

FUNDING PROGRAMME: Ministry of Research, Innovation and Digitalization as part of the National Research, Development and Innovation Plan 2022-2027. SUBPROGRAMME: "Henri Coandă" – Research Scholarships	 MINISTERUL CERCETĂRII, INOVĂRII ȘI DIGITALIZĂRII
PROJECT TITLE/ACRONYM: Three-layer Support Based on Collagen and Functionalized Carbon Nanotubes with Drug – A New Concept of Intelligent Dressing with Controlled Release	
CONTRACT NO.: 2/16.01.2024	
TOTAL PROJECT BUDGET: 100,000 RON	INCDTP'S BUDGET: 100,000 RON
PROJECT STARTING DATA: 16/01/2024	PROJECT ENDING DATA: 24/12/2024
WEB PAGE: https://incdtp.ro/icpi/pdf/proiecte/web_Henri%20Coanda_RO.pdf	
PARTNERS: CO: National Research and Development Institute for Textile and Leather (RO) - Mentor Dr. Chim. Madalina ALBU KAYA   Olympiad Students: Bianca Mihaela NEMEȘ and Alexandru MOMOIU, International Computer Science High School, Bucharest, currently students at the University of Pennsylvania and the University of Cambridge, respectively.	
GENERAL OBJECTIVES: The main objective of the project is the development of a biocompatible material based on collagen with a three-layer structure and multiple functions, enabling the healing of injuries regardless of their severity.	
SPECIFIC OBJECTIVES/ EXECUTION PHASES: Objective 1: Development of new biocompatible materials based on collagen, natural/synthetic polymers, and functionalized carbon nanotubes with drugs, and finalizing the technology for their production. Objective 2: Establishing a complete set of physical, chemical, and microbiological characterization for the biological materials obtained. Objective 3: Exploiting results through presentations, publications, and patenting.	
NOVELTY ELEMENTS/ SCIENTIFIC CONCEPT: The project aims to develop a new concept for intelligent wound dressings for tissue regeneration following severe trauma. This dressing is designed to perform multiple functions simultaneously to reduce costs and trauma, being much more efficient than daily dressings. The dressing consists of three layers with different functions: the layer in direct contact with the skin serves a regenerative purpose; the second layer includes microcapsules containing stem cells/growth factors, which, together with collagen, aid in natural tissue repair; and the third layer is a protective layer made of collagen with functionalized carbon nanotubes containing medication. The project resulted in experimental models and testing reports.	
EXPECTED EXPLOITABLE RESULTS: - Experimental Models: a) Hydrogels based on collagen, polyethylene glycol, and fructose b) Microcapsules with growth factors c) Collagen-based support with SWCNT functionalized with drugs d) Intelligent three-layered dressing - Physical, chemical, microbiological, and biocompatibility characterization reports - Project webpage - Patent application submission - Participation in an international competition - Final activity report	
OBTAINED RESULTS: - product: smart dressing for healing skin lesions - physico-chemical, microbiological and biocompatibility test reports - international award (The two students won First Prize and Gold Medals at the <i>Taiwan International Science Fair 2024</i> in the Health & Medical Sciences category). - submission of a research project based on the new dressing concept for certification and introduction into the	

medical market



DISSEMINATION, PATENT APPLICATIONS, AWARDS:

- **Patent Applications:** Bianca Mihaela NEMES, Alexandru MOMOIU, Madalina Georgiana ALBU KAYA, Regenerative wound dressing based on collagen, polyethylene glycol and fructose with controlled porosity and its processing, Patent application No. A00312/11.06.2024.
- **Awards:** First Prize and Gold Medals at the Taiwan International Science Fair 2024 in the Health & Medical Sciences category

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