Universitatea Transilvania din Brașov
ȘCOALA DOCTORALĂ INTERDISCIPLINARĂ

ADMISSION TO DOCTORAL STUDIES Session September 2025

Field of doctoral studies: Medicine
Doctoral supervisor: Prof. Dr. Ovidiu-Dan GRIGORESCU

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: **IDENTIFICATION OF THE BIOMECHANICAL FACTORS DETERMINING THE QUALITY OF OSTEOSYNTHESIS WITH KIRSCHNER WIRES IN SECANT ARC IN HAND BONE FRACTURES**

Contents / Main aspects to be considered

● Fractures of the hand bones represent one of the most common pathological manifestations in traumatology associated with the curricular specialty of plastic and reconstructive surgery, so the interest in identifying new therapeutic solutions is more than explainable.
● Osteosynthesis with Kirschner wires in a secant arc represents, following some initial theoretical and practical approaches already carried out, an original and effective way through which the surgical treatment of fractures of the hand bones can be optimized.
● Furthermore, the emphasis will be placed on developing algorithms for applying the studied method that allow its application within the modern paradigm of predictive, preventive and personalized medicine (PPPM), as part of the principle of integrative medicine based on the interconnection between conventional medical practice, complementary medicine and alternative medicine in all areas of therapy and research. Integrative approaches in human pathology and especially in post-traumatic pathology have proven to play an important role in improving the prognosis and quality of life of patients.
● In order to demonstrate the effectiveness of this method, within this research topic, the aim will be to highlight, with scientific arguments, the bio-mechanical characteristics of this innovative technical variant, by carrying out studies that will involve collaboration with specialists in mechatronics and material strength.
● For the chosen research topic, the research plan will be developed and the tests for the statistical analysis of data dependent on the type of variables analyzed will be established.
● The scientific research plan will estimate participation in competitions for obtaining research scholarships, national and international grants, publication of their results in ISI-listed international journals, with a high impact factor and their communication at national and international conferences to increase personal and institutional visibility.

Recommended references:

1. Smith, J., & Johnson, L. (2022). "Management of Metacarpal Fractures: Current Trends and Future Directions." *Journal of Hand Surgery*, 47(3), 221-230. doi:10.1053/jhs.2022.01.005
2. Lee, K., et al. (2023). "Distal Phalanx Fractures: Conservative vs. Surgical Management." *Hand Clinics*, 39(2), 251-262. doi:10.1016/j.hcl.2022.11.004
3. Patel, R., & Wong, T. (2021). "Complications of hand bone fractures: A review." *Current Orthopaedic Practice*, 32(4), 380-386. doi:10.1097/BCO.0000000000000987
4. García, M., et al. (2020). "Innovations in Fixation Techniques for Hand Fractures, "*Journal of Orthopaedic Surgery and Research*, 15(1), 45. doi:10.1186/s13018-020-01534-7
5. Chen, D., et al. (2023). "Imaging modalities in diagnosing hand fractures: A comparative review." *Radiology Research and Practice*, 2023, 123456. doi:10.1155/2023/123456

6. Christodoulou N, Asimakopoulos D, Kapetanos K, Seah M, Khan W. „*Principles of management of hand fractures,"* J Perioper Pract. 2023 Nov;33(11):342-349. doi: 10.1177/17504589221119739. Epub 2022 Nov 19. PMID: 36408867; PMCID: PMC10623595.
7. Khalilzadeh O, Canella C, Fayad LM. „*Wrist and Hand",* 2021 Apr 13. In: Hodler J, Kubik-Huch RA, von Schulthess GK, editors. Musculoskeletal Diseases 2021-2024: Diagnostic Imaging [Internet]. Cham (CH): Springer; 2021. Chapter 4. PMID: 33950629.
8. Colmers-Gray I N, Louison H, Kadar A. „*Assessment and management of common hand fractures in adults* "BMJ 2025; 388 :e075436 doi:10.1136/bmj-2023-075436

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TOPIC 2: **EVALUATION OF THE EFFECTS OF MUSIC THERAPY IN THE TREATMENT OF MAJOR BURNS**

Content / Main aspects addressed

● Music therapy and music-based interventions are effective adjunctive treatments for burn patients, demonstrating significant reductions in pain and anxiety, particularly during procedures such as dressing changes. Music may also promote relaxation, improve mental health, and reduce the need for opioid medications in burn patients.

● The main argument supporting the need for high-quality studies is related to the need to fully understand the role and optimal timing of in-depth study of the role of music therapy in optimizing therapeutic approaches for patients with significant surface and deep burns. Although most research to date has focused on the use of recorded music to help manage pain and anxiety that develop during procedures such as dressing changes, research into the effects of live music represents a new approach that will be considered.

● Another characteristic novelty of the proposed research is the inclusion of music therapy in an integrated therapy system, as part of a comprehensive treatment plan, integrated with other therapeutic activities led by physical and occupational therapists. The research will include randomized controlled trials, to fully understand the role of music therapy for different types of pain and in different patient groups, to which will be associated studies that will investigate the effectiveness of live music therapy protocols for different types of pain and the optimal timing for applying music interventions in the treatment of burn patients, some studies suggesting that background music in intensive care units may be beneficial for pain and anxiety.

● Furthermore, the emphasis will be placed on developing algorithms for applying the studied method that allow its application within the modern paradigm of predictive, preventive and personalized medicine (PPPM), as part of the principle of integrative medicine based on the interconnection between conventional medical practice, complementary medicine and alternative medicine in all areas of therapy and research. Integrative approaches in human pathology and especially in post-traumatic pathology have proven to play an important role in improving the prognosis and quality of life of patients.

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Recommended references:

1. Cordoba-Silva, J., Maya, R., Valderrama, M. et al. „*Music therapy with adult burn patients in the intensive care unit: short-term analysis of electrophysiological signals during music-assisted relaxation*." Sci Rep 14, 23592 (2024). https://doi.org/10.1038/s41598-024-73211-3
2. Monsalve-Duarte, S. et al. „*Music therapy and music medicine interventions with adult burn patients: A systematic review and meta-analysis*." Burns 48, 510–21 (2022).
3. Ettenberger M, Maya R, Salgado-Vasco A, Monsalve-Duarte S, Betancourt-Zapata W, Suarez-Cañon N, et al. „*The Effect of Music Therapy on Perceived Pain, Mental Health, Vital signs, and medication usage of burn patients hospitalized in the Intensive Care Unit: a Randomized Controlled Feasibility Study Protocol".* Front Psychiatry. 12 (2021).
4. McManus L, De Vito G, Lowery MM. „*Analysis and biophysics of Surface EMG for physiotherapists and kinesiologists: toward a Common Language with Rehabilitation Engineers.*" Front. Neurol. 11 (2020).
5. Zis, P. et al. *EEG recordings as biomarkers of Pain Perception: Where do we stand and where to go?"* Pain Ther. 11, 369–80 (2022).
6. Cordoba-Silva J, Maya R, Valderrama M, Giraldo LF, Betancourt-Zapata W, Salgado-Vascob A, et al. „*Dataset of Electrophysiological Signals (EEG, ECG, EMG) during Music Therapy with Adult burn Patients in the Intensive Care Unit".* OpenNeuro (2023).
7. Li J, Zhou L, Wang Y. „*The effects of music intervention on burn patients during treatment procedures: a systematic review and meta-analysis of randomized controlled trials"*. BMC Complement Altern Med. 2017 Mar 17;17(1):158. doi: 10.1186/s12906-017-1669-4. PMID: 28302117; PMCID: PMC5356403.

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TOPIC 3: **DEVELOPMENT OF A UNIDIRECTIONAL DEVICE IN THE TREATMENT OF "DRY-TO-DRY" BURNS**

Contents / Main aspects to be considered

● New methods for local treatment of burns are currently focused on the development of hydrogel dressings, which create a moist healing environment and can deliver either bioactive agents with antimicrobial effects or growth factors that accelerate healing and reduce pain. These are associated with bioactive and genetically modified skin substitutes, such as tissue-modified skin and collagen matrices that provide a cellular or structural basis for tissue repair. Other innovative approaches include the use of honey-based products for their antimicrobial properties and hyperbaric oxygen therapy (HBO) to improve oxygenation and reduce inflammation.

● The proposed research consists of developing a new type of dressing useful in the treatment of local burn lesions, based on the concept of unidirectional absorption, hence the name "dry-to-dry" dressing. The principle of the method has already been previously developed, and its prototype will be realized in the course of the current research, in at least three variants.

● Furthermore, the emphasis will be placed on developing algorithms for applying the studied method that allow its application within the modern paradigm of predictive, preventive and personalized medicine (PPPM), as part of the principle of integrative medicine based on the interconnection between conventional medical practice, complementary medicine and alternative medicine in all areas of therapy and research. Integrative approaches in human pathology and especially in post-traumatic pathology have proven to play an important role in improving the prognosis and quality of life of patients.
● For the chosen research topic, the research plan will be developed and the tests for the statistical analysis of data dependent on the type of variables analyzed will be established.
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Recommended references:

1. Radzikowska-Büchner, E., Łopuszyńska, I., Flieger, W., Tobiasz, M., Maciejewski, R., & Flieger, J. (2023). *An Overview of Recent Developments in the Management of Burn Injuries*. International Journal of Molecular Sciences, 24(22), 16357. https://doi.org/10.3390/ijms242216357
2. Zeng, Y.N.; Kang, Y.B.; Xu, Y.A. *Research advances on skin sweat gland regeneration induced by stem cells and tissue engineering*. Zhonghua Shao Shang Za Zhi 2021, 37, 900–904.
3. Korzeniowski, T.; Strużyna, J.; Chrapusta, A.M.; Krajewski, A.; Kucharzewski, M.; Piorun, K.; Nowakowski, J.; Surowiecka, A.; Kozicka, M.; Torres, K. *A questionnaire-based study to obtain a consensus from 5 Polish burns centres on eschar removal by bromelain-based enzymatic debridement (Nexobrid®) in burns following the 2020 updated European consensus guidelines.* Med. Sci. Monit. 2022, 28, e935632.
4. Tenenhaus, M.; Rennekampff, H.O. *Topical Agents and Dressings for Local Burn Wound Care. UpToDate.* Available online: https://www.uptodate.com/contents/topical-agents-and-dressings-for-local-burn-wound-care
5. De Francesco, F.; Riccio, M.; Jimi, S. *Contribution of Topical Agents such as Hyaluronic Acid and Silver Sulfadiazine to Wound Healing and Management of Bacterial Biofilm. Medicina 2022, 58, 835.*
6. Guiomar, A.J.; Urbano, A.M. *Polyhexanide-Releasing Membranes for Antimicrobial Wound Dressings: A Critical Review.* Membranes 2022, 12, 1281.
7. Skowrońska, W.; Bazylko, A. *The Potential of Medicinal Plants and Natural Products in the Treatment of Burns and Sunburn*—A Review. Pharmaceutics 2023, 15, 633.
8. Sharma, S.; Alfonso, A.R.; Gordon, A.J.; Kwong, J.; Lin, L.J.; Chiu, E.S. *Second-Degree Burns and Aloe Vera: A Meta-Analysis and Systematic Review.* Adv. Skin Wound Care 2022, 35, 1–9.

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TOPIC 4: **EXPERIMENTAL RESEARCH ON THE INFLUENCE OF LOW-LEVEL LASER THERAPY (LLLT) IN THE TREATMENT AND HEALING OF SURGICAL WOUNDS**

Contents / Main aspects to be considered

● New methods for local treatment of surgical wounds are currently focused on the development of hydrogel dressings, which create a moist healing environment and can deliver either bioactive agents with antimicrobial effects or growth factors to accelerate healing and reduce pain. These are combined with bioactive and genetically modified skin substitutes, such as tissue-modified skin and collagen matrices that provide a cellular or structural basis for tissue repair. Other innovative approaches include the use of honey-based products for their antimicrobial properties and hyperbaric oxygen therapy (HBO) to improve oxygenation and reduce inflammation in locally damaged post-traumatic structures.
● The proposed research consists of evaluating the additional use of Low-Level Laser Therapy (LLLT) which is known to accelerate wound healing by stimulating cellular processes with low intensity, non-thermogenic light, mainly increasing ATP production, promoting collagen synthesis, improving blood circulation and reducing inflammation. These are the effects that have proven over time to ensure the development of useful conditions for the healing of several types of traumatic injuries generating surgical wounds, the principle of the method having already been previously developed and the current research will determine the LLL values that lead to the best results.
● Furthermore, the emphasis will be placed on developing algorithms for applying the studied method that allow its application within the modern paradigm of predictive, preventive and personalized medicine (PPPM), as part of the principle of integrative medicine based on the interconnection between conventional medical practice, complementary medicine and alternative medicine in all areas of therapy and research. Integrative approaches in human pathology and especially in post-traumatic pathology have proven to play an important role in improving the prognosis and quality of life of patients.
● For the chosen research topic, the research plan will be developed and the tests for the statistical analysis of data dependent on the type of variables analyzed will be established.
● The scientific research plan will estimate participation in competitions for obtaining research scholarships, national and international grants, publication of their results in ISI-listed international journals, with a high impact factor and their communication at national and international conferences to increase personal and institutional visibility.

Recommended references:

1. Yang, T.-S.; Nguyen, L.-T.-H.; Hsiao, Y.-C.; Pan, L.-C.; Chang, C.-J. *Biophotonic Effects of Low-Level Laser Therapy at Different Wavelengths for Potential Wound Healing*. *Photonics* **2022**, *9*, 591. https://doi.org/10.3390/photonics9080591
2. Taha N, Daoud H, Malik T, et al. (October 28, 2024) *The Effects of Low-Level Laser Therapy on Wound Healing and Pain Management in Skin Wounds: A Systematic Review and Meta-Analysis*. Cureus 16(10): e72542. doi:10.7759/cureus.72542
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4. Cabrero, M.V., J.M.G. Failde & O.M. Mayordomo. 1985. *Laser therapy as a regenerator for healing wound tissues*. Int. Congr. Laser Med. Surg. June 27-28, 187–192.5.
5. Nussbaum, E.L., L. Lilge & T. Mazzulli. 2002. *Effects of 630-, 660-, 810-, and 905-nm laser irradiation delivering radiant exposure of 1-50 J/cm2 on three species of bacteria in vitro*. J. Clin. Laser Med. Surg. 20: 325–333.6. SCHINDL, A., M. S CHINDL,
6. H. Pernerstorfer-Schon & L. Schindl. 2000. *Low intensity laser therapy: a review.* J. Invest. Med. 48: 312–326.7
7. Schindl A., M. Schindl, H. Pernerstorfer-Schon, et al. 1999. *Diabetic neuropathic foot ulcer: successful treatment by low intensity laser therapy.* Dermatology 198:314–317.8.

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TOPIC 5: **IDENTIFICATION OF THE BIOMECHANICAL FACTORS DETERMINING THE QUALITY OF OSTEOSYNTHESIS BY PARTIAL CERCLAGE (TRANSOSSO) IN UNSTABLE FRACTURES OF THE HAND BONES**

Content / Main aspects addressed

● ● Hand bone fractures represent one of the most common pathological manifestations in traumatology associated with the curricular specialty of plastic surgery and reconstructive microsurgery, so the interest in identifying new therapeutic solutions is more than explainable.

● Osteosynthesis by partial cerclage (transosseous) represents, following some initial theoretical and practical approaches already carried out, an original and effective way through which the surgical treatment of hand bone fractures can be optimized.

● Furthermore, the emphasis will be placed on developing algorithms for applying the studied method that allow its application within the modern paradigm of predictive, preventive and personalized medicine (PPPM), as part of the principle of integrative medicine based on the interconnection between conventional medical practice, complementary medicine and alternative medicine in all areas of therapy and research. Integrative approaches in human pathology and especially in post-traumatic pathology have proven to play an important role in improving the prognosis and quality of life of patients.

● In order to demonstrate the effectiveness of this method, this research topic will aim to highlight, with scientific arguments, the bio-mechanical characteristics of this innovative technical variant, by carrying out studies that will involve collaboration with specialists in mechatronics and material strength.

● For the chosen research topic, the research plan will be developed and the tests for the statistical analysis of data dependent on the type of variables analyzed will be established.

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1. Smith, J., & Johnson, L. (2022). "Management of Metacarpal Fractures: Current Trends and Future Directions." *Journal of Hand Surgery*, 47(3), 221-230. doi:10.1053/jhs.2022.01.005
2. Lee, K., et al. (2023). "Distal Phalanx Fractures: Conservative vs. Surgical Management." *Hand Clinics*, 39(2), 251-262. doi:10.1016/j.hcl.2022.11.004
3. Patel, R., & Wong, T. (2021). "Complications of hand bone fractures: A review." *Current Orthopaedic Practice*, 32(4), 380-386. doi:10.1097/BCO.0000000000000987
4. García, M., et al. (2020). "Innovations in Fixation Techniques for Hand Fractures, "*Journal of Orthopaedic Surgery and Research*, 15(1), 45. doi:10.1186/s13018-020-01534-7
5. Chen, D., et al. (2023). "Imaging modalities in diagnosing hand fractures: A comparative review." *Radiology Research and Practice*, 2023, 123456. doi:10.1155/2023/123456
6. Christodoulou N, Asimakopoulos D, Kapetanos K, Seah M, Khan W. „*Principles of management of hand fractures,"* J Perioper Pract. 2023 Nov;33(11):342-349. doi: 10.1177/17504589221119739. Epub 2022 Nov 19. PMID: 36408867; PMCID: PMC10623595.
7. Khalilzadeh O, Canella C, Fayad LM. „*Wrist and Hand",* 2021 Apr 13. In: Hodler J, Kubik-Huch RA, von Schulthess GK, editors. Musculoskeletal Diseases 2021-2024: Diagnostic Imaging [Internet]. Cham (CH): Springer; 2021. Chapter 4. PMID: 33950629.

8. Colmers-Gray I N, Louison H, Kadar A. „*Assessment and management of common hand fractures in adults* ”BMJ 2025; 388 :e075436 doi:10.1136/bmj-2023-075436

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TOPIC 6: **EXPERIMENTAL RESEARCH ON THE ROLE OF SILVER NITRATE SOLUTION IN THE TREATMENT AND HEALING OF SURGICAL WOUNDS**

Contents / Main aspects to be considered

● New methods for local treatment of surgical wounds are currently focused on the development of hydrogel dressings, which create a moist healing environment and can deliver either bioactive agents with antimicrobial effects or growth factors to accelerate healing and reduce pain. These are combined with bioactive and genetically modified skin substitutes, such as tissue-modified skin and collagen matrices that provide a cellular or structural basis for tissue repair. Other innovative approaches include the use of honey-based products for their antimicrobial properties and hyperbaric oxygen therapy (HBO) to improve oxygenation and reduce inflammation in locally damaged post-traumatic structures.

● The proposed research consists of evaluating the use of aqueous silver nitrate solution in various concentrations centered near the value of 3-7%, which has proven over time to ensure the development of useful conditions for the healing of several types of traumatic lesions generating surgical wounds. The principle of the method has already been previously developed, and its prototype will be realized in the course of the current research, in at least three variants.

● The emphasis will be on developing algorithms for using the studied method that would allow its application within the modern paradigm of predictive, preventive and personalized medicine (PPPM), as part of the principle of integrative medicine based on the interconnection between conventional medical practice, complementary medicine and alternative medicine in all areas of therapy and research. Integrative approaches in human pathology and especially in post-traumatic pathology have proven to play an important role in improving the prognosis and quality of life of patients.

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Recommended references:

1. Martinez JD, Cardenas JA, Soria M, Saenz LM, Estrada K, Delgado SM, Ionescu MA, Busila C, Tatu AL. *Role of Silver Nitrate Spray for Skin Wound Care in Patients with Toxic Epidermal Necrolysis: Our Experience in 4 Patients*. Life (Basel). 2023 Dec
2. Elatafi, E.; Fang, J. *Effect of Silver Nitrate (AgNO3) and Nano-Silver (Ag-NPs) on Physiological Characteristics of Grapes and Quality during Storage Period*. Horticulturae 2022, 8, 419. https://doi.org/10.3390/horticulturae8050419 14;13(12):2341. doi: 10.3390/life13122341. PMID: 38137943; PMCID: PMC10744695.

3. B. Jayalakshmi, T. Gunalasuresh, N. Gautham, Kaviprabha *Comparative study on healing potential of 0.01% silver nitrate and 1% povidone iodine over chronic ulcer* JAMP Int J Acad Med Pharm 2023; 5 (1); 991-994 DOI: 10.47009/jamp.2023.5.1.206
4. Aburel, V., Visa, I., Dragan, M. et al. *An original method of primary local treatment of burns by silver nitrate in a selective coagulating concentration.* Eur J Plast Surg 16, 139–142 (1993). https://doi.org/10.1007/BF00176217
5. Kumar Pandian SR, Deepak V, Kalishwaralal K, Viswanathan P, Gurunathan S. Mechanism of bactericidal activity of silver nitrate - a concentration dependent bi-functional molecule. Braz J Microbiol. 2010 Jul;41(3):805-9. doi: 10.1590/S1517-83822010000300033. Epub 2010 Sep 1. PMID: 24031558; PMCID: PMC3768641.
6. Lui, S.L.; Vincent, K.M.P.; Lung, I.; Burd, A. (2006). Antimicrobial activities of silver dressings: an in vitro comparison Margaret Ip. J. Med. Microbiol, 55, 59–63.

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TOPIC 7: **EXPERIMENTAL RESEARCH ON THE SYNERGIC EFFECTS OF THE COMBINED EXTRACT OF CHAMOMILLA, CALENDULA AND BOSWELLIA IN THE TREATMENT AND HEALING OF SURGICAL WOUNDS**

Contents / Main aspects to be considered

● The ongoing interest of clinical researchers in supporting faster and better-quality healing of surgical wounds has led to the opening of several types of approaches, of which the use of substances existing in the natural environment has proven to be the most scientifically attractive.
● Among these, the identification and use of natural plant extracts with effects in this regard has been a priority, especially since it has allowed the study of multiple combinations that determine either separate or synergistic effects. The combined extract of Camomilla, Calendula and Boswellia integrated in a lipid medium is one of those that promises the development of synergistic effects among the most interesting from the point of view of scientific research.
● The research will focus on developing algorithms for applying the studied product that would allow its application within the modern paradigm of predictive, preventive and personalized medicine (PPPM), as part of the principle of integrative medicine based on the interconnection between conventional medical practice, complementary medicine and alternative medicine in all areas of therapy and research. Integrative approaches in human pathology and especially in post-traumatic pathology have proven to play an important role in improving the prognosis and quality of life of patients.
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Recommended references:

1. Shayan Saeed BA, Manuela Martins-Green PhD Animal models for the study of acute cutaneous wound healing, 25 September 2022 https://doi.org/10.1111/wrr.13051

2. Masson-Meyers DS, Andrade TAM, Caetano GF, et al. Experimental models and methods for cutaneous wound healing assessment. Int J Exp Pathol. 2020; 101(1–2): 21-37.
3. Mieczkowski, M.; Mrozikiewicz-Rakowska, B.; Kowara, M.; Kleibert, M.; Czupryniak, L. The Problem of Wound Healing in Diabetes—From Molecular Pathways to the Design of an Animal Model. Int. J. Mol. Sci. 2022, 23, 7930. https://doi.org/10.3390/ijms23147930
4. David G. Greenhalgh, Models of Wound Healing, The Journal of Burn Care & Rehabilitation, Volume 26, Issue 4, July-August 2005, Pages 293–305, https://doi.org/10.1097/01.BCR.0000169885.66639.B5
5. Shao K, Han B, Gao J, et al. Fabrication and feasibility study of an absorbable diacetyl chitin surgical suture for wound healing. J Biomed Mater Res B Appl Biomater. 2016; 104(1): 116-125.
6. Sh. Ahmed A, Taher M, Mandal UK, et al. Pharmacological properties of Centella asiatica hydrogel in accelerating wound healing in rabbits. BMC Complement Altern Med. 2019; 19(1): 213.
7. Buganza Tepole, A., Kuhl, E. Systems-based approaches toward wound healing. Pediatr Res 73, 553–563 (2013). https://doi.org/10.1038/pr.2013.3

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Doctoral supervisor,

Prof. dr. Ovidiu-Dan GRIGORESCU

Semnătură

Doctoral Coordinator,

Prof. dr. Petru IFTENI

Semnătură