Tympanic membrane (or eardrum) is provided by nature with unique anatomic features that ultimately allow a superb physiologic performance in varying frequency ranges. Several pathologies damage this tissue, including chronic otitis media (COM), which ultimately bring to deafness. Current approaches used for eardrum repair or replacement show sub-optimal hearing outcomes. 4NanoEARDRM aims at filling an exposed gap in COM treatment by providing biomimetic, reliable and highly performant eardrum devices provided with targeted drug delivery and anti-inflammatory activity, finally enabling in situ tympanic membrane regeneration with optimal acoustics. The 4NanoEARDRM device is conceived to be “4 times” “nano”, as it will have nanofibres supportive for cell repopulation, immunomodulatory nanofibrils, drug-delivery nanoparticles, and nanoscale vibration. At the same time, it will be “for” “Nano”, namely, for enabling exploitable nanotechnologies and nanomedicine products in otologic surgery.