

Immunology: Chemokines, Cytokines, and Their Receptors

The regulation of the expression of cytokines and chemokines and their receptors plays a fundamental role in the development and the function of the immune system. Cytokines, secreted by immune cells, bind to their cognate receptors on the surface of other immune or non-immune cells. That event initiates signaling cascades prompting the target cells to secrete other proteins, proliferate, migrate, or mediate other immune responses. Monitoring the expression of these genes allows researchers to study immune response changes prompted by experimental conditions or disease states. The RT² Profiler™ PCR Arrays featured in this issue are designed to profile the relative expression of chemokines, cytokines, their receptors, and other immunologically important genes. For example, the Chemokines and Receptors PCR Arrays profile the expression of 84 genes that encode members of the C-C and C-X-C motif subfamilies of small inducible cytokines, their receptors, and other related genes. Descriptions and application examples for the Inflammatory Cytokines & Receptors and the Common Cytokines PCR Arrays are provided below. Using real-time PCR, you can easily and reliably analyze expression of a focused panel of genes related to chemokines, cytokines, and inflammation with these PCR Arrays.

Inflammatory Cytokines & Receptors

The Human, Mouse, and Rat Inflammatory Cytokines & Receptors RT² Profiler PCR Arrays profile the expression of 84 key genes involved in the inflammatory response. These arrays contain genes involved in mediating immune cascade reactions during inflammation. The chemokines, cytokines, and interleukins involved in the inflammatory response are represented as well as their receptors.

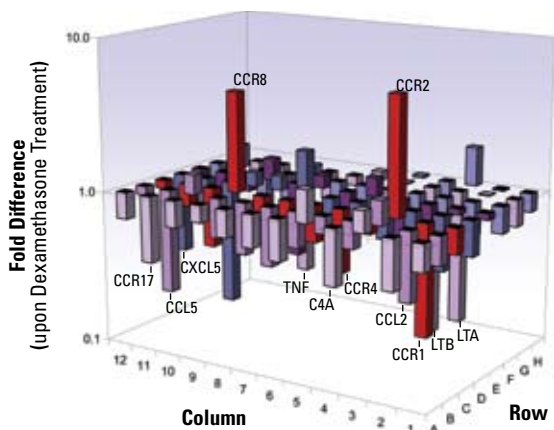


Figure 1: Dexamethasone Inhibits the LPS-Induced Inflammatory Response in a Human Corneal Epithelial Cell Line. RNA samples from cells treated with LPS and with or without dexamethasone were characterized with the Human Inflammatory Cytokines & Receptors PCR Array. The 3D profile depicts the fold change in gene expression (z-axis) of the represented genes (xy-plane in the same layout as the PCR Array). The results show that most of the inflammatory cytokine genes are down-regulated in the presence of dexamethasone (columns pointing down with a negative z-axis displacement) verifying the known anti-inflammatory properties of the steroid.

Common Cytokines

The Human, Mouse, and Rat Common Cytokines RT² Profiler PCR Arrays profile the expression of 84 important cytokine genes. These arrays include interferons and interleukins as well as the bone morphogenetic proteins (BMP) and members of the TGF- β family. Also represented are platelet-derived and vascular endothelial growth factors. Tumor necrosis factors are included as well as other cytokine-related genes.

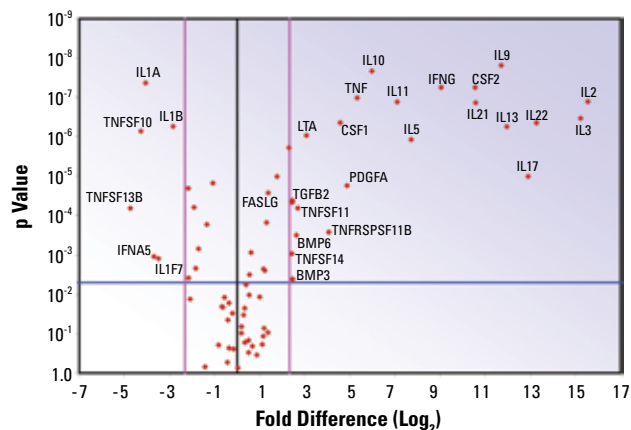


Figure 2: Monitor the Induction of Cytokines in PBMC by PMA and Ionomycin. RNA isolated from resting PBMC or PBMC stimulated with PMA and ionomycin for 6 h were characterized on the Human Common Cytokine PCR Array. Log₂ fold-changes in gene expression between stimulated and resting PBMC are plotted against t-test p-values to produce a “volcano plot”. Genes in the extreme upper left and right sections of the graph have larger, more statistically significant changes in gene expression. Thresholds: fold-change (pink lines), >5-fold; statistical significance (blue line), $p < 0.005$

Inflammatory Cytokines & Receptors RT² Profiler PCR Arrays

Description	Cat. No.
Human Inflammatory Cytokines & Receptors	PAHS-011
Mouse Inflammatory Cytokines & Receptors	PAMM-011
Rat Inflammatory Cytokines & Receptors	PARN-011

Common Cytokines RT² Profiler PCR Arrays

Description	Cat. No.
Human Common Cytokines	PAHS-021
Mouse Common Cytokines	PAMM-021
Rat Common Cytokines	PARN-021