No.	Category	Keywords
		Adhesion molecules
		Agonist selection
		AIRE
		Bone marrow
		Bone marrow transplantation
		b-selection CD1
		Cell fate decision
		Cell Migration/ Chemotaxis
		Central tolerance
		Chemokine/ Chemokine receptors
		Co-stimulation
		Cytokines/ Cytokine receptors
		Cytoskeleton
		Extracellular matrix
		Extrathymic differentiation Fibroblastic reticular cell (FRC)
		Follicular dendritic cell (FDC)
		Hematopoietic stem cells
		Homeostasis
		Lectins
		Lineage commitment
		Lymph nodes
1	Hematopoiesis and Immune Environment	Lymphatic endothelial cells
		Lymphocyte development
		Lymphoid precursors Mesenchymal stem cells
		Mesenchymai stem cens
		Niche
		Non-classical MHC
		Notch/Delta
		Osteoblasts
		Plasticity
		Pluripotency
		Positive/negative selection Pre-TCR
		Promiscuous gene expression
		Repertoire selection & formation
		Self-renewal
		Signal transduction
		Sphingosin-1-P
		Stromal cells
		T cell receptor (TCR) TEC
		Thymic microenvironment
		Thymus
		Vascular endothelial cells
		Adaptor protein
		Affinity maturation
		AID
		Antigen-antibody interaction B cell activation
		B cell receptor (BCR)
		Class switch
		Clonal selection
		Co-receptor
		Co-stimulation
		Early B cell development
		GEM/Lipid microdomain
2	B cells	Germinal center Inhibitory signals
4		Inhibitory signals ITAM, ITIM
		Long-lived plasma cells
		Memory B cell
		Plasma cells
		Pre-BCR
		Receptor editing
		Regulatory B cell
		Repertoire Secondary lymphoid organ
		Secondary lymphoid organ Signal transduction
		Somatic hypermutation
		Transcription factors
	<u> </u>	V(D)J recombination
		Adaptor proteins
		Adhesion molecules
		AICD
		Anergy
		Antigen presenting cells
		CD1 CD4 memory
		CD4 memory
		CD8 memory Cell Migration
		Cellular interaction
		Central memory
		Chemokine/ Chemokine receptors
		Co-stimulation
		Cytokines/ Cytokine receptors
		Cytotoxic T cells

		2024.04.10
No.	Category	Keywords
		Epigenetics
		GEM/lipid raft
		Gene expression
		Gene regulation
_		Homeostasis
3	T cells	Homeostatic proliferation
		Immune diseases
		Immune regulation
		Immune-metabolism Immunological memory
		Immunological synapse
		Inhibitory signals
		Life-long memory
		Memory T cells
		MHC
		Neuro-immune axis Non-classical MHC
		Plasticity
		Programmed cell death
		Secondary lymphoid organ
		Signal transduction
		T cell activation
		T cell receptor (TCR)
		T-B interaction Th1/Th2/Th17
		tissue resident memory T cells
L		Transcription factors
		Antigen peptides
		Antigen processing
		Antigen transfer
		Antigen-presenting cell Apoptosis
		Apoptosis Autophagy
		Cathepsin
		CD1
		Cell circulation
		Cell migration
		Chemokine/ Chemokine receptors
		Co-stimulation Cross-presentation
		Cytokines/ Cytokine receptors
		Development of DC, Macrophages, and granulocytes
		Differentiation
		Differentiation
		Differentiation pathway Hsp
		Immune regulation
		Immunological tolerance
4	Dendritic cells, macrophages, granulocytes	Inflammasome
4	bendhile cens, macrophages, grandiocytes	Inflammation
		Intercellular interaction
		Interferon Lectins
		Maturation/Activation
		MHC
		Migration
		Neutrophils
		Nod like receptor (NLR)
		Non-classical MHC Phagocytes
		Phagocytosis
		Proteasome
		Recognition of non-self
		Regulatory dendritic cell
		Regulatory macrophage Subsets
		T cell activation
		Th differentiation
		Tissue macrophage
		Toll-like receptor (TLR)
L		Ubiquitination
		Cell Migration Chemokine/ Chemokine receptors
		CSF
		Cytokines/ Cytokine receptors
		Gene regulation
		Homing
		Immune diseases
		In vivo imaging Interferon
5	Cytokines and chemokines	Interleukin
5		IRF
		Jak/STAT
		NF-kb
		Signal transduction
		Smad
		SOCS TGF-β family
		TNF family
		TRAF

No.	Category	Keywords
		ADCC
		Adjuvant
		Allergy
		Antigen presenting cells
		Apoptosis
		Atherosclerosis
		Autophagy
		Bone marrow transplantation
		CD1
		cGAS
		Chemokine
		Complement
		C-Type Lectin Receptor (CLR)
		Cytokines/ Cytokine receptors
		Cytotoxic molecules
		DAMPs
		Dendritic cells
		gdT cells
		Glycolipid
		ILC inflammasome
		Inflammation
		Inflammatory mediators
		Interferon
		Intracellular trafficking
		Lectin
		Lipid
		LTi
		Macrophages
		MAIT cells
~		Mannose receptor
6	Innate immunity	MAP kinase
		metabolic change
		Mucosal Immunology
		Necrosis
		neutrophil extracellular traps (NETs)
		Neutrophils
		NF-kb
		Nitric oxide
		NK cell target molecules
		NK cells
		NK receptors
		NKT cells
		Nod like receptor (NLR)
		Nuclease
		Nucleic acid
		Organelle
		Paired receptors
		Phagocytosis
		Protease
		Pyroptosis
		Reactive oxygen
		Recognition of apoptotic cells
		Redox
		RIG-I-like receptor
		RORgt
		Signal transduction STING
		Tissue damage
		· · · · · · · · · · · · · · · · · · ·
		Toll-like receptor (TLR) Uric acid
		Uric acid Virus infection
		Atopic dermatitis
		B-1(Ly-1)cells
		Bronchus-associated lymphoid tissues (BALT)
		Commensal bacteria
		Cytokines/ Cytokine receptors
		Dendritic cells
		Epithelial cell
		Food allergy
		Gut-associated lymphoid tissues (GALT)
		Homing
		IgA
		ILC
		Inflammatory bowel diseases
		Intraepithelial T lymphocytes
7	Mucosal-Skin Immunity	Isolated lymphoid follicles (ILF)
-		Langerhans cell
		M cells
		Macrophages
		Mucin
		Mucosa-associated lymphoid tissues (MALT)
		Mucosal vaccine
		Nasopharyngeal-associated lymphoid tissues (NALT)
		Oral tolerance
		Peyer's patch
		Skin immunity
		Th1/Th2/Th17
		Tr1

No.	Category	2024.04.10 Keywords
		Upper respiratory allergy Anergy
		Autoimmunity
		Bone marrow transplantation
		CD28-B7 family
		Cell death
		cell senescence CentralTolerance
		Co-stimulation
		CTLA4
		Cytokines/ Cytokine receptors
		Dendritic cells
		Feto-maternal interaction
		Foxp3
		GvH
		GvL ICOS-L
		IDO
		IL-10
		IL-2
~		ILC
8	Tolerance and Immune suppression	Immune checkpoint
		Immune homeostasis Immune suppression
		Immunosuppression Immunosuppressive agents
		Inflammation
		MHC
		Organ transplantation
		PD-1
		Peripheral tolerance
		Peripherally-generated Treg
		Receptor editing Recognition of apoptotic cells
		Regulatory CD8+ T cells
		TGF-β family
		Thymus-derived Treg
		TNF-TNFR family
		Tolerogenic dendritic cells
		Tr1
		Transcription factors Transplantation immunology
		Treg
		Adjuvant
		Anti-microbial products
		Autophagy
		bacteria
		Cell surface receptors
		Central memory CTL
		Cytokine induction
		Dendritic cells
		DNA sensor
		DNA vaccine
		Effector cells
		Effector memory
		Effector memory
		Escape mechanism
		Escape mechanism Fungus
		Escape mechanism Fungus Host defense mechanism
		Escape mechanism Fungus
		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory
		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome
		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon
۵	Virus infection	Escape mechanism Fungus Host defense mechanism Immune regulation Immune object Immunological memory Inflammasome Interferon Lectin receptors
9	Virus infection Bacterial / mycofungal / parasite infection	Escape mechanism Fungus Host defense mechanism Immune regulation Immunological memory Inflammasome Interferon Lectin receptors Life-long memory
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immunological memory Inflammasome Interferon Lectin receptors Life-long memory
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR)
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nd like receptor (NLR) Parasites
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR)
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-I
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-1 RIG-1 RIG-1-like receptor
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-1 RIG-1-Like receptor RNA sensor
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-I RIG-I-Iike receptor RNA sensor Signaling molecules
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-I RIG-I-like receptor RNA sensor Signaling molecules Target cells
9		Escape mechanism Fungus Host defense mechanism Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-1 RIG-1-like receptor RNA sensor Signaling molecules Target cells Target cells Target cells Target cells
9		Escape mechanism Fungus Host defense mechanism Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-1 RIG-1-like receptor Signaling molecules Target cells Target cells Tal/Th2 Toll-like receptor (TLR)
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-1 RIG-1-like receptor RNA sensor Signaling molecules Target cells Th1/Th2 Toll-like receptor (TLR) Toxin
9		Escape mechanism Fungus Host defense mechanism Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-1 RIG-1-like receptor RNA sensor Signaling molecules Target cells Th1/Th2 Toll-like receptor (TLR)
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-I RIG-I-like receptor RNA sensor Signaling molecules Target cells Th1/Th2 Toll-like receptor (TLR) Toxin Virus petides Virus
9		Escape mechanism Fungus Host defense mechanism Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-1 RIG-1-like receptor RNA sensor Signaling molecules Target cells Tin1/Th2 Toll-like receptor (TLR) Toxin Viral spetides Virus Virus-specific CTL Adhesion molecules
9		Escape mechanism Fungus Host defense mechanism Immune regulation Immune responses Immunological memory Inflammasome Interferon Lectin receptors Life-long memory Macrophages Maintenance of memory MAP kinase Microbial immunoactivators Neutrophils NF-kb NK cells Nod like receptor (NLR) Parasites Pathogen sensors Phagocytosis RIG-I RIG-I-like receptor RNA sensor Signaling molecules Target cells Th1/Th2 Toll-like receptor (TLR) Toxin Virus petides Virus

No.	Category	Keywords
		Autoantibody
		Autoantigens
		Autoimmunity
		Autoinflammatory disease (Autoinflammatory syndrome)
		Biologics
		Cellular interaction
		Chemokine/ Chemokine receptors
		Cord blood lymphocyte
		Co-stimulation
		Cytokines/ Cytokine receptors
		Disease-associated gene
		Gene expression
10	Autoimmune diseases	Human immunity
10		Humanized mouse
		Immunodeficiency
		Immunointervention
		Infection
		Inflammatory bowel disease
		iPS cell
		Organ specific autoimmune disease
		Organ tansplantation
		Organoid
		Osteoblasts
		Osteoclasts
		Regenerative medicine
		Regulatory T cells
		Stem cell transplantation
		Synovial cells
		·
		Systemic autoimmune disease
		Activating and inhibitory signal transduction
		Airway inflammation
		Allergens
		Allergic disease
		Basophils
		Bronchial asthma
		Contact hypersensitivity
		Cytokines/ Cytokine receptors
		Differentiation pathway
4 4		Eosinophils
11	Allergy	IgE
		IgE receptor
		Innate lymphoid cells
		ltch
		Mast cells
		Migration
		Mucosal Immunology
		Neuro-immune axis
		Protease
		Th2
		Vaccine for allergy
		Adjuvant
		Adoptive immunotherapy
		Antibody
		Antigen presentation
		Antigen processing
		B cells
		Biomarkers
		Cancer
		cancer-associated fibroblasts
		CAR-NKT cells
		CAR-T cells
		Checkpoint blockade
		Chemokine/ Chemokine receptors
		Chemotherapy
		Co-inhibitory molecules
		Co-Innibitory molecules
		Cytokines/ Cytokine receptors
		cytotoxic T lymphocytes
		Dendritic cells
		DNA, RNA vaccine
		Effector cells
		Engineered antibodies
		· · ·
12	Tumor immunity	Gene therapy
12	Tumor immunity	· · ·
12	Tumor immunity	Gene therapy Graft versus tumor effect
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-vasion immune-surveillance Immunogenic cell death Immunogenicity
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy iPS cells
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy iPS cells
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy iPS cells Macrophages Metabollism
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy iPS cells Macrophages Metabollism Myeloid-derived suppressor cells
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immunogenic cell death Immunogenicity Immunotherapy iPS cells Macrophages Metabollism Myeloid-derived suppressor cells Neoantigens
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy iPS cells Macrophages Metabollism Myeloid-derived suppressor cells Necoantigens NK cells
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immunogenic cell death Immunogenicity Immunotherapy iPS cells Macrophages Metabollism Myeloid-derived suppressor cells Neoantigens
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy iPS cells Macrophages Metabollism Myeloid-derived suppressor cells Necantigens NK cells
12	Tumor immunity	Gene therapy Graft versus tumor effect Helper T cells immune-evasion immune-surveillance Immunogenic cell death Immunogenicity Immunotherapy iPS cells Macrophages Metabollism Myeloid-derived suppressor cells Necoantigens NK cells

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No.	Category	Keywords
		Regulatory T cells
		TCR-T cells
		tumor antigens
		tumor blood vessel
		Tumor microenvironment