MATIČNE CELICE IN REGENERATIVNA MEDICINA

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STEM CELLS PASSING TROUGH MANY DIFFRENTIATION STAGES





http://www.nytimes.com/2012/10/09/health/research/

Cloning and Stem Cell Work Earns Nobel

Shinya Yamanaka, left, in April 2009, and John B. Gurdon.





Self-renewal and differentiation Asymetric cell division













Amphibians have tremendous regenerative potential





http://www.youtube.com/watch?v=0qPRJWZsA0c

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Sci-Mind[™] Biopolymers

Body changes with time due to normal cell turnover









Adult Stem Cells Therapy adds millions of your repair cells (MSCs)





Adult Older people do not heal as fast

George Koliakos MD PhD, Department of Biological Chemistry Medical School Aristotle University Thessaloniki Greece. Hellenic National Research Foundation Stem Cell Bank Athens Greece.





How stem cells act?

Source: George Koliakos MD PhD, Department of Biological Chemistry Medical School Aristotle University Thessaloniki Greece. Hellenic National Research Foundation Stem Cell Bank Athens Greece.



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The AGE of REGENERATIVE MEDICINE:



- "Regenerative medicine seeks to revolutionize the ways we improve the length and quality of life by restoring, maintaining, or enhancing tissue and organ function. It involves the merging of several fields, including tissue engineering, biomaterials development, and stem cell biology."
- Source: NIH, "Summary of the President's FY 2004 Budget," February 3, 2003

...and Tissue Engineering



 Tissue engineering is a relatively new field, first time mentioned 20 years ago

Broadly defined, tissue engineering is the development and manipulation of laboratory-grown molecules, cells, tissues and organs to replace or support the function of defective or injured body parts."

Pittsburgh Tissue Engineering Initiative, Inc., 1988

Tissue engineering and regenerative medicine





Challenges in RM





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Ex vivo cell propagation process



Cultivation and Proliferation of Cells

Regenerative medicine returns the quality of life



ChondroArt[™] 2D

2nd generation of cell products

• cells on collagen scaffold





- fixation with fibrin glue
- opptional use of ChondroGide[®] membrane instead of periost



ChondroArt – regenerated tissue

Before implantation





After implantation







Tissue engineering method for

treatment of vesicoureteral reflux

implantation of autologous chondrocytes





ŽŠ 1945 before implantation

after implantation

Implantation of HSC for heart failure

- Stimulation of patients with G-CSF (4 days)
- Assessing of mobilised CD34+ cells in blood
- Harvesting cytopherisis Isolex 300i(Baxter)/Clinimacs (Milteny)

Two techniques :

 into coronary arthery through catheter

OR

 Intramyocardialy– left ventricle



Regeneration of paradental bone

Injuries of alveolar bone and periodontal diseases :

- periodontitis
- cyst
- teeth impalntants







Umbilical cord blood - biobanking



Tissue engineered bladder

Researchers said they have grown bladders from patients' cells and successfully transplanted the organs back into the patients.



 Surgeon takes a small biopsy that extends all the way through the bladder.

 Cells from the inner and outer layers of the biopsy are isolated.



3. The isolated cells are cultured separately until they have sufficiently multiplied.



4. The cultured cells are seeded onto a biodegradable scaffold shaped like a bladder.



5. The cells attach and grow throughout the "scaffold" for seven to eight weeks.





SOURCE: Tengion | The Washington Post - April 04, 2006, http://www.washingtonpost.com/wp-dyn/content/graphic/2006/04/04/GR2006040400156.html





http://www.sciencedaily.com/videos/?channel=Your+Health&clipid=73698

Tissue engineered Trachea

- GENE THERAPY
- THERAPEUTICAL CLONING
- REPRODUCTIVE CLONING





History of Regenerative medicine in Slovenia

