Innate immunity

Key points	Physical	Secreted	Cellular
Born/same	Skin	Antiba-cterial	Nk cell
Non specif-ic/fast	GI tract	Antibodies	Phagocytes
Prevent Pathogen entry	Respir-atory	Complements	
Induces adaptative	Mucous	Cytokines	

Goal 1 - PREVENT

Skin	Respiratoy	Eyes	GI tract
Dry/Thick	Tightly Packed	Blink/Tear	Perist-alsis
Antimi-crobial	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	lipote-ichoic 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 O^2 (Neutroph-il)

→ After Phagocytosis ↑ O^2 = Respiratory Burst

→ O^2 Reduced by NADPH = Hydroxyl radical, hypochlorite

Reactive N^3 (Mcrop-hage)

→ L-arginine → L-citr-uline = 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

→ Inflamation- cell adhere to BV → infection site

→ IL-8, MCP

interferons

→ IFNα & IFNß Produced by virus infected cell

» Natural killer cell

» Infected/tumour cells

» Respond to TNFa, IL-12

» make TNFγ

» Upregulate MHC = Activate Macrophage

» IL-12 - differention 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 diominopimelic

◑ 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)

PRR (cont)

TLR 9
Unmenthylated CpG DNA

Antigen presenting cell

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

Summary

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