

## Global gene expression analysis for evaluation and design of biomaterials

### REVIEW ARTICLE

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**Abstract** Comprehensive gene expression analysis using DNA microarrays has become a widespread technique in molecular biological research. In the biomaterials field, it is used to evaluate the biocompatibility or cellular toxicity of metals, polymers and ceramics. Studies in this field have extracted differentially expressed genes in the context of differences in cellular responses among multiple materials. Based on these genes, the effects of materials on cells at the molecular level have been examined. Expression data ranging from several to tens of thousands of genes can be obtained from DNA microarrays. For this reason, several tens or hundreds of differentially expressed genes are often present in different materials. In this review, we outline the principles of DNA microarrays, and provide an introduction to methods of extracting information which is useful for evaluating and designing biomaterials from comprehensive gene expression data.

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