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DNA stretching - a new technique being carried out at CIC microGUNE to detect illnesses

martes, 05 de abril de 2011 Elhuyar Fundazioa

Making DNA sequences being passed through nanochannels a thousand times thinner than a human hair to the point that they take on the form of diminutive spaghetti. This is an innovative technique, known as DNA stretching, and is one of the lines of research in which CIC microGUNE is working, and about which they have already published two scientific articles and are shortly to apply for a patent. The technique basically consists of the analysis of a single molecule of DNA, after stretching it, measuring its length and analysing its sequence.

This novel technology could become a simpler and more effective alternative than current methods to analysing DNA and, in this manner, apply it in order to know the predisposition for suffering certain illnesses, diagnosing them or establishing the best therapy once its development is known. The method will also enable other applications, such as the identification of bacteria and viruses, carrying out forensic diagnoses or providing systems for the advancement of therapies for chronic diseases.

In order to stretch DNA molecules, it is necessary to make them pass through channels of tiny dimensions. The Micro- and Nano-engineering Unit at CIC microGUNE, basing itself on known technology such as nanoprinting lithography, has manufactured devices that contain sealed channels of 50 nanometres.

The elements manufactured by CIC microGUNE form part of specific lab-on-a-chip series of devices known as single molecule devices, which enable carrying out a multitude of tasks using a tiny quantity of DNA - practically the content of a single cell.

“This technology enables determining DNA sequences, detecting genetic alterations that determine specific genes associated with the early detection of illnesses”, explained Mr Santos Merino, researcher at CIC microGUNE. This same detection can predict the susceptibility of certain populations of individuals to certain medication (what is known as Pharmacogenetics). The design of these kinds of chips will provide fast, cheap and in-situ (health centre walk-in or out-patient) detection.

Rapid diagnosis - CIC microGUNE's commitment

The project demonstrates what the main commitment by CIC microGUNE when targeting their research work over the next few years: health sciences. This is the area where the Basque centre believes the greatest opportunities will arise for developing new products to improve current technology and, in the end, contribute to the enhancement of the wellbeing of persons.

And, within this sphere, one of the niches where a considerable part of their projects are concentrated is in rapid diagnoses: developing devices which enable detecting pathologies on the spot and in any patient care environment. These devices, able to carry out diagnoses through biomolecular analysis, will be very small, cheap and disposable, which, together with their ease of use, will enable them to be used in any situation of patient care.

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