Regenerative Medicine in Russia

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Regenerative medicine – a new field of medicine that aims to regrow and recover function of damaged organs and tissues

Faculty of Medicine

Medical center

Institute of regenerative medicine

Federal Law №180

«On biomedical cell products»

Took effect since 01.01.2017

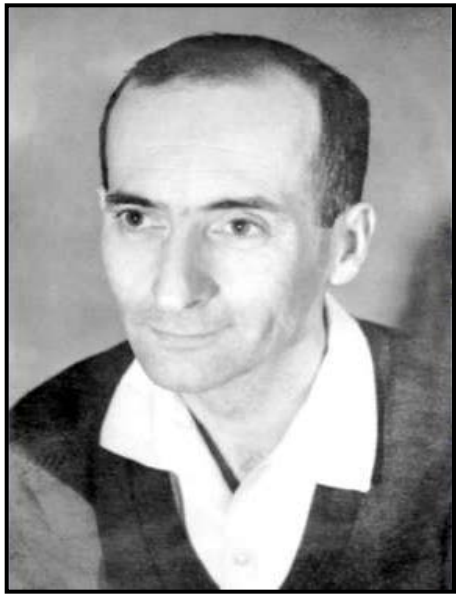
Russian history of discoveries in stem cell biology

Alexander Maximow

(1874, Saint-Petersburg, Russian Empire–1928, Chicago, USA)

Discovery of hematopoietic stem cell and "stemness" itself (1908)

Maximow A.A. Folia Haematologica. 1909.



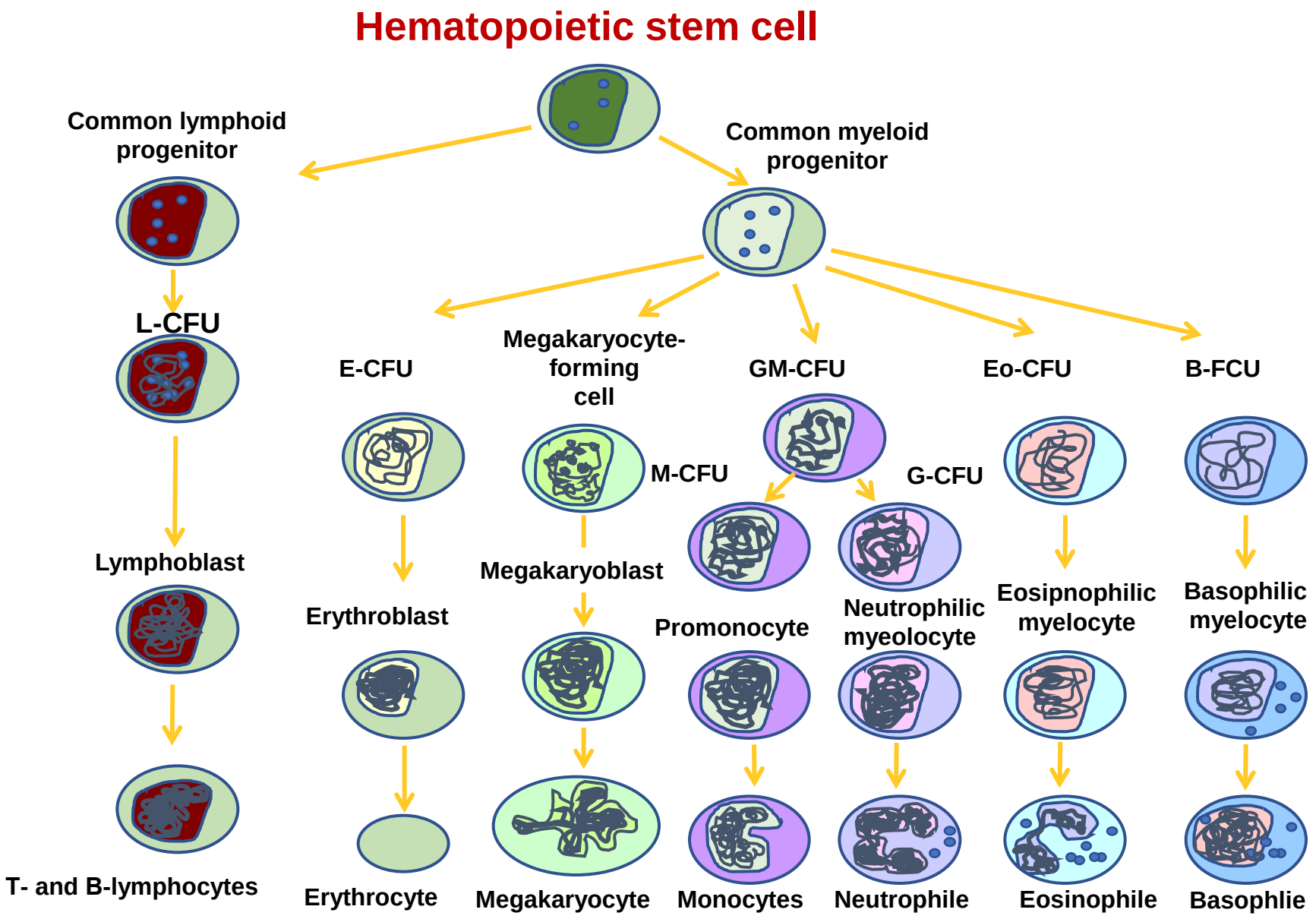
Alexander Friedenstein

(1924, Kiev, USSR - 1997, Moscow, USSR)

Discovery of adult stem cells in human body (1968)

Friedenstein A.J. et al. Transplantation. 1968.

Hematopoietic stem cell gives rise to all blood cells



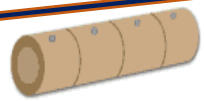
Mesenchymal stem cells (MSC) create the stroma of human body and induce blood vessel and nerve growth

MSC

MSC differentiation to stromal cell types

Effects of secretome on vascular and nerve growth

Fibroblast

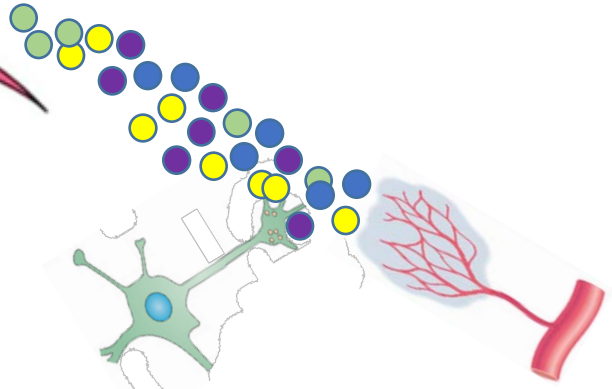


Myocyte

Adipocyte

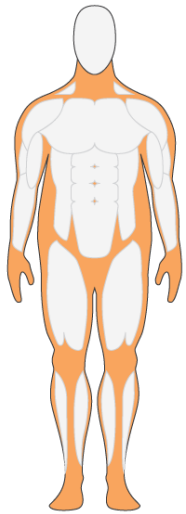
Chondrocyte

Osteocyte



Nerve fiber growth

Angiogenesis

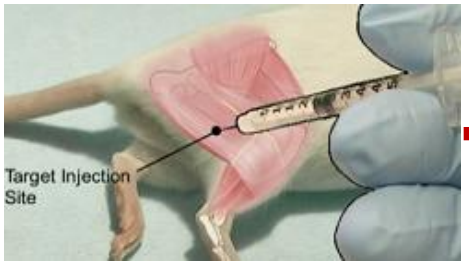


Human mesenchymal stem cells (MSC) stimulate angiogenesis in mouse with limb ischemia

Immunodeficient (Nude) mice

Limb ischemia induced

Human MSC injected

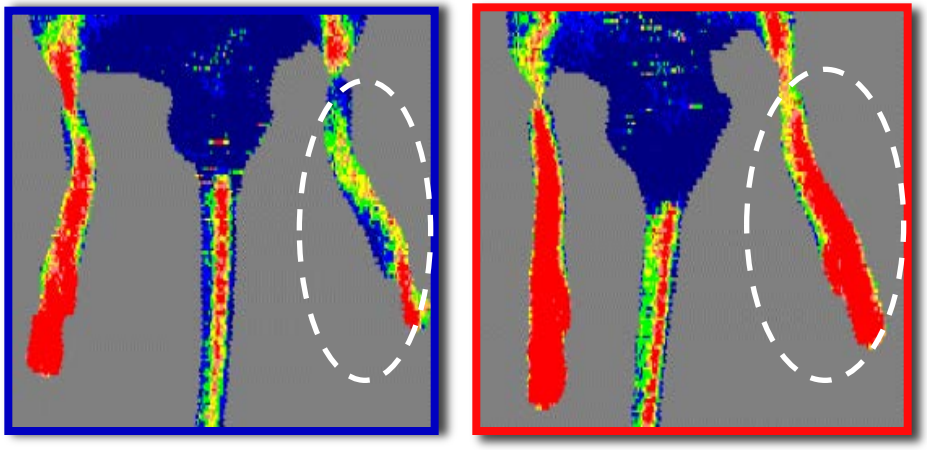


Blood flow measurements (20 days)

Limb necrosis reduced

Untreated MSC

Limb perfusion improved



Untreated MSC

Cell-derived products developed by Russian groups

1. **Cultured adult mesenchymal stem cells (MSC)** for therapeutic angiogenesis and tissue regeneration (Lomonosov Moscow University)
2. **Minimal tissue constructs (cell sheets)** from MSC and cardiac stem cells to induce organ regeneration (Lomonosov Moscow University, Cardiology Research Center)
3. **Multilayered dermal equivalent grafts** for surgical use and burn care (Pirogov Medical University)
4. **Autologous tissue-engineered cartilages** (Pirogov Medical University)
5. Cellular constructs for **regeneration of liver and pancreatic beta-cells** (Institute of Transplantology and Artificial Organs)

Potential cooperation and topics for projects in regenerative medicine

1. Investigation of mechanisms underlying human cell plasticity and differentiation pathways
2. Development of new adult stem cells therapeutics
3. New biomaterials for tissue and organ engineering
4. Tissue engineering for surgery and correction of trauma
5. New methods and models to ensure biosafety of stem cells

3rd National Congress on REGENERATIVE MEDICINE

15-18 November 2017 | Moscow | Russia

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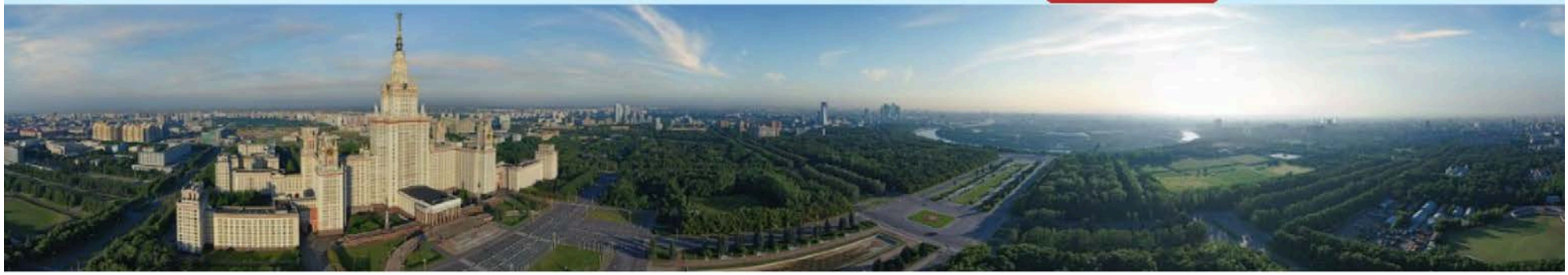

November, 15-18, 2017, Lomonsov Moscow State University

REGISTRATION OPEN

Thank you for attention!