



## Opinion

# What can Mathematics say about unsolved problems in Medicine?

Marco P Soares dos Santos\*

Department of Mechanical Engineering, University of Aveiro, Campus Universitário de Santiago 3810-193 Aveiro, Portugal

Centre for Mechanical Technology and Automation (TEMA), University of Aveiro, Campus Universitário de Santiago 3810-193 Aveiro, Portugal

**\*Address for Correspondence:** Marco P Soares dos Santos, Department of Mechanical Engineering, University of Aveiro, Campus Universitário de Santiago 3810-193 Aveiro, Portugal, Email: marco.santos@ua.pt

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Nobody doubts that mathematics plays a crucial role in medical achievements. It is certain that is being mainly used in statistics and physics for biomedical problems [1]. For sure that we have already heard about how mathematics can improve the anticancer arsenal [2]. Quantitative genetics have triggered a giant potential in medical care [3,4]. And mathematical algorithms, provided by artificial intelligence, continuously boost new therapeutic paradigms [5,6]. Nonetheless, one cannot ignore the ability of mathematics for analyzing ideas. One can see that when Soares dos Santos and colleagues [7] wondered what mathematics is able to say about how to optimize the performance of implantable medical devices, they wondered about the optimality of their research projects in the first place. What mathematics says about how to design “optimal” devices? It says that current devices are not able to ensure such performance. Will new or improved surgical techniques solve device failures? Mathematics also says «no». Will new or improved materials solve device failures? Mathematics says «it is possible, but it will be harder». Harder than what? Mathematics says: «Harder than instrumented active devices. Medical devices can perform optimal performances if they are active, i.e., if they are able to monitor their own state and the physiological states of the tissues surrounding the device, and if they are able to apply therapeutic actuations to such tissues so that the failure state is conducted to a without-failure state» [7-11]. And mathematics also says that this analysis can be applied to the overall implantable medical devices [7]. One cannot deny that mathematics is a powerful tool to identify what are the key challenges that must be addressed for unsolved problems in medicine. Thanks to mathematics, the universe of concepts is not apart from the clinical practice. However, medical research is being conducted by considering the paradoxicality of mathematics in medicine [1] as an assumption-the first challenge must be to question mathematics about the real accomplishments that our research projects can achieve.

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