ANTIGEN:: any part of an organism that is recognized as non-self (foreign) by the immune system and stimulates an immune response

* Most cells possess antigens in their cell surface membrane which act as markers enabling cells to recognise each other
* Usually large complex molecules such as proteins or glycoproteins

Although any complex can be antigenic

* The body can then distinguish between local and foreign cells but only usually make antibodies in response to foreign antigens

\* transplant organs have non-self antibodies

∴The immune system recognises it as foreign material and attempts to destroy it

* The effect of antigen variability on disease and disease prevention (e.g. the influenza virus)
* Self-antigen (part of own cell)
* Non-self antigen (foreign)
* 2 main types of white blood cells

|  |  |
| --- | --- |
| **Phagocytes** | **Lymphocytes** |
| Unusual lobed nucleus | large round nucleus |
| Engulfing pathogens (**phagocytosis**) | Bind to pathogen and divide by mitosis and produce **antibodies** |
| Kill pathogens by digesting them with enzymes. | Antibodies **clump pathogens together** – making it easier for phagocytes to engulf them. |

* Some lymphocytes divide to form memory cells
* Memory cells do not make antibodies

But stay in blood for a long time after an infection allowing the body to produce antibodies sooner

Faster

In greater quantity

0 
o 
o 
o 
initial 
exposure 
secondary 
immune response 
secondary 
exposure 
primary 
immune 
response 
Time 

* Lymphocytes (produced in bone marrow)
* B- lymphocytes (B cells) mature in BM
* T- lymphocytes (T cells) mature in thymes
* The aim of vaccination is to stimulate the immune system to produce memory cells, but without causing the disease
* Vaccines are usually either:
* Pathogens which have been killed
* Live pathogens which have been weakened (attenuated)

12 
Hours 
Days 
Time after infection 

* The human body has a range of defences to protect itself from pathogens
* Non-specific immunity (or innate immunity): these are general and immediate

defences like the skin forming a barrier to the entry of pathogens and phagocytes

* Specific immunity(or adaptive/ acquired immunity): these are more specific to

each pathogen, but the response is generally lower

Defence 
mechanisms 
Non-specific 
Physical barriers 
e.g. skin 
Phagocytosis 
Specific 
Cell-mediated 
response 
T-lymphocytes 
Humoral 
response 
B-lymphocytes 

NON- SPECIFIC IMMUNITY

* To cause disease, a pathogen must successfully gain entry to the host and travel to the location where it can establish an infection
* Should the physical and chemical barriers (e.g. skin, stomach acid) fail, phagocytes ingest and destroy the pathogen by the process of phagocytosis
* Phagocytes
* Macrophages
* Neutrophils
* Resting phagocytes become activated by chemical products of pathogen or dead, damaged and abnormal cells
* → causes the phagocytes to move towards the pathogen
* Phagocytosis: process where the phagocyte engulfs a particle to form an internal

vesicle called a phagosome