

TLR5- cluster of differentiation 285

Toll-like receptor 5 (TLR5), a member of the evolutionarily conserved Toll-like receptor family, has evolved to permit mammals specifically to detect flagellated bacterial pathogens. Like all other members of the TLR family, TLR5 is composed of an extracellular domain containing multiple leucine-rich repeats (LRRs), a transmembrane region, and a cytoplasmic tail containing the conserved TIR domain. The TLR5 gene has been mapped to chromosome 1q41-42. The gene encodes a putative 858 amino acid protein with a calculated molecular weight of 91 kDa. It is most closely related to TLR3 with 26% overall amino acid sequence identity. In vivo, TLR5 mRNA is expressed as a single transcript in ovary, prostate. In vitro, TLR5 is most significantly upregulated in PMA-differentiated THP-1 cells by autocrine IL-6, IL-10, and TNF- α , but is also elevated by IFN- γ . Further, TLR5 mRNA expression is elevated after exposure to both Gram-positive and Gram-negative bacteria. Ex vivo, however, granulocyte and in particular monocyte TLR5 expression is downregulated upon exposure to Gram-negative bacteria (1, 2). TLR5 is expressed in epithelial cells of the airways, intestine, and urogenital tract, as well as on hemopoietic cells of the innate and adaptive immune system and has recently been shown to be involved in the transport of flagellated *Salmonella typhimurium* from the intestinal tract to the mesenteric lymph nodes. Like other described TLRs, TLR5 utilizes the adaptor protein MyD88 and IL-1 receptor-associated kinase (IRAK) to activate a signal transduction cascade that results in the activation of the transcription factor NF- κ B necessary for flagellin-induced effects on gene expression (4). TLR5 forms a homodimer as well as a heterodimer with TLR4. Both complexes function to recognize the Flagellin protein of both Gram-positive and Gram-negative bacteria, and activation of the receptor mobilizes the nuclear factor NF- κ B and stimulates tumour necrosis factor- α production. The TLR5 recognition site on flagellin is conserved among a wide variety of flagellated bacteria although select bacterial species possess unique flagellin molecules that evade TLR5 recognition. These amino acids are located in the highly conserved D1 domain of the flagellin protein and cluster on the convex surface that contacts adjacent flagellin monomers in the flagellar protofilament. Mutating individual residues in the TLR5 recognition site significantly reduced or completely abolished bacterial motility, suggesting that evolving a functional flagellin that evades TLR5 would require a complex series of mutations (5). Reference: 1. Zarembek, K.A. & P.J. Godowski (2002) *J. Immunol.* 168:554. 2. Muzio, M. et al. (2000) *J. Immunol.* 164:5998. 3. Yimin Yu *Am J Physiol Gastrointest Liver Physiol* 285: G282-G290, 2003 4. *Nature.* 2001 Apr 26;410(6832):1099-103.

About the Author

IMGENEX India Pvt Ltd. the only biotech company in Orissa and one of its kinds in Eastern India. IMGENEX India started in Oct as an outsourcing branch of [IMGENEX Corporation](#), San Diego, USA. Find out more information about [Toll-like receptors](#).

Source: <http://www.wonderoffice.com>