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Measurement of cytokine and chemokine protein expression in the Freund adjuvant-induced inflammatory pain model by the antibody array technique

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Nociceptive nerve impulses generated in peripheral tissues are conducted by sensory fibers to the superficial spinal dorsal horn. Following local processing, the nociceptive signals are transmitted to higher brain centers through ascending sensory pathways. In higher brain centers, the nociceptive signals evoke various motivational-affective behaviors including pain. Due to chronic inflammatory processes the nociceptive sensory system undergoes a chemical reorganization resulting in central sensitization and chronic pain. The major goal of our experiments was to find molecules which contribute to central sensitization of nociceptive neural circuits in the spinal cord and cingulated cortex and thus the development of chronic inflammatory pain. We induced chronic subcutaneous inflammation by injecting complete Freund adjuvant (CFA) into the hindpaw of rats. Mechanical allodynia indicating the development of chronic pain was measured by the von Frey mechanical paw withdrawal behavioral test. At the peak of mechanical allodynia (3 days after CFA injection) we studied the expression level of 29 cytokines and chemokines by the antibody array method. Pro-inflammatory cytokines and chemokines like CINC were found to be remarkably up-regulated both in the spinal dorsal horn and cingulate cortex. Our results suggest that cytokines and chemokines may contribute to the development of inflammatory chronic pain.