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Personal View

THE HEURISTIC VALUE OF INTERDISCIPLINARITY IN SCIENTIFIC MEDICAL RESEARCH

Nicolae CONSTANTINESCU

Honor Member of Academy of Romanian Scientists
Professor of Department of Clinical Anatomy and Surgical Techniques,
University of Medicine and Pharmacy "C. Davila", Bucharest, Romania

Author for correspondence:
Nicolae Constantinescu,
Mb: 0732.931.754,
E-mail: nae_constantinescu@yahoo.com

Abstract

Interdisciplinarity is characterized by the horizontal transfer of knowledge from one discipline (field) to another, which involves conceptual or methodological exchanges. The border area where the fields intersect is the most fertile to discovery.

Fifty years ago, as a junior doctor at the Sanatorium of Osteoarticular Surgery in Eforie Sud headed by dr. Victor Climescu, I was surprised to notice the superiority of rib transplant over tibia transplant in the treatment of pseudo-arthrosis and bone substance losses. The legitimate question I asked myself: "which is the cause of the rib graft superiority?" could not find an answer in the field of orthopedic surgery, therefore I have turned to another field, the experimental surgery, and I have imagined a study model for tissue transplants combining the advantages of a *window chamber*, of a *diffusion chamber* and of a *tissue culture*. I chose the anterior chamber of the adult rabbit eye as site for heterotopic transplantation of periosteum, cortical bone, cancellous bone and red bone marrow. The experimental model showed me that the red bone marrow has an important contingent of stem cells, which demonstrate a potential to proliferate and differentiate into multiple cell lines: bone cells, endothelial cells, hematopoietic cells. I was able to draw these conclusions after I got familiar with a third field of research - the red bone marrow histology and cytology - so after I entered the territory of hematology. *I elaborated the model of the complex polyvalent genome of the marrow stem cell capable of differentiation on several cell lines, and I thought the sequence bone-sinusoid capillary-red bone marrow as fundamental in sustaining the theory of the keyboard of the phenotypic expression of the polyvalent complex genome of the marrow stem cell in adult*.

In 1980 I published a book about the biological value of bone transplant, which I have sent to some prestigious orthopedists and hematologists from all over the world. Each and all asked me to English translation of the book but neither in Romania nor

abroad this translation wasn't possible. If the English translation had been done, the angiogenesis initiated by the stem cells would have been operational for over 20 years.

Key-words: *interdisciplinarity, bone marrow stem cell, angiogenesis*

Rezumat

Interdisciplinaritatea se caracterizează prin transferul orizontal de cunoştinţe de la o disciplină la alta, pentru un progres ştiinţific conceptual şi metodologic. Limitele acestor domenii în parte se intersectează pentru a deveni mai fertile şi mai atractive pentru cunoaştere. În urmă cu 5 ani, tânărul medic de la Sanatoriul de chirurgie osteoarticulară din Eforie Sud, Victor Climescu a remarcat superioritatea transplantului de coastă faţă de cel de tibie, în tratamentul pseudoartrozelor şi al lizelor osoase.

Întrebarea legitimă care se pune este: autografa poate fi superioară? aspect nou în chirurgia ortopedică. Pornind de la această situaţie, am realizat un model de studiu pentru ţesuturi transplantate, în culturi tisulare. S-a observat că în camera anterioară a ochiului de iepure, sunt situsuri pentru transplant heterotopic de periost din corticala osoasă, osteocite şi pentru măduvă roşie osoasă. Acest model experimental arată că măduva roşie osoasă poate fi un important contingent de celule stem, cu potenţial proliferativ şi de diferenţiere în multiple linii celulare osoase, endoteliale sau hematopoetice. Am remarcat acest aspect, după cercetarea în parte a histologiei măduvei roşii osoase folosită în teritoriul hematologic. Am elaborat un model genomic complex polivalent al celulelor stem medulare, capabil de diferenţiere în câteva linii celulare: secvenţa capilare sinusoide osoase-celule roşii medulare osoase este fundamentul substanţial al teoriei expresiei fenotipice al complexului genomic polivalent al celulelor stem medulare la adult. În 1980, am publicat o carte despre valoarea biologică a transplantului osos în care am menţionat contribuţia unor hematologi şi ortopezi din lume in domeniul celulelor stem.

Cuvinte-cheie: *celule stem medulare osoase, interdisciplinaritate, angiogeneză.*

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I think it was in 1956 or 1957, when I heard that a series of conferences on general biology topics in correlation with other sciences will be held by Victor Săhleanu and Emil Repciuc in one of the lecture halls of the University in Bucharest. At one of these conferences, I heard Victor Săhleanu who drew three secant circles, each of them representing a field of biological or non-biological sciences, and who spoke about the paramount importance of the intersection area for promoting knowledge (*figure* 1).