DNA-based molecular nano-wires

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An international consortium of 7 universities and research centres are seeking an alternative to silicon-based microelectronics in using molecules of DNA, which could enable a reduction in size of the current systems by a thousand times. The University of the Basque Country (UPV/EHU) is participating in this project through the research group led by Professor Ángel Rubio Secades of the Department of Materials Physics.

The really innovative nature of this project lies, on the one hand, in the use of all the recognition and self-assembly potential of biological systems, more specifically, using derivatives of DNA such as G4-DNA, M-DNA and PC-DNA with a greater electronic potential than DNA itself (which is by itself an insulator). On the other, it lies in carrying out studies in surface chemistry combined with scanning probe microscopy (SPM) and spectroscopy, the measurement of electrical transport, sophisticated nano-manufacture and theoretical studies of the computational simulation of the stability and properties of synthesised devices and/or motivating new structures that might have a greater potential. In this way the manner of designing nano-wires using these molecular derivatives is being developed.

As is the way of controlling the interaction between the molecular electrode and the molecular substrate, seeking a deep understanding of the energy conduction mechanisms of these nano-wires and being able to produce models of nanomolecular devices based on these DNA derivatives.

Source: Elhuyar Fundazioa

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