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## Drug-protein and drug-gene interactions for clinical research by NAPPA QCM\_D conductimetry

Claudio Nicolini, Nicola Bragazzi and Eugenia Pechkova  
University of Genova, Italy

Conductometric monitoring of drug-gene and drug-protein interactions is of fundamental importance in the field of clinical pharmacology. Here, we present our main findings and characterizations of two important antitubercular (Temozolomide and Cytarabine) interacting with selected genes and proteins, including among the others MLH1, that represents a biomarker of the rate survival of the patients suffering from brain tumors, of the outcome of chemotherapy and resistance to drug itself. We use our previously introduced and described Nucleic Acid Programmable Protein Arrays (NAPPA) based nanoconductometric sensor realized coupling the cell-free protein array with the quartz crystal microbalance with dissipation monitoring (QCM\_D, showing that we are able to perform both pharmacogenomics and pharmacoproteomics tasks, discriminating each drug by its unique conductance curve as well as its interactions with genes and proteins. This is feasible also when multiple genes are spotted on the same well and multiple proteins are expressed. Moreover, we discuss and envisage clinical implications of our experiments.

### Biography

Claudio Nicolini was born in Udine, Italy. He received the doctoral degree in physics from the University of Padua, in 1967. After serving as Adjunct Professor at the University of Bari, he moved for 17 years to the United States, of which he became citizen since 1974, and was originally at Brown University, MIT, and BNL. He then moved to Temple University School of Medicine, Philadelphia, where after a period of intensive training and research in pathology he became Associate Professor of Pathology and then Professor and Chairman of the Biophysics in 1976. In 1985, he was called as "eminent scientist" to the Chair of Biophysics of the University of Genoa, in Italy until 2012, where he was successively Director of Biophysics Institute, DISTBIMO and CIRSDNNOB. From 1993 until now is Life President of the Fondazione ELBA Nicolini and of the Nanoworld Institute. On 2008 has been elected as a Foreign Member of the Russian Academy of Sciences and on 2010 *Honoris Causa* Professor of Biophysics and Nanobiotechnology at Moscow State University. He was Chief Editor of Cell Biophysics (USA), Science and Technology Advisor to Italian Prime Minister Craxi, Member of the National Science and Technology Council upon Parliament election, Scientific Director Industrial Consortium CIREF, Founder Technobiochip; President Polo National Bioelectronics, President Scientific Technological Park of Elba Island. He received several awards and prizes and has authored more than 480 publications in international scientific journals (SCI), 35 patents (WPI), 28 books and Series Editor in Bioelectronics (Plenum) and Nanobiotechnology (Pan Stanford). His main scientific activities concerned cancer research, biophysics and nanotechnology, pioneering world-wide chromatin structure-function, bioelectronics and nanobiotechnology.

clannicolini@gmail.com