Ferghana Partners Group is a Life Sciences investment banking house with offices in London and New York.

We specialise in creating and executing effective strategic transactions for pharmaceutical, chemical, diagnostic and biotech companies.

"THE THERAPEUTIC REALITIES OF STEM CELLS"

INTRODUCED AND MODERATED BY WILLIAM J. KRIDEL, JR

FERGHANA PARTNERS GROUP

I. What are Stem Cells? (1)

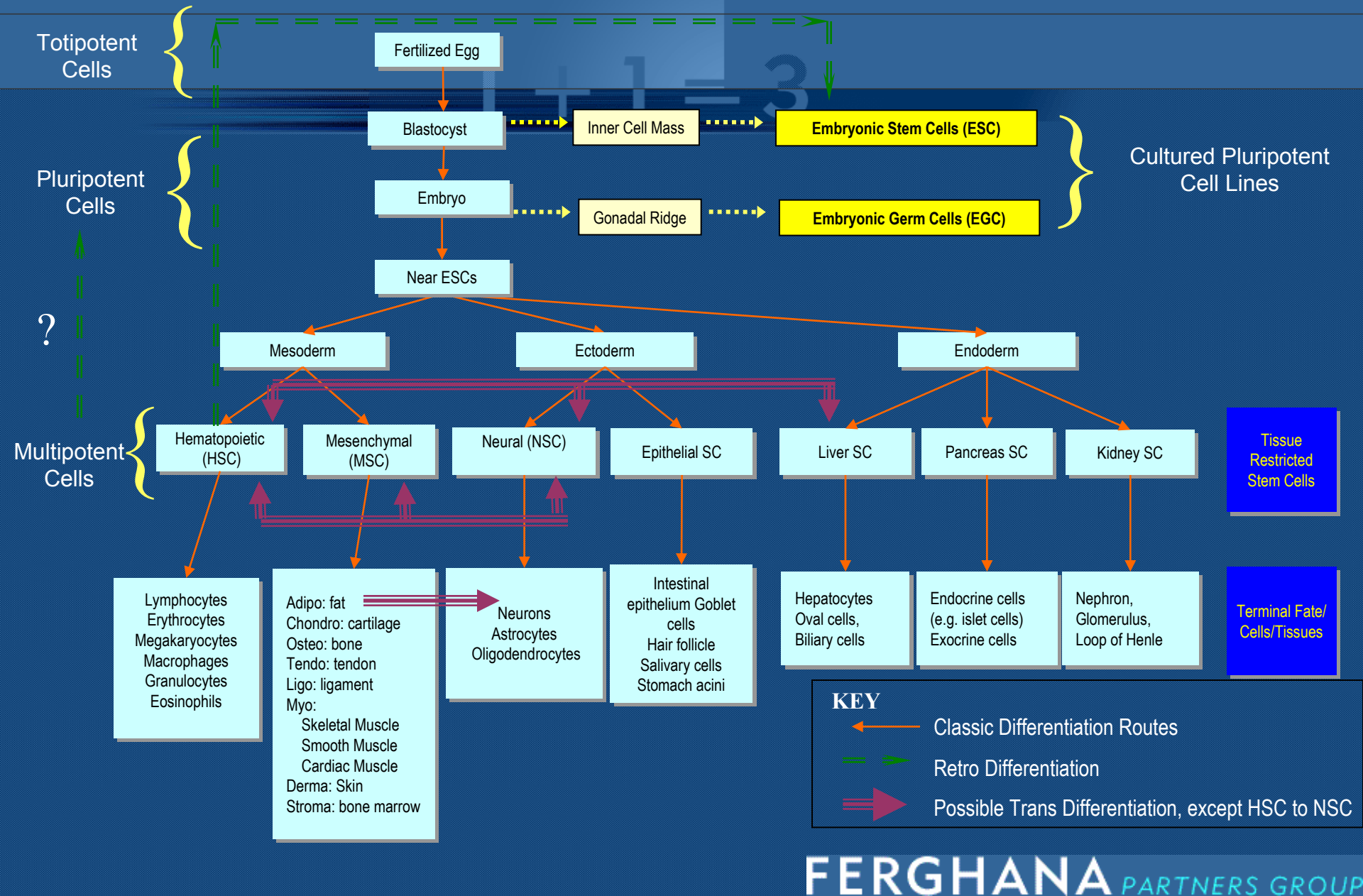
Stem Cells are highly plastic, multipotential cells with the capacity to self replicate; that is, they can generate all the cell types composing more specialised stem cells and then ultimately a functional organ or tissue, while maintaining a pool of cells like themselves for the lifetime of the individual.

What are Stem Cells (2)

Totipotent –Stem cells which are capable of forming every type of body cell. Each totipotent cell could replicate and differentiate and become a human being. All cells within the embryo are totipotent up until the 16-cell stage or so … at which point some specialisation occurs.

Multipotent/Pluripotent – Pluripotent stem cells which can develop into any of the three major tissue types: endoderm (interior gut lining); mesoderm (muscle, bone, blood); and ectoderm (epidermal tissues and nervous system). Multipotent stem cells can eventually specialise in any bodily tissue within (and sometimes amongst several) a cell lineage, but they cannot replicate themselves.

II. Stem Cells World



III. Where do Cells Come From? (1)

Embryonic SC:

– From embryo (natural or artificial)

– By retrodifferentation from TRSC like MSC or NSC.

Adult/Tissue Restricted Stem Cells (TRSC):

– by ESC differentiation (from the more generalised to a more specialised cell type); process can be controlled quite well

– by harvesting them from residential organs or tissues (such as MSCs from bone marrow or NSCs from the brain).

– by transdifferentiation: ?from another TRSC, under certain circumstances (still experimental).

Where do Cells Come From? (2)

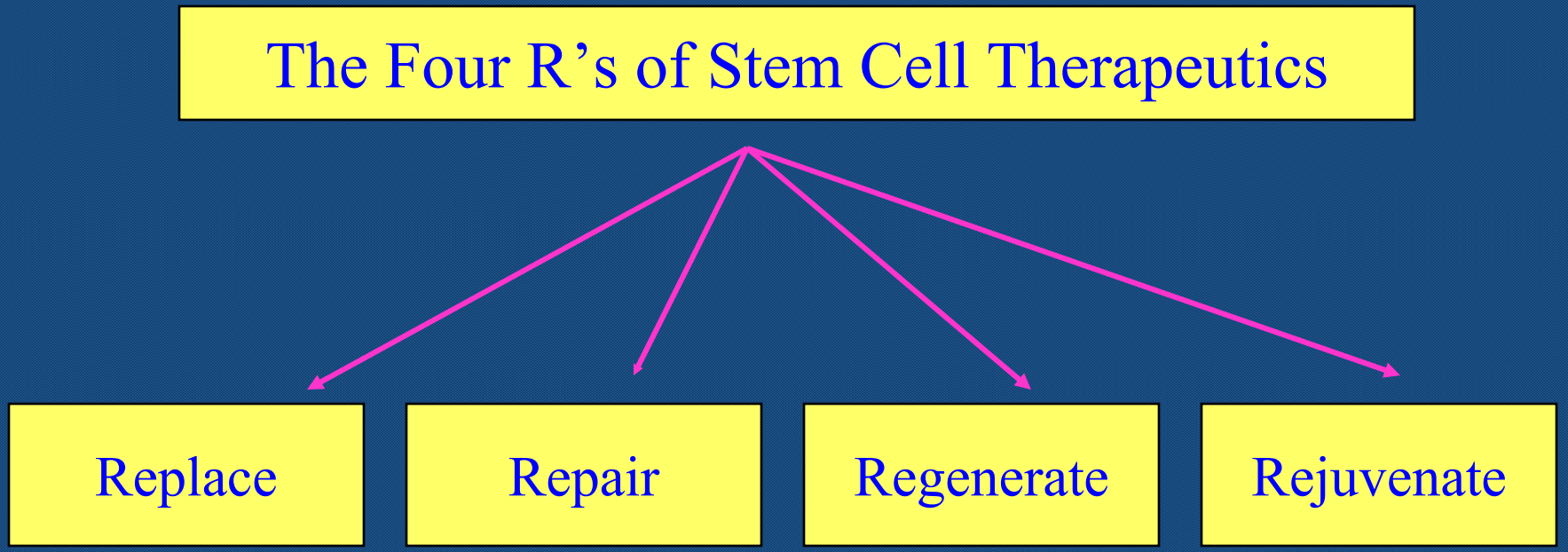
Terminal Fate Cells (over 200 kinds):

- by Differentiation from TRSC
- by Transdifferentiation?
- Naturally
- “With assistance from Ph.Ds

IV. Other Stem Cell Distinctions

- In Vivo vs Ex Vivo Proliferation and Differentiation
  - Directly in a "Niche"
  - Using "factors" in situ
  - In a laboratory
- Autologous vs Allogeneic
  - From the patient
  - From a healthy, even if mismatched, donor.

V. What are Stem Cells useful for? (1)



These processes recapitulate/mimic natural events of developmental biology

What are Stem Cells useful for? (2)

1. Replace: Many diseases such as Parkinson's Disease and juvenile diabetes result from the death or dysfunction of just one or a few cells. Therefore, stem cells can be used as replacement cells, offer "lifelong treatment".
2. Repair: Stem cells can be used to repair diseased or damaged organs. By isolating stem cells in a laboratory, scientists theoretically could grow new heart cells to repair damage from heart attacks, new liver cells to treat hepatitis and new red blood and stromal cells for cancer patients after ablative radiotherapy.

What are Stem Cells useful for? (3)

3. Regenerate: Embryonic or TR stem cells can be used to renew biological functions (like the immune system) or damaged organs.
4. Rejuvenate: Scientists are trying to learn how to coax stem cells to become new, healthy "younger" cells to rejuvenate, restore and repair older cells and ailing hearts, liver, brains and other organs.

Perhaps a 5th "R"? (4)

- Rebalance the body's biochemical processes definitively, obviating the need for classic, costly, repetitive pill-taking, injections and surgery … better pharmaco-economics and availability of stem cell therapy still need to be proven, but…