

Innate immunity			
Key points	Physical	Secreted	Cellular
Born/same	Skin	Antibacterial	Nk cell
Non specific/fast	GI tract	Antibodies	Phagocytes
Prevent Pathogen entry	Respiratory	Complements	
Induces adaptative	Mucous	Cytokines	

Goal 1 - PREVENT			
Skin	Respiratory	Eyes	GI tract
Dry/Thick	Tightly Packed	Blink/Tear	Peristalsis
Antimicrobial	Cilia	Lysopzyme	HCl
Keratin	Mucus	Microbial competition	Low Ph

Goal 2 - RECOGNISE			
PAMP	Bacteria		PRR
Highly conserved	Gram-ve	Gram+ve	Collectins
Only microbes	LPS	lipoteichoic Acid	TLR
Essential to live	Lipid A		Nod like

Effector mechanism
→ Complements
→ Phagocytosis
→ NK
→ Activation of Adaptive
→ Cytokine

Stages of Phagocytosis
1 → Chemotaxis & Adherence of microbes to phagocytes
2 → Ingestion
3 → Phagosome formed
4 → Phagolysomes through fusion
5 → Residual body/ indigestible material formed
6 → Discharged waste

Killing Mechanism
Reactive O² (Neutrophil)
→ After Phagocytosis ↑ O ² = Respiratory Burst
→ O ² Reduced by NADPH = Hydroxyl radical, hypochlorite
Reactive N³ (Macrophage)
→ L-arginine → L-citrulline = NO radicals
→ Catalysed by Nitric oxide synthase (iNOS, NOS2), induced by Cytokines and Bac components
→ Damage in bacterial DNA and Membrane

Complements
→ Proteins in B (blood) and TF (tissue fluid)
→ Via cascade
→ C3 convertase activates C3

Phagocytosis	
Monocytes/ Macrophage	Neutrophil
High in GI tract, Lung, Liver, Spleen	Only in B
Long life	Short life

Cytokines
→ Protein Messenger
→ De/activating
→ → IL(Interleukin)-1
→ → IL-6
→ → TNF (tumour necrosis factor) α

Chemokines
→ Chemoattractant
→ Inflammation- cell adhere to BV → infection site
→ IL-8, MCP

interferons
→ IFNα & IFNβ Produced by virus infected cell
» Natural killer cell
» Infected/tumour cells
» Respond to TNFα, IL-12
» make TNFγ
» Upregulate MHC = Activate Macrophage
» IL-12 - differentiation of CD4 Th1 cell

PRR
Collectins
In solution
2 region:
● Collagen Like
Interacts with effector
● Lectin Like
Interacts with Sugar on pathogen. E.g Mannose
NOD like
In cytoplasm
2 type:
● NOD 1
glytamyl diaminopimelic
● NOD 2
muramyl dipeptide
► Gram -ve +ve
TOLL like
TLR 1
G +ve
Lipopeptide
PDG
TLR 2
G +ve
Mycoplasma
TLR 3
RNA virus (ds RNA, Poly:C)
TLR 4
G -ve
LPS
TLR 5
Flagellin
TLR 6
Mycoplasma
TLR 7-8
RNA virus (ss RNA)



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PRR (cont)

TLR 9
Unmethylated CpG DNA

Antigen presenting cell

- Macrophage
- B-cell
- Mature Dendritic cell (Activate T cell)

Summary

RECOGNISE → PRR/ Complement R
INGEST → Phagocytosis/ Opsonisation
RECRUIT → Inflammation/ Cytokines
RESPONSE SPECIFIC → IL&TNF/ Antigen processing



By **darkknightess**

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