SESSION #5

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INTRODUCTION TO THE IMMUNE SYSTEM

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IMPORTANT PEOPLE: LOUIS PASTEUR - SICK WORM

ELIE METCHWINDE - DROSOPHILA

IMMUNE SYSTEM → SENSES MICROBE MOLECULES. THE SIGNALS ARE PROCESSED LOCALLY AND AT DISTANCE

WHY DROSOPHILA?

- SHORT LIFE CYCLE
- GENETIC SYSTEM UNDERSTOOD
- FORWARD GENETICS
- REVERSE GENETICS

DROSOPHILA IMMUNE SYSTEM CAN SENSE: (BUT NOT NECESSARILY BIND)

- GRAM-POSITIVE BACTERIA
- " " -NEGATIVE ""
- VIRUSES

TLR

THERE ARE MANY "TOLL-LIKE" RECEPTORS THAT RECOGNIZE SIGNALS FROM BACTERIA, VIRUSES, PROTOZOA AND FUNGI

TLR INITIATE A SIGNALING CASCADE THAT ACTIVATES TRANSCRIPTION FACTORS

OTHER ORGANISMS (MICE & RATS) HAVE BEEN IMPORTANT TO STUDY THE STRUCTURE & FUNCTIONALITY OF HUMAN IMMUNE SYSTEM.
GI Host ↔ Microbiome

Steady state complex cross-talk between epithelial cells and the microbiome
- Contribute to tissue shaping after birth

The hematopoietic system of mammals
- Erythrocytes, platelets, granulocytes, macrophages, dendritic cells, T-cells, NK cells, B-cells
- Circulate within the blood vascular bed, the rest circulate

Phagocytosis (steady state)
- Invasive microbes
- Apoptotic cells → Immunom-signaling cascades lead to:
  - Clearance by phagocytes
  - Synthesis of counter-inflammatory signals by the same phagocytes

Phagocytosis (non-steady-state)
- Invasive microbes
- Apoptotic cells post cell death
- Microbes → Immunom-signaling cascades lead to:
  - Clearance of microbes
  - Transient tightly regulated anti-inflammatory
CELL LINEAGE: SENSE AND PROCESS INVASIVE MICRO-ORGANISMS