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Chemoattractant cytokines, or chemokines, are the largest sub-family of cytokines. About 50 distinct chemokines have been identified in humans. Their principal role is to stimulate the directional migration of leukocytes, which they achieve through activation of their receptors, following immobilization on cell surface glycosaminoglycans (GAGs). Chemokine receptors belong to the G protein-coupled 7-transmembrane receptor family, and hence their identification brought great promise to the pharmaceutical industry, since this receptor class is the target for a large percentage of marketed drugs. Unfortunately, the development of potent and efficacious inhibitors of chemokine receptors has not lived up to the early expectations. Several approaches to targeting this system will be described here, which have been instrumental in establishing paradigms in chemokine biology. Whilst drug discovery programs have not yet elucidated how to make successful drugs targeting the chemokine system, it is now known that certain parasites have evolved anti-chemokine strategies in order to remain undetected by their hosts. What can we learn from them?