

## Applications of microarrays in anatomy and histology

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Just few years ago, molecular studies were performed by identifying and testing a single molecule and/or a sample at a time.

To date the technological advances have made possible to design systems able to study simultaneously, in a single experiment, thousands of biological molecules in different samples with important scientific implications. Although not yet commonly used in clinical and diagnostic practice, microarrays represent a fundamental innovation, destined to be ever more present in the panorama of biology and medicine. Their versatility, the possibility of making a large number of tests on relatively small amounts of biological material, the speed at which the examinations can be performed, are factors that open new perspectives, offering opportunities unimaginable until now. With the generic term of microarray are combined technologies and applications very different between them, such as: array of gene expression, for comparative genomic hybridization (array-CGH), for single nucleotide polymorphisms studies (SNP), protein arrays and arrays for methylation studies.

The applications of microarray technology in basic research are manifold, including functional characterization of genes, identification of metabolic and physiological processes associated genes, identification of genes that regulate specific pathways or cellular responses to specific stimuli, toxicogenomics and pharmacogenomics.

Many of these applications have the potential to address important clinical issues such as the identification of genes related to the abnormal biological behavior, the characterization of gene expression profiles for the prediction of disease progression, prognosis, treatment and understanding the genetic basis of multifactorial diseases such as diabetes, atherosclerosis, and cancer.