Coronavirus:

Structure, Testing and Vaccine Development

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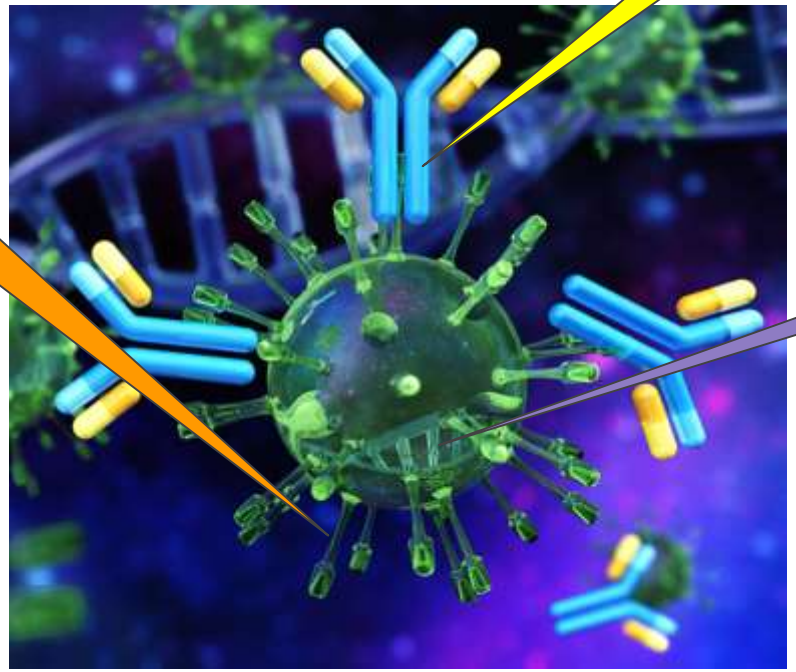
Key Terms

Antibodies

Proteins made by the immune system (NOT a part of the virus) to fight the virus

Surface proteins

Help the virus gain entry into host cells



RNA

Genetic material
Instructions for protein synthesis and reproduction

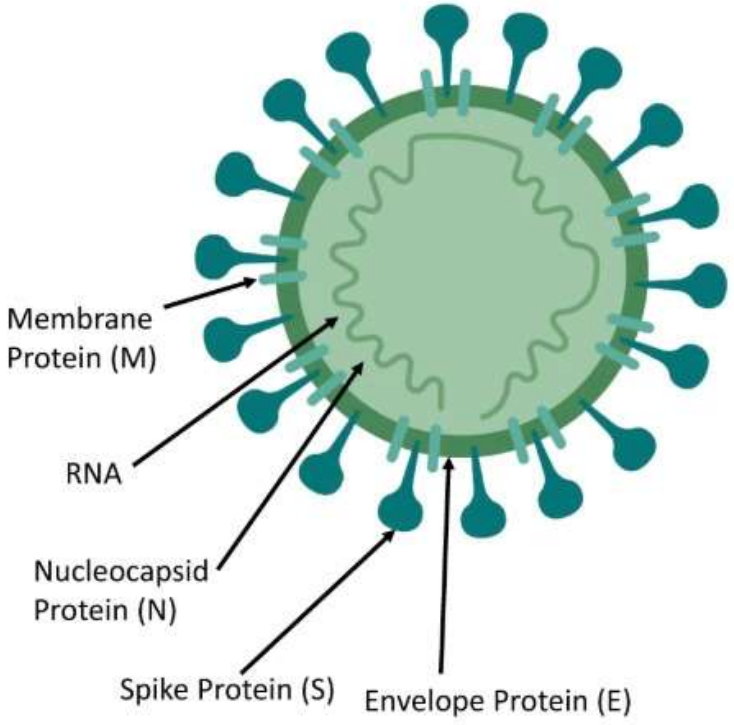
RNA

Single strand

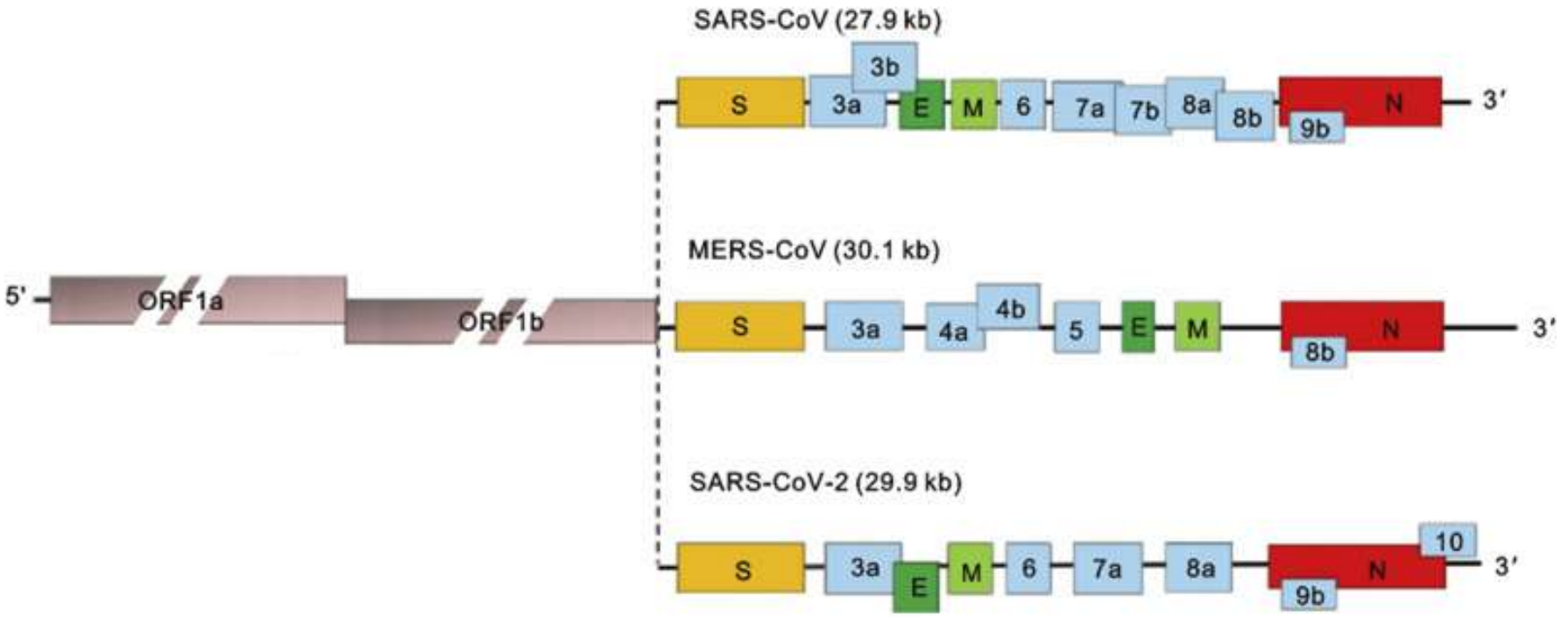
Helically symmetrical

Codes for 4 main structural proteins

- Spike (S)
- Membrane (M)
- Envelope (E)
- Nucleocapsid (N)



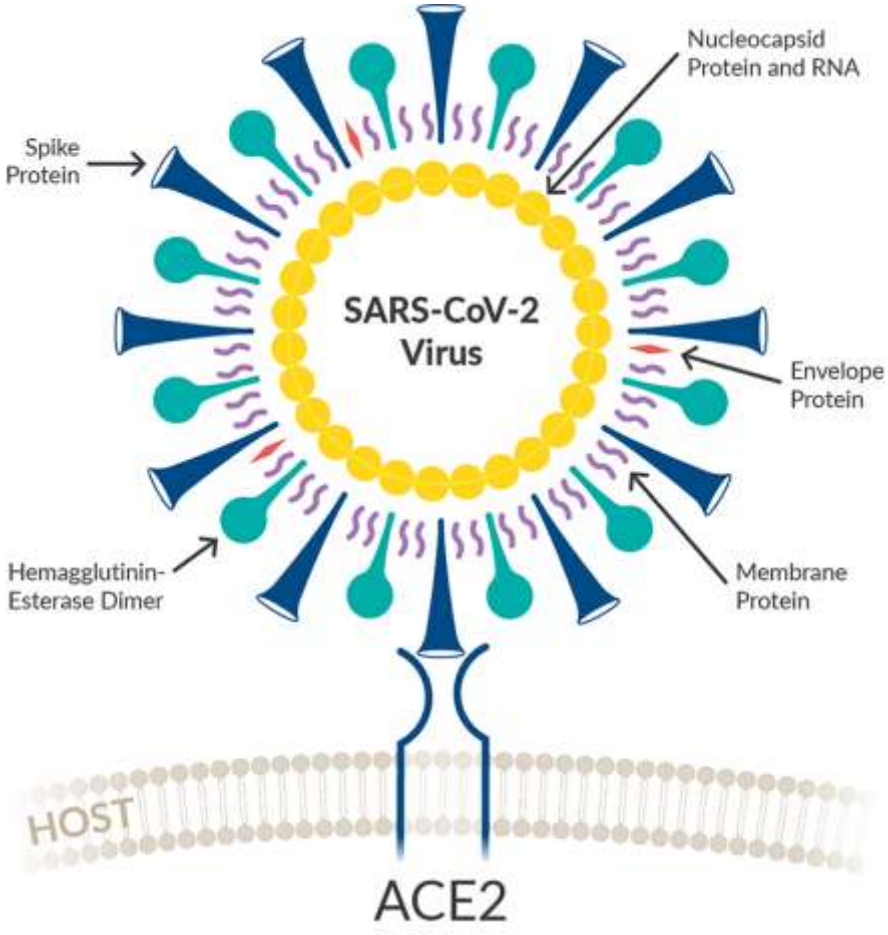
RNA


SARS-CoV (27.9 kb)
3b
S
3a
E
M
6
7a
7b
8a
8b
9b
N
3′
MERS-CoV (30.1 kb)
5′
ORF1a
ORF1b
S
3a
4a
4b
5
E
M
8b
N
3′
SARS-CoV-2 (29.9 kb)
S
3a
E
M
6
7a
8a
9b
10
N
3′

Surface Proteins

1. Spike protein
    a. Entry into host cell

1. Hemagglutinin-esterase protein
    a. Viral release from infected cells



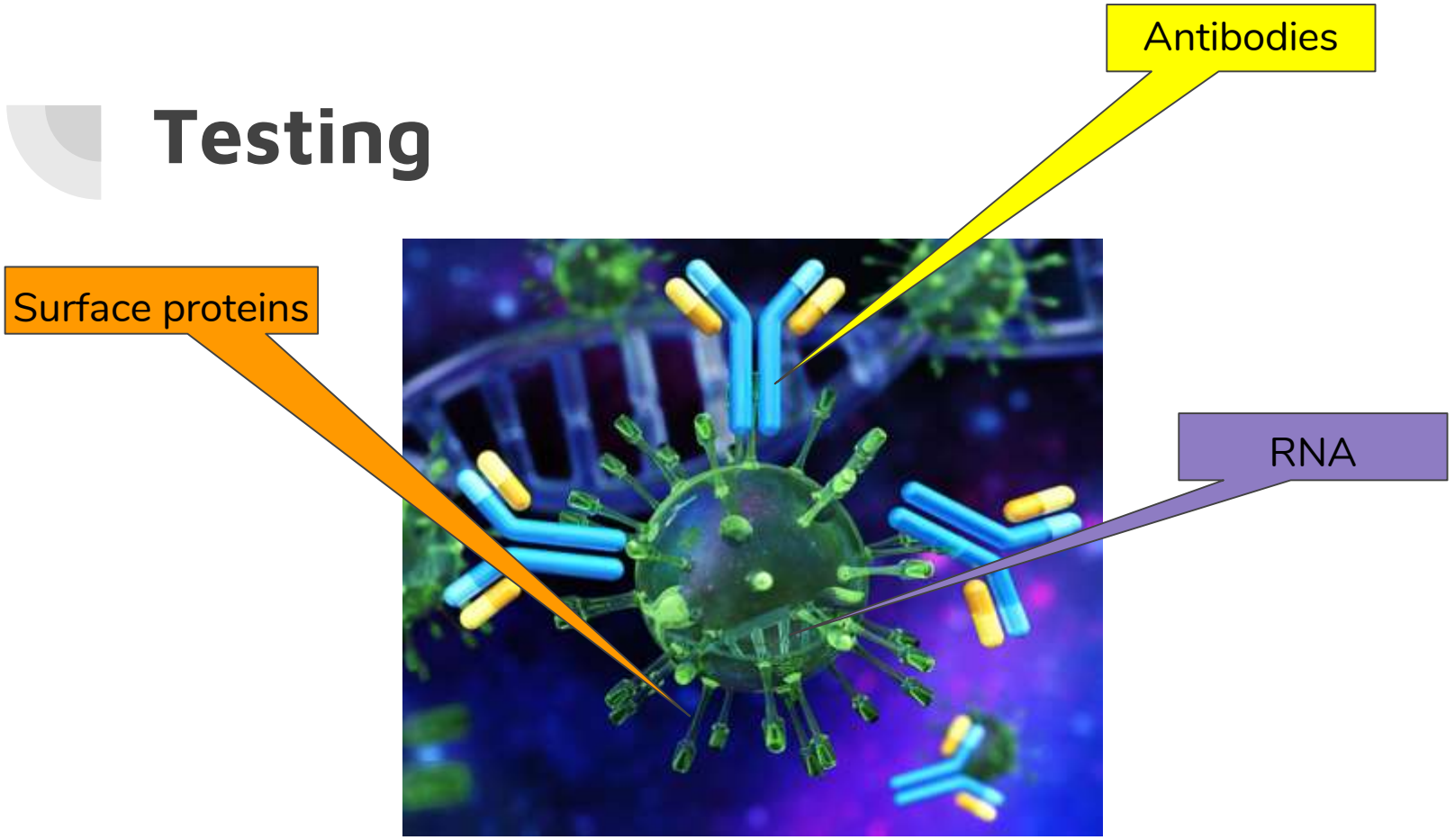
Antibodies

Proteins created by the host immune system to neutralize foreign threats to the body

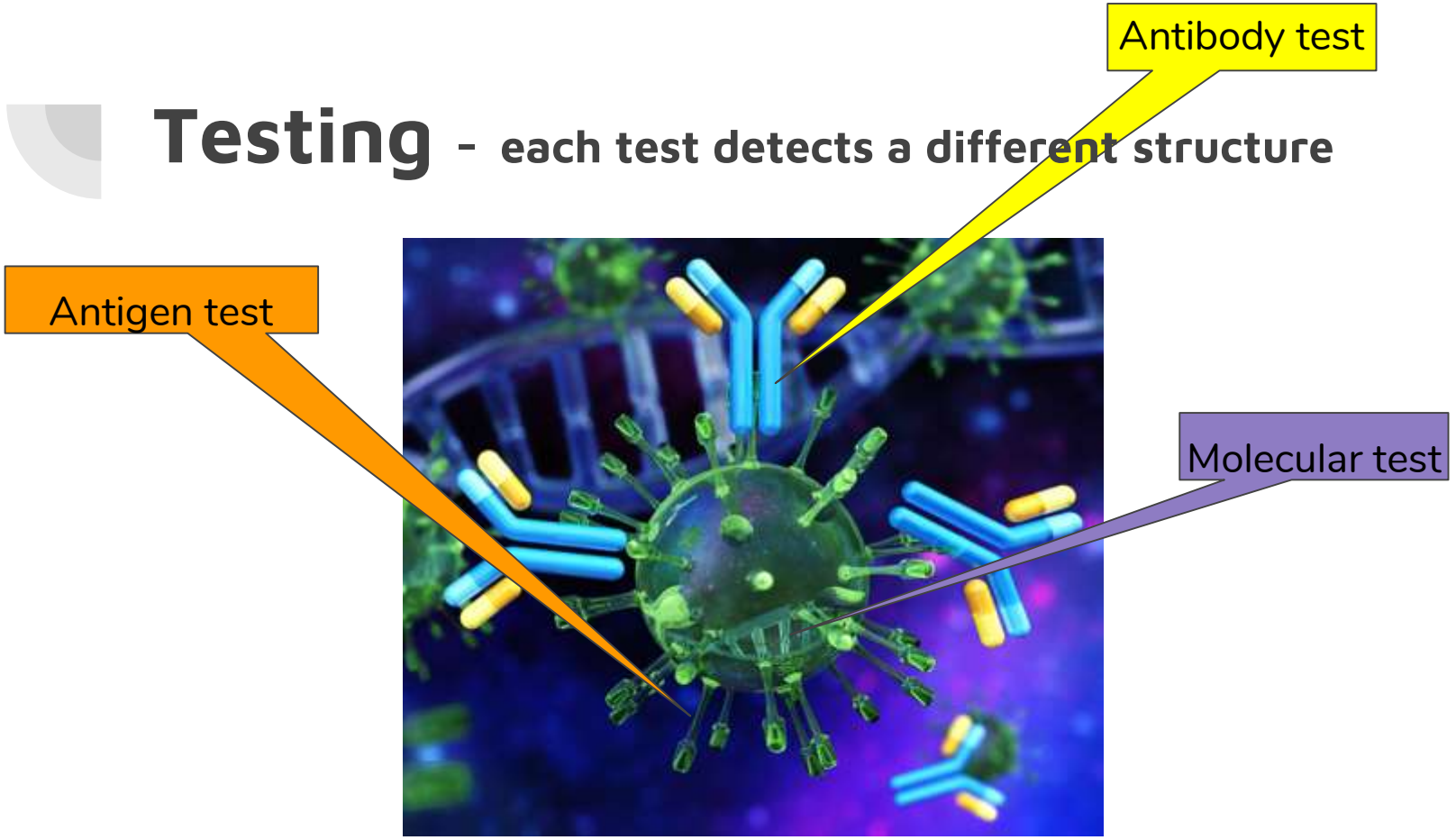
Testing

Diagnostic	Antibody
To detect if the virus is in the body **Molecular** - test for genetic material **Antigen** - test for surface proteins	To determine if an individual has previously been infected

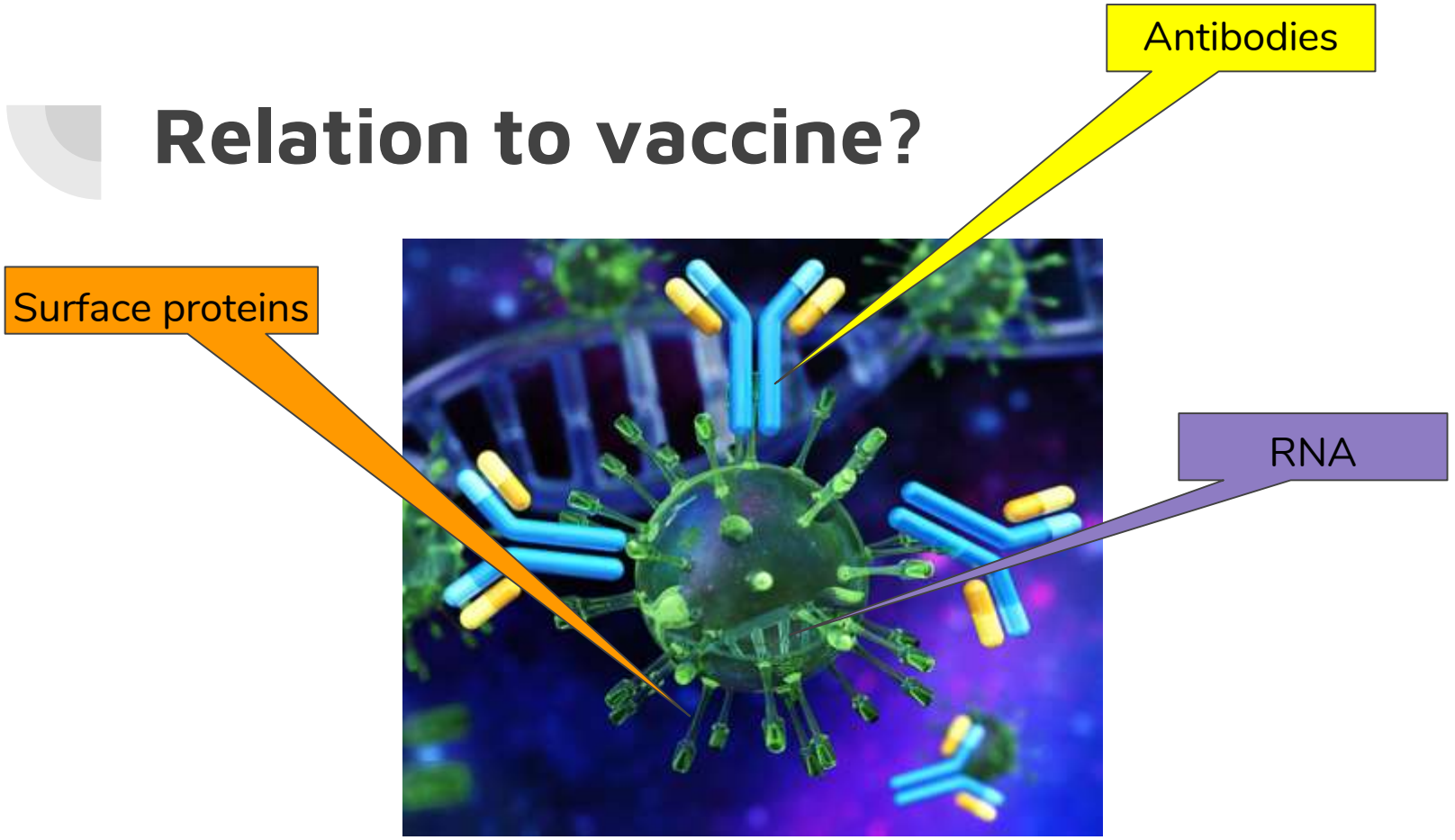
Testing



Testing - each test detects a different structure



Relation to vaccine?



Vaccine Development

Expose the body to surface proteins or RNA so it produces antibodies

Types of Vaccines Currently in Clinical Trials:

- Non-replicating viral vector
- Replicating viral vector
- Protein subunit
- DNA
- Virus-like particles
- Inactivated
- RNA

Research Institutions/BioTech Companies:

- Oxford University
- AstraZeneca
- Beijing Institute of Biotechnology
- CanSino Biologics
- Gamaleya Research Institute

Sources (images)

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Thank you

Questions?