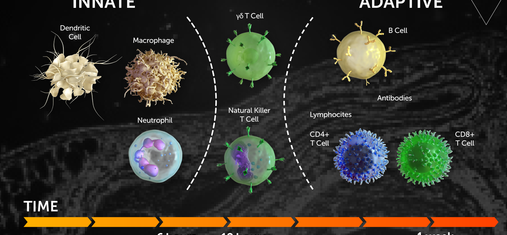
UNDERSTANDING INNATE IMMUNITY

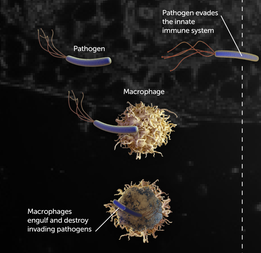
INTRODUCTION

The immune system is comprised of two arms that work together to protect the body – the innate and adaptive immune systems.



INNATE IMMUNITY

Innate immunity is the body's first line of immunological response and reacts quickly to anything that should not be present.

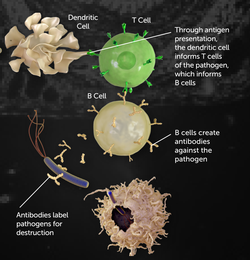


Scientists estimate innate immunity comprises approximately:

80% of the immune system

ADAPTIVE IMMUNITY

The adaptive, or acquired, immune system is activated when the innate immune system is not able to fully address a threat, but responses are slow, taking up to a week to fully respond.



The adaptive immune system develops memory of pathogen exposures, so that B and T cells can respond quickly to eliminate repeat invaders.

IMMUNE SYSTEM AND DISEASE

If the immune system consistently under-responds or over-responds, serious diseases can result.

CANCER

Cancers grow and spread when tumor cells evade detection by the immune system. The innate immune system is responsible for detecting cancer cells and signaling to the adaptive immune system for the destruction of the cancer cells.

INFLAMMATION

Certain diseases trigger the innate immune system to unnecessarily respond and cause excessive inflammation. This type of chronic inflammation is associated with autoimmune and auto-inflammatory conditions.

DEEP DIVE INTO INNATE IMMUNITY

A variety of innate immune cell types build the first line of defense, surveilling for threats and quickly responding to invading pathogens.

PATTERN RECOGNITION RECEPTORS

Pathogens are identified by Pattern Recognition Receptors (PRRs) found on the surface or inside specialized immune cells.

SURFACE PRRs:

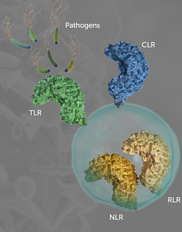
- Toll-like receptors (TLR)
- C-type lectin receptors (CLR)

Identify external threats by pathogen-associated molecular patterns (PAMPs)

INTERNAL PRRs:

- NOD-like receptors (NLR)
- RIG-1 like receptors (RLR)

Identify internal threat by damage-associated molecular patterns (DAMPs).



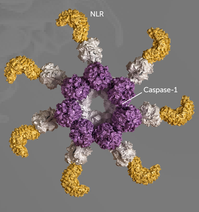
INFLAMMASOMES

PRRs, like NLR, recruit help to overcome threats, using inflammatory responses.

After recognition of a PAMP or DAMP, some NLRs can change shapes to create a multi-protein structure known as an inflammasome.

The inflammasome is a molecular machine that activates inflammatory processes including programmed cell death, through the key protein, caspase-1.

- Cell death can attract other inflammatory mediators to fight infection



Innate immune biology offers a multitude of clinical targets and pathways across several therapeutic areas.

IFM Therapeutics is investigating systemic and targeted delivery options, as well as the potential for combination treatments.

IFM THERAPEUTICS

1. Takeuchi O. and Akira S. Pattern Recognition Receptors and Inflammation. Cell. 2010. 140(6):805-820.
2. Franchi L. et al. Intracellular NOD-like receptors in innate immunity, infection and disease. Cellular Microbiology. 2008. 10(1): 1-8.