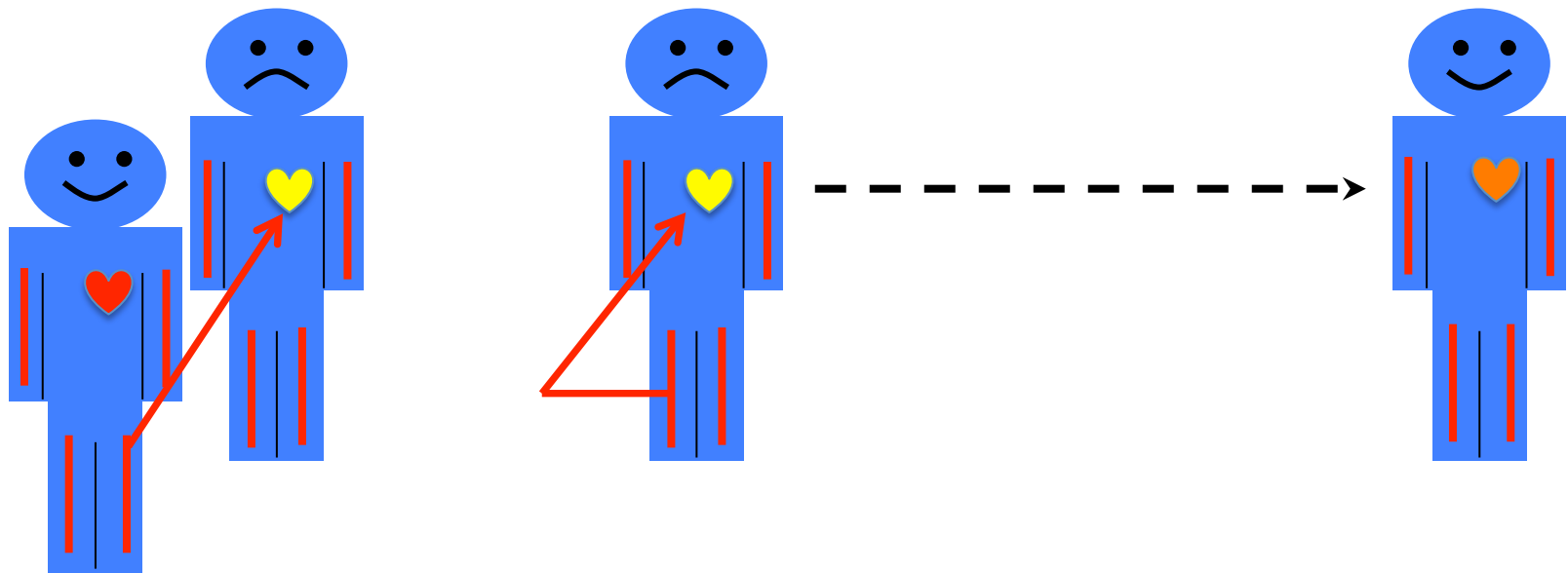
- Immune system (260)
- Heart (197)
- Marrow (157)
- CNS (125)
- Vascular system (90)

Factors Driving Regenerative Medicine



Empirical Testing *versus* Biology Rationale

Can Heterologous Tissue Stem Cell Transplantation Succeed?



Allogeneic or Autologous

Solution?

*More Research on Producing
Homologous Adult Tissue Stem Cells*

