

BioChips: Introduction to DNA microarray technology

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DNA chips are high-density arrays of oligonucleotides (small DNA fragments or “probes”) immobilized on a surface (Fig. 1 A). Hybridization of fluorescently labeled sample DNA (or “target” DNA) to complementary DNA probes on the surface can be visualized by fluorescence imaging. DNA chips are widely used in research to study gene expression in disease or response to diverse stimuli.

The goal of this practical will be to fabricate a simple DNA microarray and to use it in hybridization with different fluorescently labeled target sequences. This practical combines several well-employed technologies in the fields of molecular biology and micro- and nanotechnologies. The following techniques will be employed : covalent grafting of DNA on a glass slide (Fig. 1 B), target-probe DNA hybridization, fluorescence measurements and quantitative image analysis (Fig. 1 C).

The practical schedule is the following:

Covalent grafting of DNA probes on silanized glass slides with a spotting robot

Hybridization of fluorescently labeled target DNA on the DNA chip

Acquisition of fluorescence image and quantitative image analysis

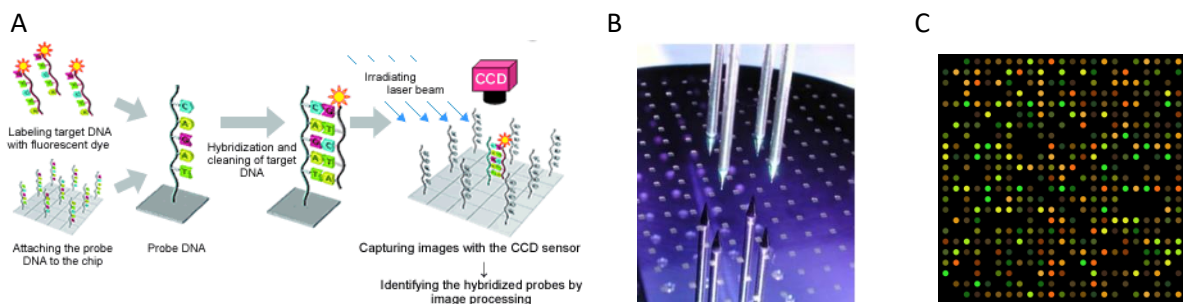


Figure 1. **A.** Successive steps for the fluorescence-based detection of DNA sequences using microarrays. **B.** DNA spotting on a silanized surface. Four different probes are deposited at the same time. **C.** Fluorescence analysis of the target DNA associated with the different probes. Different colors reflect DNA samples labelled with different fluorophores.

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