

Table 1 Defects in innate immunity

Disease	Affected cells	Functional defects	Associated features	Inheritance	Genetic defects	OMIM	HGNC symbol	HGNC ID(s)	ENSEMBL ID
Anhidrotic ectodermal dysplasia with immunodeficiency (EDA-ID) Hyper IgM syndrome 4	L + M	NF-κB signaling pathway	Anhidrotic ectodermal dysplasia + specific antibody deficiency (lack of antibody response to polysaccharides), various infections (<i>Mycobacteria</i> and pyogenes)	XR	<i>NEMO</i>	300291, 300584, 300301	<i>NFKBIA</i>	7797	ENSG00000100906
Anhidrotic ectodermal dysplasia with immunodeficiency (EDA-ID)	L + M	NF-κB signaling pathway	Anhidrotic ectodermal dysplasia + T-cell defect + various infections	AD	<i>IKBA</i> gain-of-function	612132, 300248	<i>IKBK</i>	5961	ENSG00000073009
IL-1 receptor-associated kinase 4 (IRAK4) deficiency	L + M	TIR-IRAK signaling pathway	Bacterial infections (pyogenes)	AR	<i>IRAK4</i>	607676, 606883	<i>IRAK4</i>	17967	ENSG00000198001
MyD88 deficiency	L + M	TIR-MyD88 signaling pathway	Bacterial infections (pyogenes)	AR	<i>MYD88</i> , a component of the TLR and IL-1R signaling pathway	612260, 602170	<i>MYD88</i>	7562	ENSG00000172936
WHIM (warts, hypogammaglobulinemia infections, myelokathexis) syndrome	N + L	Increased response of the CXCR4 chemokine receptor to its ligand CXCL12 (SDF-1)	Hypogammaglobulinemia, reduced B-cell number, severe reduction of neutrophil count, warts/HPV infection	AD	<i>CXCR4</i> gain-of-function	193670, 162643	<i>CXCR4</i>	2561	ENSG00000121966
Epididymodysplasia verruciformis	Keratinocytes + leukocytes		Human papilloma virus (group B1) infections and cancer of the skin	AR	<i>EVER1(TMC6)</i> , <i>EVER2(TMC8)</i>	226400, 605828	<i>TMC6</i>	18021	ENSG00000141524
						605829	<i>TMC8</i>	20474	ENSG00000167895
Herpes simplex encephalitis	CNS resident/ Epithelial/ Dendritic cells + leukocytes	UNC-93B-dependent IFN-α, IFN-β and IFN-λ induction	Herpes simplex virus 1 encephalitis and meningitis	AR	<i>UNC93B1</i>	610551, 608204	<i>UNC93B1</i>	13481	ENSG00000110057
Herpes simplex encephalitis	CNS resident/ Epithelial/ Dendritic cells + CTL	TLR3-dependent IFN-α, IFN-β and IFN-λ induction	Herpes simplex virus 1 encephalitis and meningitis	AD	<i>TLR3</i>	613002, 603029	<i>TLR3</i>	11849	ENSG00000164342
(c) TRAF3 deficiency	CNS resident cells and fibroblasts	TRAF3-dependent IFN-α, -β, and -λ induction	Herpes simplex virus 1 encephalitis	AD	Mutation of <i>TRAF3</i>	601896	<i>TRAF3</i>	12033	ENSG00000131323
7. Predisposition to fungal diseases	Mononuclear phagocytes	CARD9 signaling pathway	Invasive candidiasis and peripheral dermatophytosis	AR	Mutations of <i>CARD9</i>	212050	<i>CARD9</i>	16391	ENSG00000187796
8. Chronic mucocutaneous candidiasis (CMC)									
(a) IL-17RA deficiency	Epithelial cells, fibroblasts, mononuclear phagocytes	IL-17RA signaling pathway	CMC	AR	Mutation in <i>IL-17RA</i>	605461	<i>IL17RA</i>	5985	ENSG00000177663
(b) IL-17F deficiency	T cells	IL-17F-containing dimers	CMC	AD	<i>IL-17F</i>	606496	<i>IL17F</i>	16404	ENSG00000112116
(c) STAT1 gain-of-function	T cells	Gain-of-function STAT1 mutations that impair the development of IL-17-producing T cells	CMC, impaired delayed-type hypersensitivity to <i>Candida</i> antigens CMC isolated or with hypothyroidism	AD	STAT1	614162, 600555	<i>STAT1</i>	11362	ENSG00000115415
APECED, autoimmune polyendocrinopathy with candidiasis and ectodermal dystrophy	increased CD4+ cells		Autoimmune disease of parathyroid, adrenal and other organs plus candidiasis, dental enamel hypoplasia and other abnormalities	AR	Defects in <i>AIRE</i> , encoding a transcription regulator needed to establish thymic self-tolerance				
9. Trypanosomiasis		APOL-I	Trypanosomiasis	AD	<i>APOL-I</i>	603743	<i>APOLI</i>	618	ENSG00000100342

L, lymphocytes; M, monocytes-macrophages; NF-κB, Nuclear factor κB; XR, X-linked recessive; NEMO, NF-κB essential modulator; AD, autosomal dominant inheritance; AR, autosomal recessive inheritance; IRAK4, IL-1 receptor-associated kinase 4; N, Neutrophils; SDF-1, stromal-derived factor 1; EVER, epidermodysplasia verruciformis; TIR, Toll and IL-1 receptor; HPV, human papilloma virus; CNS, central nervous system; CTL, cytolytic lymphocytes; TLR, Toll-like receptor.