#118 - HIGH-DENSITY ZNO NANOWIRES FOR CELLULAR BIOINTERFACES: A NEW ROLE AS MYOGENIC DIFFERENTIATION SWITCH

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The design of artificial platforms for expanding undifferentiated stem cells is of tremendous importance for regenerative medicine [1]. We have recently demonstrated that a ZnO nanowires (NWs) decorated glass support permits to obtain a differentiation switch during proliferation for mesoangioblasts (MABs)– i.e. multipotent progenitor cells which are remarkable candidates for the therapy of muscle diseases [2]. We have optimized the ZnO NWs synthesis on glass surfaces by numerical simulations and experimental systematic investigations, considering zinc speciation and supersaturation [3]. In particular, we demonstrated by numerical simulations that the ligand ethylenediamine, at the isoelectric point of the ZnO NWs tips, can effectively control – at 1:1 stoichiometric ratio with zinc – both speciation and supersaturation of zinc in the nutrient solution. In this regard, we employed ethanolamine (a safer precursor) for *in-situ* producing ethylenediamine by means of a zinc-catalysed amination reaction of ethanolamine by ammonia. The obtained high-quality ZnONWs-cells biointerface allows cells to maintain viability and a spherical viable undifferentiated state during the 8 days observation time. Simulations of the interface by theoretical models [4] and our experimental investigations by SEM and confocal microscopy demonstrate that NWs do not induce any damage on the cellular membrane, whilst blocking their differentiation. More specifically, the myosin heavy chain, typically expressed in differentiated myogenic progenitors, is completely absent. Interestingly, the differentiation capabilities are completely restored upon cell removal from the NW-functionalized substrate and regrowing onto a standard culture glass dish. These results open the way towards unprecedented applications of ZnO NWs for cell-based therapy and tissue engineering [5].

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#119 - COMPETITION AND COOPERATIVITY IN THE SIMULTANEOUS BINDING OF DRUGS AND FATTY ACIDS TO ALBUMIN

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Human serum albumin binds a wide variety of drugs with different structure and affinity and accommodates them into two main binding sites, drug site I (DS1) and drug site II (DS2), which partially or totally overlap with fatty acid (FA) sites. Although multiple binding sites are available