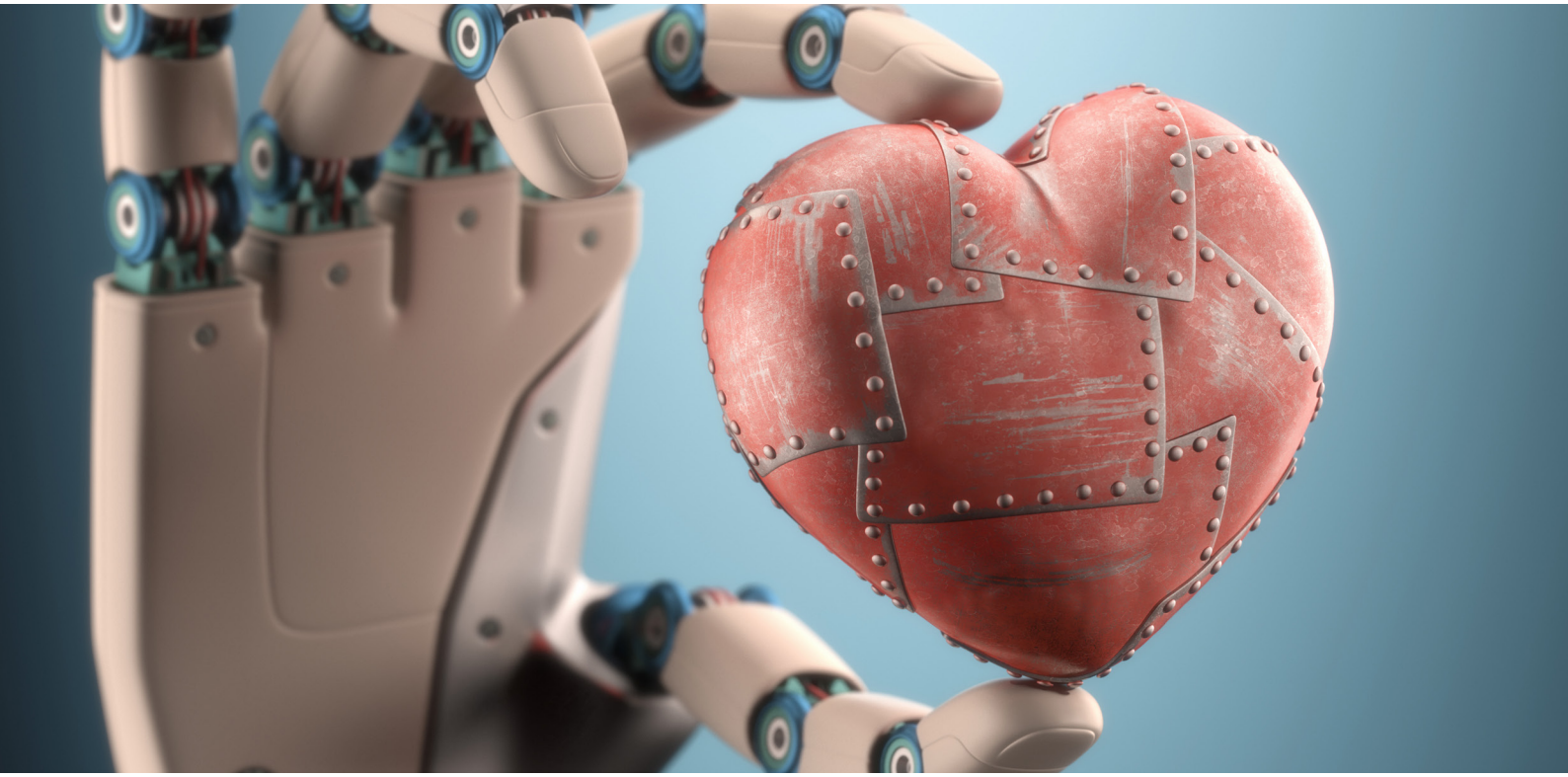
MEDtube science

30th September Issue 3/2015



Impacted uterine myoma in a 14 week pregnant patient

also

Dengue vs. Leptospirosis, diagnosis and treatment from the first contact

Recurrent incisional hernia sublay repair with fully reabsorbable monofilament mesh – a case report

Dengue, for apparatus and systems

Bionic Pancreas and Bionic Organs – how far we are from the success

Fragments od bacterial DNA presence in hemodialisis patients' blood-preliminary report

EDITORIAL OFFICE

PUBLISHER

MEDtube Ltd.

Złota 59 street; 00-120 Warsaw, Poland

Tel.+4822 2402234

Fax. +4822 2224601

US OFFICE

55 Tiemann Place

Suite 29; New York, NY 10027, United States

WEBMASTERING AND IT

Adrian Fester

DISCLAIMER

Publisher and the Editorial Board accept no liability whatsoever for the consequences of any inaccurate or misleading data, opinions or statements contained in the articles. Every effort is made to ensure that all data and techniques are presented accurately.

PRINT RUN

500

CONTACT

science@medtube.net

WEBSITE

http://www.medtube.net/science

MICHAŁ WSZOŁA MD, PhD
Editor in Chief

ARTUR KWIATKOWSKI MD, PhD
Editor in Chief

Dear Colleagues,

We are pleased to present another issue of MEDtube Science - an open access publication distributed online.

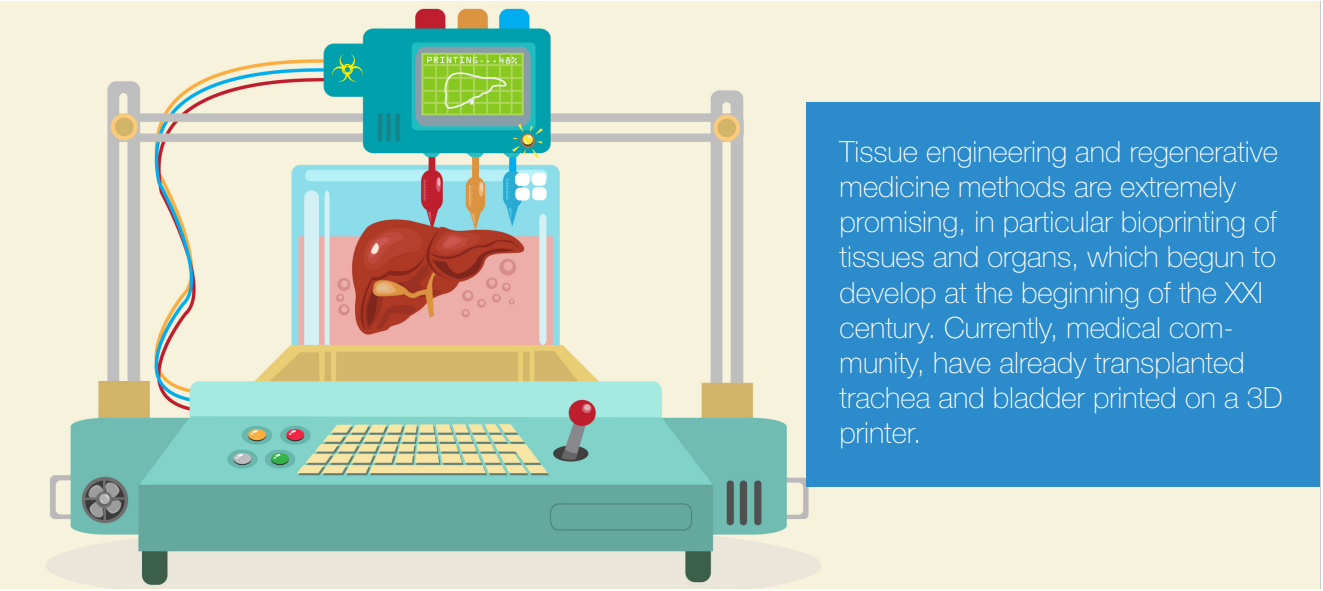
MEDtube Science is addressed to all medical professionals – physicians, researchers who are interested in achievements in basic and clinical medical science. MEDtube Science is supposed to satisfy the demand for combining different formats - video and written science in particular. The journal has international scope. It will be published quarterly and exclusively in English. Original articles, reviews, case reports, rapid communications, special articles and letters to the Editor in both basic and clinical medical research are accepted for publication with particular stress on manuscripts enriched with multimedia such as videos or pictures. We have strong confidence that this new project will be quickly recognized in Medline and other medical bases and will become an indexed journal with impact factor. At the end of our journal you will find information and instructions for authors on how to submit articles. We are also pleased to inform you that in 2014 there will be no fee for accepted articles – so do not waste time – send us your paper.

Kindest Regards,

Michal Wszola MD, PhD
Editor-in Chief

Artur Kwiatkowski MD, PhD
Editor-in Chief

TABLE OF CONTENTS



Tissue engineering and regenerative medicine methods are extremely promising, in particular bioprinting of tissues and organs, which begun to develop at the beginning of the XXI century. Currently, medical community, have already transplanted trachea and bladder printed on a 3D printer.

Bionic Pancreas and Bionic Organs – how far we are from the success

Michal Wszola[1,7#], Joanna Idaszek[2], Andrzej Berman[1], Alicja Kosik[2], Lukasz Gorski[1], Agnieszka Jozwik[1], Agnieszka Dobrzyn[3], Agnieszka Cudnoch-Jędrzejewska[4], Artur Kaminski[5,6], Robert Wrzesien[4], Marta Serwanska-Swietek[1], Andrzej Chmura[1], Artur Kwiatkowski[1] and Wojciech Swieszkowski[2]

1. Department of General and Transplantation Surgery, Warsaw Medical University.
2. Division of Material Engineering, Warsaw University of Technology, Poland.
3. Nencki Insitute of Experimental Biology, Polish Academy of Science, Poland.
4. Department of Experimental and Clinical Physiology, Laboratory of Centre for Preclinical Research, The Medical University of Warsaw, Warsaw, Poland
5. National Centre for Tissue and Cell Banking, Warsaw, Poland
6. Department of Transplantology and Central Tissue Bank, Medical University of Warsaw, Poland
7. Foundation for Research and Science Development, Otwock, Poland
8.

#Corresponding author: michal.wszola@wp.pl

RUNNING TITLE Bionic organs

KEYWORDS bioprinting, 3D-bioprinting, bionic pancreas, bionic organs, artificial organs, islets transplantation

WORD COUNT 1 154

CONFLICT OF INTERESTS no conflicts of interest

ABSTRACT

The progress in the treatment of chronic diseases of civilization that occurred in recent years, led to a significant prolongation of median survival time of the developed countries societies. Organ transplantation has revolutionized medicine as it became possible to replace an irreversibly diseased organ. However, at the moment we can observe a significant shortage of organs for transplantation, which forces doctors to accept those coming from more and more expanding criteria donors. No doubt, the number of donors, at best, will certainly not grow. Tissue engineering and regenerative medicine methods are extremely promising, in particular bioprinting of tissues and organs, which begun to develop at the beginning of the XXI century. Article highlights possible future direction of organ transplantation.

The progress in the treatment of chronic diseases of civilization that occurred in recent years, led to a significant prolongation of median survival time of the developed countries societies [1,2]. Paradoxically, it has raised more medical problems such as increased number of neurodegenerative, cardiovascular diseases [2,3] and increased demand for transplantation organs [4]. In Poland alone, there are more than two and a half million diabetic patients, 200,000 of which are patients with type I diabetes [5]. According to WHO's statistics, by 2030 these numbers will double [6]. Organ transplantation has revolutionized medicine as it became possible to replace an irreversibly diseased organ. However, at the moment we can observe a significant shortage of organs for transplantation, which forces doctors to accept those coming from more and more expanding criteria donors. No doubt, the number of donors, at best, will certainly not grow. Annually, there are approximately 40 pancreas transplants in Poland. Liver and kidney transplants are more numerous, with 300 and 1000, respectively, organs transplanted each year. Pancreas transplantation has been a successful treatment of patients with diabetic complications for years, limited however to relatively small number of patients not only due to organ shortage but also due to ischemic injury of retrieved organs [7]. Injury is even more pronounced in pancreatic tissue, which is subjected to digestion processes in order to isolate the islets of Langerhans, which are especially sensitive to injury. The digestion process, by stripping the islets of their vasculature and surrounding extracellular matrix in order to isolate them and put into suspension, results in their hypoxic damage. This sequence of deleterious effects is the reason that islet transplantation has not become a common clinical treatment modality [8]. More than 50% of transplanted islets are lost during the first few days post transplant. It is possible that one of the causes of this is IBMIR - instant blood-mediated inflammatory reaction [9], leading investigators search for a new recipient sites for islet transplantation [10,11,14]. Authors have invented, performed study and introduced into clinic as the first in the world, an innovative method of endoscopic gastric submucosa islets transplantation [12,13]. The damage is also caused by deprivation of the islets of their own vasculature and extracellular matrix. "Nude" islets has higher tendency for apoptosis, which further makes that simple procedure very not effective. The medical world is developing several potential paths that can solve the problem of shortage of organs for transplantation: artificial organs [15], xenotransplantation (using organs taken from animals) [16], tissue engineering and regenerative medicine [17]. There have been first visible successes in using artificial organs, such as insulin pumps [15]. But those are not able to inhibit the development of secondary complications of diabetes, which leads to nearly 5 million deaths each year worldwide [18]. Xenotransplantation, as a treatment in humans, cannot be easily brought to the clinical phase due to the still unresolved risk of transmitting particularly dangerous zoonotic viral infections together with the cells and organs taken from animals [19]. Therefore, the development of new approaches to protect newly transplanted pancreatic islets/beta-cells from oxidative and inflammatory stress is critical and urgently needed. Dobrzyn et al. recently showed that endocanabinoid system, stearoyl-CoA desaturase and Wnt singnaling play a critical role in keeping pancreatic beta-cell identity and islet architecture and might be used for injury treatment [20-22].

Tissue engineering and regenerative medicine methods are extremely promising, in particular bioprinting of tissues and organs, which begun to develop at the beginning of the XXI century [23]. Currently, medical community, have already transplanted trachea and bladder printed on a 3D printer [24,25]. In addition, beyond the obvious purpose of transplantation, we may use bioprinted proteins, cells, tissues, and organs in in vitro drug trials (toxicity tests), in clinical trials and in „personalized medicine", adapting the drug dosage to the biological capabilities of the potential patient's tissues. Possible rebuilding extracellular matrix, with bioprinting, for islets and creating a stable, well oxygenated scaffold might effectively improve islet transplants survival, make this treatment available for a wider population of patients and influence positively survival and quality of life of millions of diabetic patients. Building scaffolds for clinical use [32-34] in orthopaedics and oncologic surgery is also developing. Recently, there has been a significant progress in the development of scaffolds, that could constitute building blocks for organs culture with a use of stem cells [26-28]. There have been attempts to built scaffolds for islets transplantation that could solve problems of lack of ECM after isolation [29]. It has been proved by Authors of this proposal and other team independently, that islets encapsulated in special hydrogels could be used as a "bioink" in 3D bio-fabrication [29-30]. Nevertheless there are several weak points to be solved if one wants to achieve a 3Dprinted scaffold with pancreatic islets, which will be ready for transplantation (and with islets responding to glucose stimulus). To print islets they have to be immersed in some kind of gel, which will have a viscosity that allows of 3D printing but on the others hand glucose will be able to easily go through the matrix material. This situation only will allow islets to response properly for glucose stimuli. So far bioengineered hydrogels like alginate, polyglicane and many others allow to print islets and allow to keep them alive but function of this islets are limited [29]. Another problem that should be solved is the lack of vasculature. All attempts are being done with islets suspended in the hydrogel, suggesting that after transplantation, the vasculature will ingrow into the islets somehow. Unfortunately by the time the vasculature in-grows into the islets, most of them are already dead, because of lack of proper nutrition. The only answer for that problem might be engineering scaffold with vasculature in it and with using proper ECM for bioprinting. It is not an easy

task, but it seems that lately there has been a small breakthrough. Researchers managed to 3D - bioprint vessels with diameter of 0,5 mm diameter, which were physiologically active – nutrients and oxygen were possible to be transported through the wall and cells of endothelium of that vessels produced steady junction between them [31]. Such vessels would be appropriate for islets nutrition within printed scaffolds. Improving of 3D bioprinting technology might help to build scaffolds that will be able to be used in clinical medicine. Of the most importance seems to be engineering an Human Bionic Pancreas with islets and extracellular matrix which could help become an islet transplantation a method of treatment for definitely larger group of patients with diabetes then it is now. Implementation of such Bionic pancreas could lower costs paid on the treatment of diabetes mellitus and its complication and may reverse negative trends which says that diabetes will be one of the most common cause of death by the end of 2030 [2]. Results of that programme will give definitely a great progress in prevention of diabetic complications and help in treatment.

CITE THIS AS

MEDtube Science 2015, Sep 3(3), 25-27

BIBLIOGRAPHY

1. WHO Global InfoBase. https://apps.who.int/infobase
2. Mathers CD, Loncar D.Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med. 2006 Nov;3(11):e442.
3. WHO. The global burden of disease: 2004 update. Geneva: World Health Organization, 2008.
4. US Dep. Health Hum. Serv. Donate the Gift of Life Statistics and Figures. US Dep Health Hum Serv; Washington, DC: 2014. The need is real: data. retrieved February 26, 2014http:// www.organdonor.gov/about/data.html
5. Patterson CC, Dahlquist GG, Gyurus E, et al. Incidence trends for childhood type 1 diabetes in Europe during 1989Y2003 and predicted new cases 2005Y20: a multicentre prospective registration study. Lancet 2009; 373: 2027.
6. Imperatore G, Boyle JP, Thompson TJ, et al., SEARCH for Diabetes in Youth Study Group. Projections of type 1 and type 2 diabetes burden in the U.S. population aged G20 years through 2050. Diabetes Care 2012; 35: 2515.
7. Michalak G., Kwiatkowski A, Czerwinski J, Chmura A, Wszola M et al. Surgical Complications of Simultaneous Pancreas–Kidney Transplantation: A 16-Year-Experience at One Center Transplant Proc. 2005 Oct;37(8): 3555-3557.
8. Fiorina P, Shapiro J, Ricordi C, Secchi A. The clinical impact of islets transplantation. Am J of Transplantation 2008;8:1990-97.
9. O. Korsgren, T. Lundgren et al.: Optimising islet engraftment is critical for successful clinical islet transplantation. Diabetologia 2008; 51:227–232.
10. Merani S, Tosso C, Emammauelle J, Shapiro J. Optimal implantation site for pancreatic islets transplantation. British Journal of Surgery 2008:95;1449-1461.
11. Wszola M, Berman A, Fabisiak M et al. TransEndoscopic Gastric Sub-Mucosa Islet Transplantation (eGSM-ITx) in pigs with streptozotocine induced diabetes - technical aspects of the procedure - preliminary report. Ann Transplant. 2009 Apr-Jun;14(2):45-50.
12. Wszola M, Kwiatkowski A, Berman A et al. Case of successful Endoscopic Pancreatic Islets auto-transplantation into gastric sub-mucosa in patient with chronic pancreatitis - preliminary report. Transplantation 2013 September 27, 2013 - Volume 96.
13. Wszola M, Kwiatkowski A, Berman A et al. Early results and technical aspects of endoscopic islets autotransplantation in a patient with contraindication to transplantation into the portal vein. Medtube Science Dec.2013; 1(1), 6-9.
14. Echeverri GJ, McGrath K, Bottino R, Hara H, Dons EM, van der Windt DJ, Ekser B, Casu A, Houser S, Ezzelarab M, Wagner R, Trucco M, Lakkis FG, Cooper DK. Endoscopic gastric submucosal transplantation of islets (ENDO-STI): technique and initial results in diabetic pigs. Am J Transplant. 2009 Nov;9(11):2485-96.Russel SJ, El-Khatib FH, sinha M et al. Outpatient glycemic control with a bionic pancreas in type 1 diabetes. N Engl J Med. 2014 Jul 24;371(4):313-25.
15. Russel SJ, El-Khatib FH, sinha M et al. Outpatient glycemic control with a bionic pancreas in type 1 diabetes. N Engl J Med. 2014 Jul 24;371(4):313-25.
16. Wolf E, Braun-Reichhart C, Streckel E, Renner S. Genetically engineered pig models for diabetes research. Transgenic Res. 2014 Feb;23(1):27-38.
17. Chaudhury K, Kumar V, Kandasamy J, RoyChoudhury S. Regenerative nanomedicine: current perspectives and future directions. Int J Nanomedicine. 2014 Sep 1;9:4153-4167. eCollection 2014.
18. Global health risks. Mortality and burden of disease attributable to selected major risks. Geneva, World Health Organization, 2009.
19. Wilson CA. Porcine endogenous retroviruses and xenotransplantation. Cell Mol Life Sci. 2008 Nov;65(21):3399-412.
20. Malenczyk K, Jazurek M, Keimpema E, Silvestri C, Janikiewicz J, Mackie K, Di Marzo V, Redowicz MJ, Harkany T, Dobrzyn A.: CB1 cannabinoid receptors couple to focal adhesion kinase to control insulin release. J Biol Chem (2013) 288(45):32685-99
21. Janikiewicz J, Hanzelka K, Dziewulska A, Kozinski K, Dobrzyn P, Bernas T, Dobrzyn A: Inhibition of SCD1 impairs palmitate-derived autophagy at the step of autophagosome-lysosome fusion in pancreatic β-cells. J Lipid Res (2015) 56(10):1901-11.
22. Malenczyk K, Keimpema E, Piscitelli F, Calvigioni D, Björklund P, Mackie K, Di Marzo V, Hokfelt TGM, Dobrzyn A, Harkany T.: Fetal endocannabinoids orchestrate the organization of pancreatic islet microarchitecture. Proc Natl Acad Sci U S A. (2015) – in press
23. Roth EA et al. Inkjet printing for high-throughput cell patterning Biomaterials 25 (2004) 3707–3715
24. Chang JW, Park SA, Park JK et al. Tissue-engineered tracheal reconstruction using three-dimensionally printed artificial tracheal graft: preliminary report. Artif Organs. 2014 Jun;38(6):E95-E105.
25. Atala A, Bauer SB, Soker S, Yoo JJ, Retik AB. Tissue-engineered autologous bladders for patients needing cystoplasty. Lancet 2006;367:1241–6.
26. Karina H. Nakayama, Cynthia A. Batchelder, Chang I. Lee and Alice F. Tarantal. Decellularized Rhesus Monkey Kidney as a Three-Dimensional Scaffold for Renal Tissue Engineering. Tissue Engineering: Part A Volume 16, Number 7, 2010.
27. Sullivan DC, Sayed-Hadi Mirmalek-Sani, Deegan DB et al. Decellularization methods of porcine kidneys for whole organ engineering using a high-throughput system. Biomaterials 33 (2012) 7756-7764.
28. Saik-Kia Goh, Bertera S, Olsen P et al. Perfusion-decellularized pancreas as a natural 3D scaffold for pancreatic tissue and whole organ engineering. Biomaterials 34 (2013) 6760-6772.
29. Marchioli G, van Gurp L, van Krieken PP et al. Fabrication of three-dimensional bioplotted hydrogel scaffolds for islets of Langerhans transplantation. Biofabrication. 2015 May 28;7(2):025009
30. Wszola M, Constantini M, Berman A et al. Using human pancreatic islets as a bioink for 3D bioprinting for bioengineering an artificial pancreas-preliminary report. IPITA report, Transplantation 2015.
31. Vivian K. Lee, Diana Y. Kim, Haygan Ngo, Young Lee, Lan Seo, Seung-Schik Yoo, Peter A. Vincent, Guohao Dai Creating perfused functional vascular channels using 3D bio-printing technology. Biomaterials (2014), Volume 35, Issue 28, Pages 8092-8102.
32. IdaszekJ, Zinn M, Bruinink A, Obarzanek-Fojt M, Święszkowski W. Materials Science and Enginerring C: Materials for Biological Applications; Vol. 33:7 (2013), 4352–4360
33. Idaszek J, Zell V, Bruinink A, Swieszkowski W.: PCL-based scaffolds with degradation profiles tuned to various treatment strategies of bone; European Cells and Materials; Vol. 26, Suppl. 4, 2013.
34. Biomechanical properties of native and tissue engineered heart valve constructs. Hasan A, Ragaert K, Swieszkowski W, Selimović S, Paul A, Camci-Unal G, Mofrad MR, Khademhosseini A. J Biomech. 2014 Jun 27;47(9):1949-63.
35. Fehily D., Uhrynowska-Tyszkiewicz I., Creusvaux H., Pariente-Khayat A., Kaminski A et al. Vigilance: lessons learned from the tissue and cell experience in the European Union. Part 1: reporting and communication. Organs Tissues & Cells, 16(3): 165-173, 2013.

INSTRUCTIONS FOR AUTHORS

MEDtube *Science* is an **open access** journal of MEDtube community and is addressed to all medical professionals – doctors, clinicians, scientists who are interested in achievements in basic and clinical medical science. The journal has the international scope. It is published quarterly and exclusively in English. Original articles, reviews, case reports, rapid communications, special articles and letters to the Editor in both basic and clinical medical research are accepted for publication with special respect to manuscripts enriched with multimedia such as video or pictures.

REVIEW PROCESS

The Editorial Board considers only papers with substantial influence and a new insight in presented research. All authors of manuscript must agree for the publication and the signature of first or corresponding author on the letter to editor is considered that this condition has been fulfilled.

Manuscript is first examined by editor-in-Chief or Editor and the assigned to three independent reviewers. Manuscripts that are not accepted for reviewing process will be sent back to authors without scientific as well as papers, which are incomplete or not prepared according to "instruction for authors" within 10 working days. All manuscripts must be prepared in English, and are subject to a rigorous and fair peer-review process. All authors are encouraged to suggest the names of possible reviewers (with e-mail addresses), but we reserve the right of final selection. The evaluation process takes up to 3 months. Submitted papers are accepted for publication after a positive opinion of at least two independent reviewers.

CONFLICT OF INTERESTS

MEDtube Science policy requires that the corresponding or lead author of all manuscripts (on behalf of all authors in the paper should disclose any A) financial interests or arrangements with a company whose product was used in a study or is referred to in a manuscript, B) any financial interests of arrangement with a competing company, C) any direct payment to an any author from any source for the purpose of writing of the assigned manuscript, D) any other financial connections or other situations that might raise the question of bias in the work reported or the conclusions or opinions stated. All those information during peer-review will be kept in confidence but if paper is accepted for publication, all those information must be published in a note following the text of a manuscript. If the manuscript is published, such information must be communicated in a note following the text, before the references.

PUBLICATION ETHIC STATEMENT

Any infringements of ethical codes, such as plagiarism, unauthorized use of data will be taken very seriously by our editors. The submitted paper should not have been previously published in any form in other journal and must not be currently under consideration for publication elsewhere.

COPYRIGHT. COPYRIGHT TRANSFER

Upon acceptance, authors transfer copyright to the MEDtube Science. Once an article is accepted for publication in MEDtube Science, the information there is prohibited from reporting by the media until the mail date of the issue in which the article appears.

Upon acceptance all published manuscripts become the permanent property of MEDtube Co. Ltd., the Publisher of MEDtube Science, and may not be published elsewhere without written permission from the Publishing Company.

Open Access policy of Publisher permits unrestricted use, distribution and reproduction in any medium, provided that the original work is properly cited.

DISCLAIMER

Publisher and the Editorial Board accept no liability whatsoever for the consequences of any inaccurate of misleading data, opinion or statement placed in articles. Every effort is made to ensure that all data and techniques are presented accurately. Nevertheless, readers are advised that methods and techniques described in MTScience, should only be followed in conjunction with the treatments' states-of-the-art in the readers own country.

PUBLISHING MODEL AND AUTHORS FEES

The submission and peer-review of manuscripts are free of charge. Accepted manuscripts at that moment are also free of charge.

CATEGORIES OF ARTICLES

Accepted papers are published in the following journal sections:

- Original article
- Case Reports
- Medical Technology – presentation of research or review works in areas of medicine and technology such us: medical imaging, diagnostics, computer simulation of health and disease processes, new medical devices etc.
- Letters to Editor for comments on a recent MTScience articles.
- Reviews and special reports
- Meta-analyses

PREPARATION OF MANUSCRIPT

Guidelines for submission to MEDtube Science are in accordance with: Uniform Requirements for Manuscripts Submitted to Biomedical Journals (N Eng J Med, 1997; 336: 309-15).

Text should be one and half spaced with 12-point typeface. Margins: 2.5 cm (1 inch) at top, bottom, right, and left.

Authors are encouraged to add ilustrations/ pictures and films to manuscript which could show technical aspects of presented work. Format of films should be: avi or similar and pictures jpg or similar

The Editorial Board reserves the privilege to adjust the format of the article.

The manuscript should include:

Title page with the following information:

- manuscript full title
- full names of all authors
- name of the department and institution in which the work was done
- affiliations of the authors
- running titl
- full name, address, telephone and/or fax number of the author responsible for manuscript preparation
- key words (3 to 6)
- e-mail address to contact with corresponding author
- source(s) of support in the form of grants (quote the number of the grant) equipment, drugs etc.

Abstract page. Abstract should not exceed 250 words should consist of four paragraphs labeled: Background, Material and Methods, Results, Conclusion.

Text. The text of the article should be divided to seven paragraphs labeled: Background, Material and Methods, Results, Discussion, Conclusions, Acknowledgements, References.

Background should contain scientific rationale and should briefly

describe the aim of the study

Material and methods should describe clearly the selection of observational or experimental subjects. Videos, in that section, are very much welcomed.

The protocol of procedures, methods of measurements, investigated parameters should be described in detail to allow to reproduce the results. Name and references to the established methods should be given. Methods should be described in detail.

The statistical methods should be described in detail to enable verification of the reported results.

Information on approval of a Local Ethical Committee should also be enclosed.

Results should reasonably present the findings. Videos are very much welcomed. Restrict tables and figures to the number necessary to explain the paper and assess its support. Do not duplicate data in graphs and tables.

Discussion should focus on important aspects of the study. Do not duplicate data or other material from other sections (the Background or the Results). Include implications for future research. The discussion should be collated with the results of other investigations especially those quoted in the text.

Conclusions should raised from the results of the study. Statements and conclusions, which are not completely supported, should be avoided.

Acknowledgements. List all contributors who do not meet the criteria for authorship. Financial and other material support should be disclosed and acknowledged.

References must be numbered as they are cited. The style of references is that of Index Medicus. List all authors when there are six or below that number; when there are seven or more, list the first three, then et al. The following is a sample reference:

Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection. Infect Control Hosp Epidemiol 1999; 20 (4): 250-278.

Avoid using abstracts as references.

Tables. Type or print out each table on a separate sheet of paper. Do not submit tables as photographs. Number tables in the order of their first citation in the text, and add a title for each.

Figures should be professionally drawn and photographed; freehand or typewritten lettering is unacceptable. Figures should be numbered according to the order in which they have been first cited in the text.

Photographs should be color or black & white. Photographs should be numbered according to the order in which they have been first cited in the text.

Videos should be in format avi and should be numbered according to the order in which they have been first cited in the text.

Abbreviations and Symbols. Try to use only standard abbreviations. All should be explained when first used in text unless it is standard and commonly used.

SENDING THE MANUSCRIPT TO THE JOURNAL

All manuscripts should be sent by our on line protocol. Only logged user can send manuscript. Details:

http://medtube.net/science/for-authors/#send