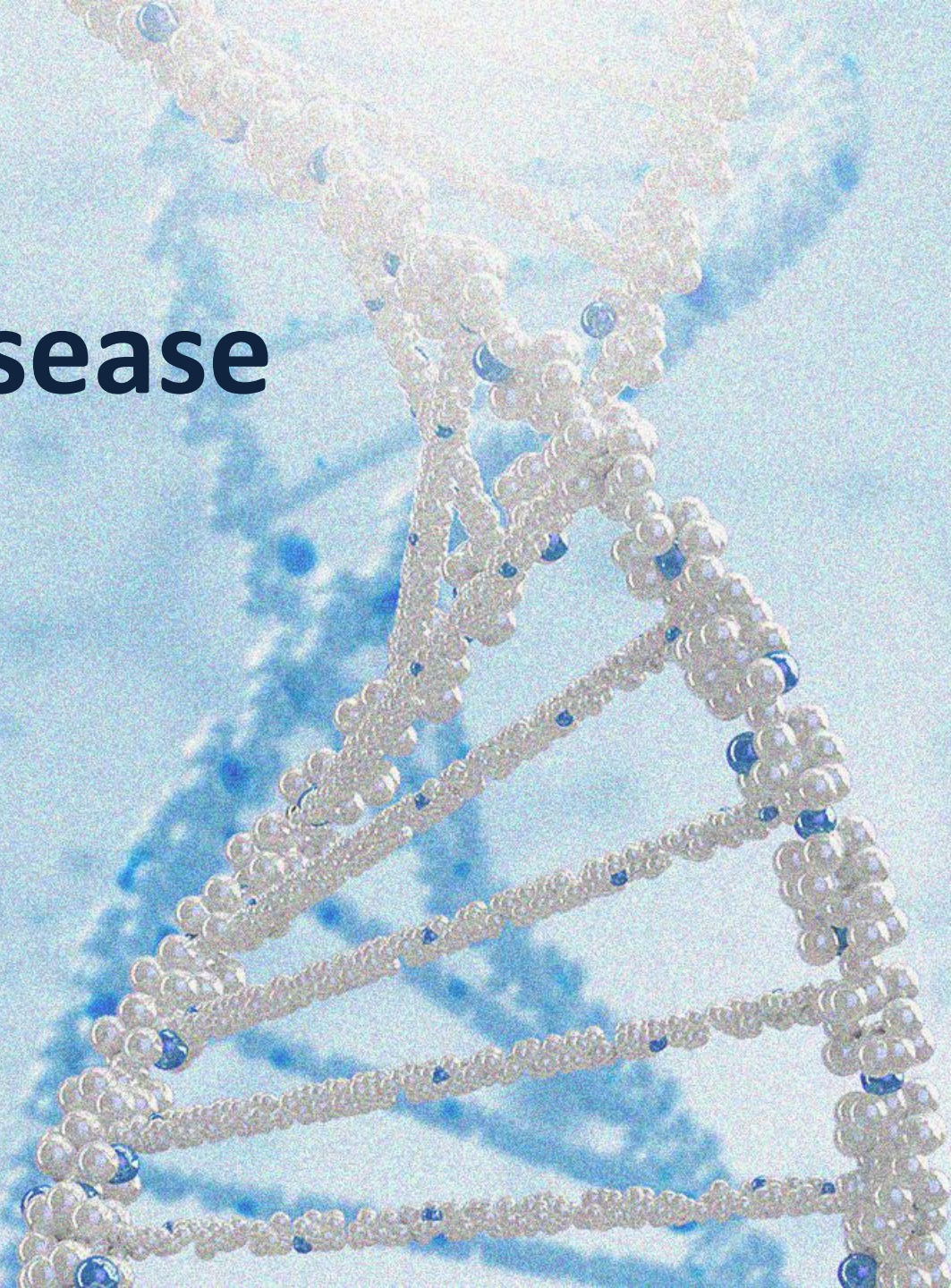
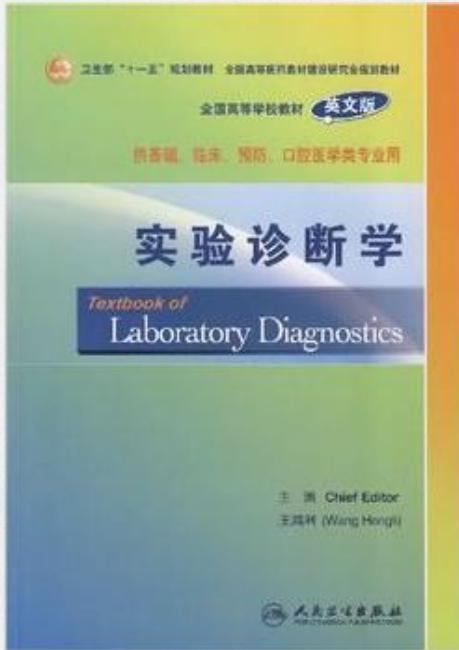


Diagnosis of Viral Disease

Li Qingrong



Textbook



<Laboratory Diagnostics (3rd edition)>

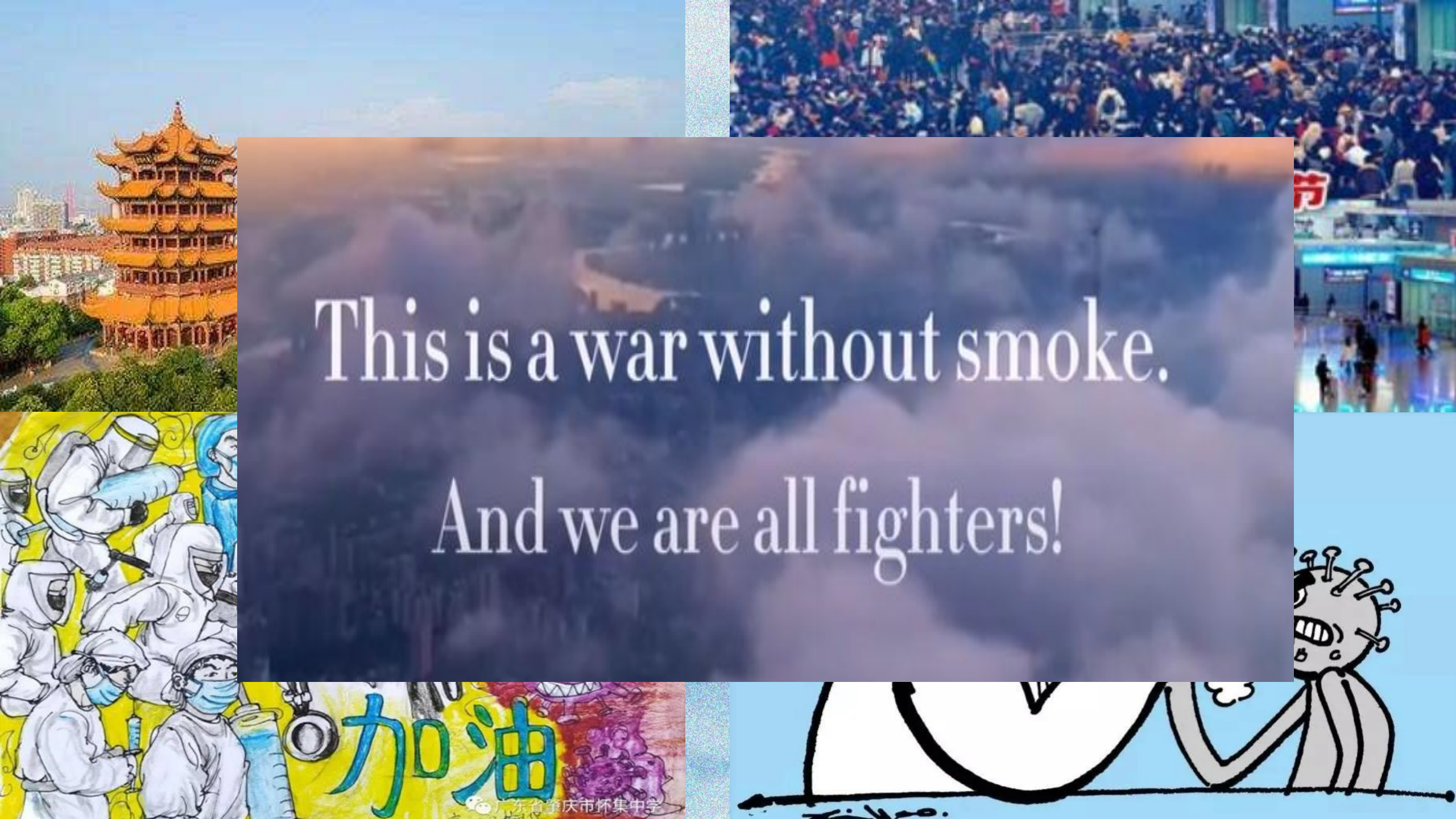
People's Medical Publishing House.Co.Ltd

Chapter29 Diagnostic Virology

Section1 Value of Specific Viral Diagnosis

Section2 Approach to Viral Diagnosis

Section3 Diagnosis of viral disease



This is a war without smoke.
And we are all fighters!

加油

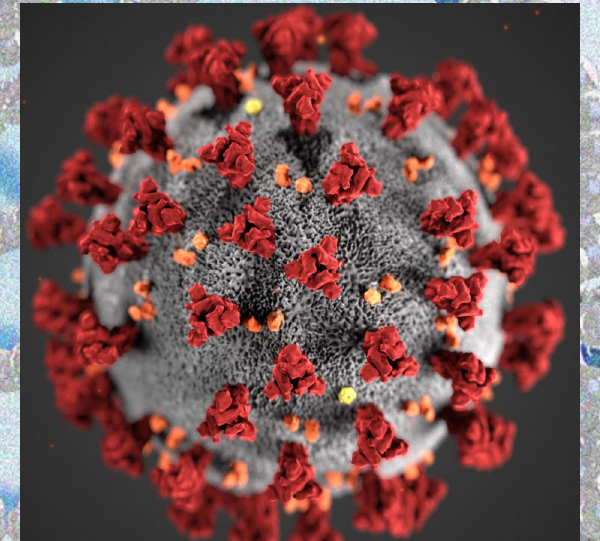
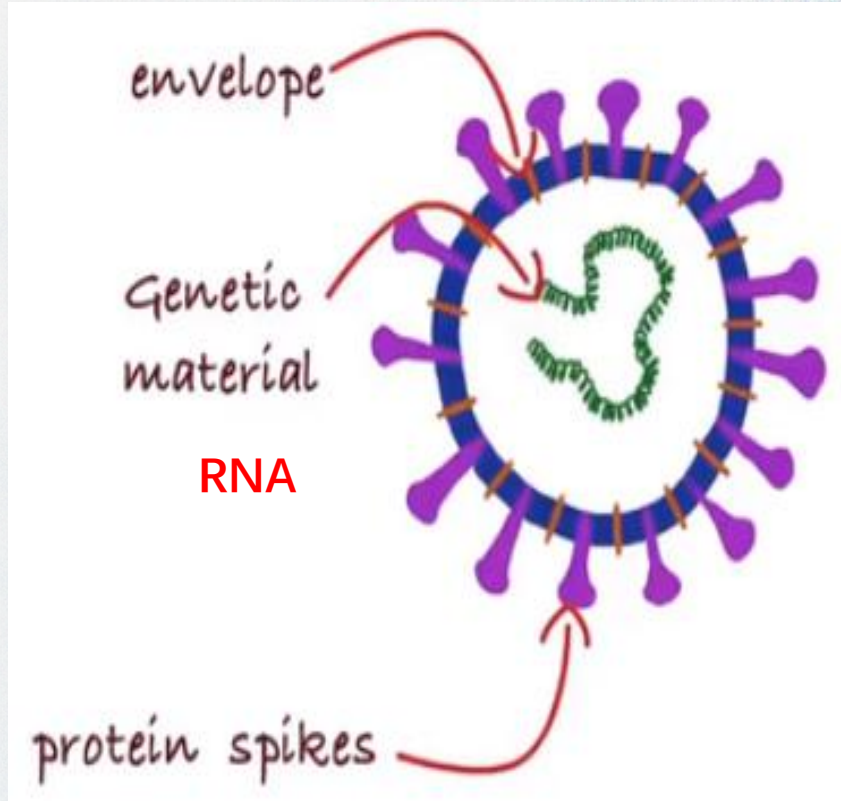
广东省肇庆市怀集中学

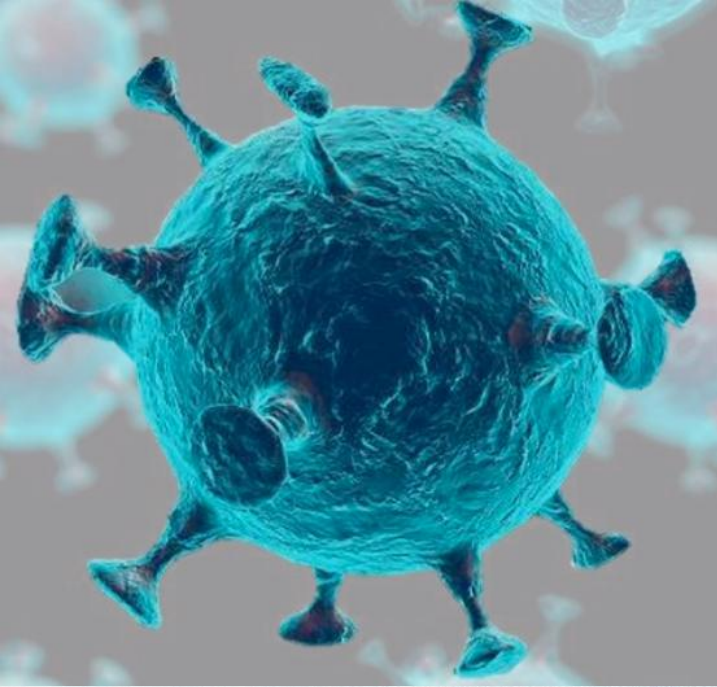
What is coronavirus ?

coronavirus

corona

virus





What is coronavirus ?

There are different types of corona virus

Gastrointestinal disease

Respiratory disease

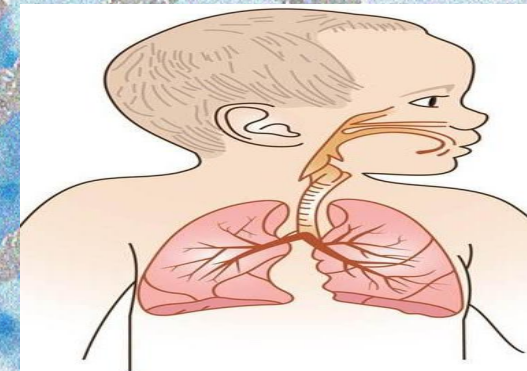


Covid-19

some cause severe disease

SARS - COV China - 2003

MERS - COV Saudi Arabia - 2012



Diagnosis of viral disease



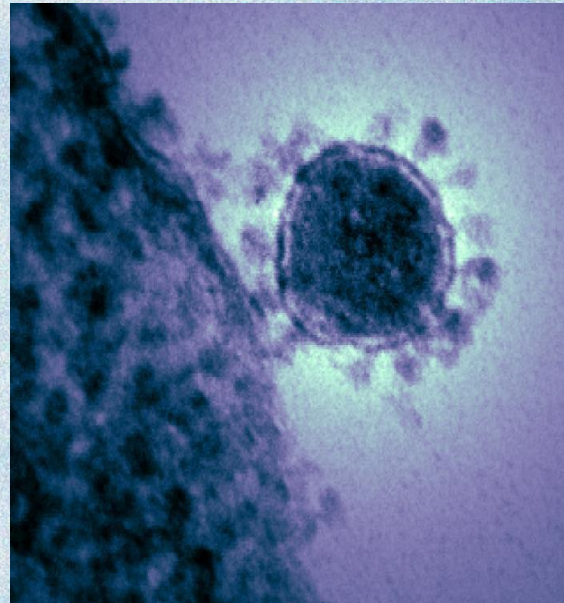
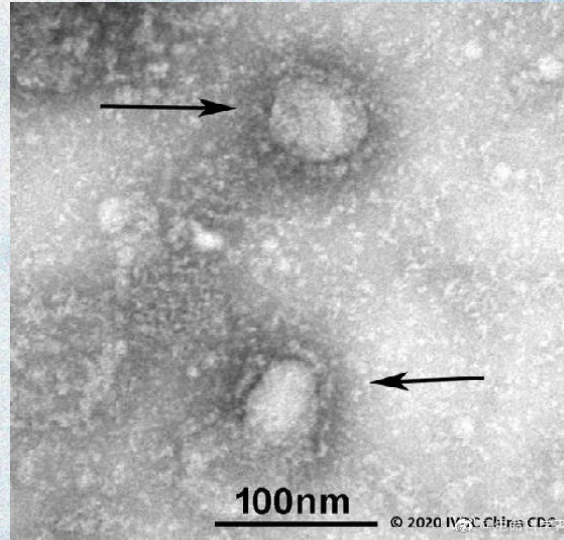
× **Virus Isolation**

require special cell culture lab

Slow



Electron Microscopy



High resolution

Specialized Equipment

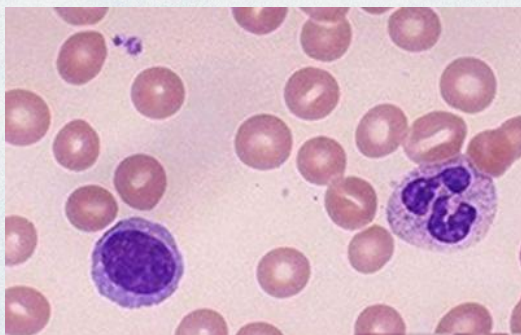
Expensive



IN THE LAB

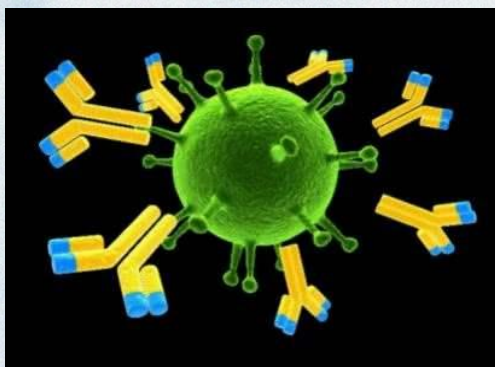


Hematological test



01

Immunological test



03

The Clinical lab
examination in Virus
Diagnosis

02

Biochemical test



04

Molecular diagnostics



Diagnosis of viral disease

Hematological tests

Covid-19

WBC ↓ or N
Lymphocyte ↓

Common virus infection

WBC ↓ or N
Lymphocyte ↑

Biochemical tests

ALT、AST、
CRP、PCT ↑、
LDH、CK、
MYO、Tn

Rapidly
Low specificity

Immunological tests

IgG、IgM

Widely available
High specificity
Delay of 2 to 3
weeks

Molecular diagnostics

Chinese Clinical Guidance for COVID-19 Pneumonia Diagnosis and Treatment (7th edition) (published by China

National Health Commission on March 4, 2020)

Confirmed cases

Suspected cases with one of the following etiology or serological evidence can be identified as confirmed cases:

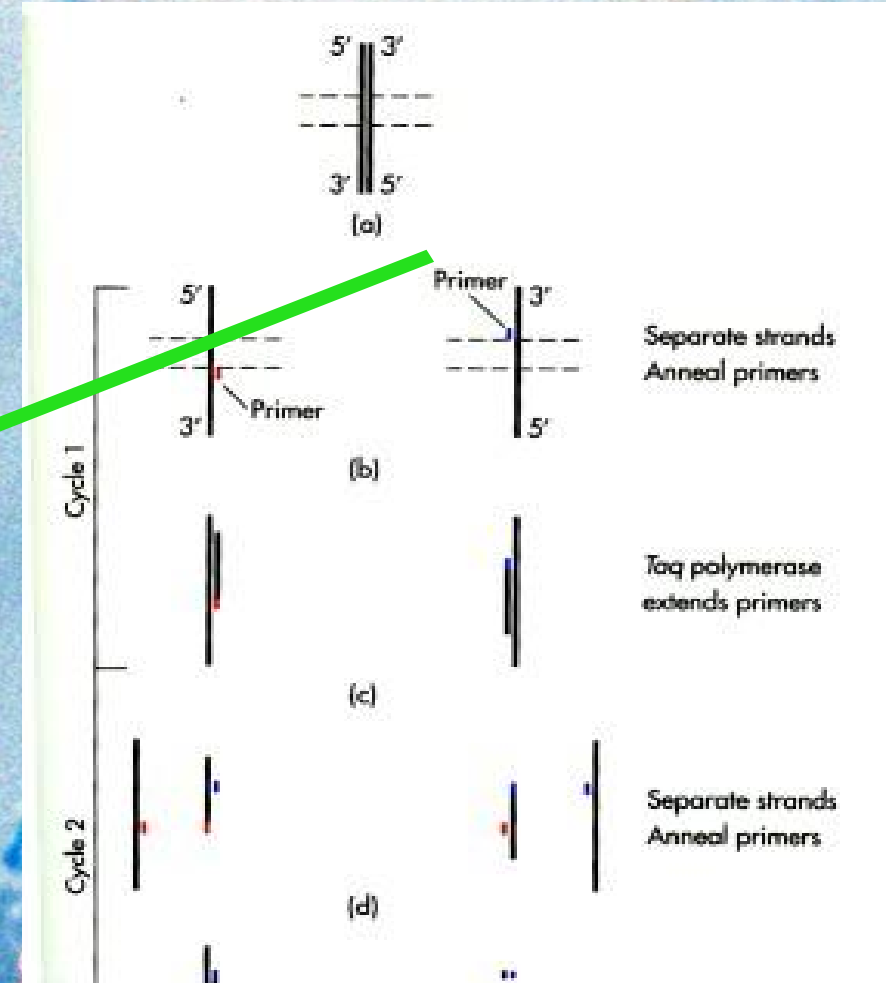
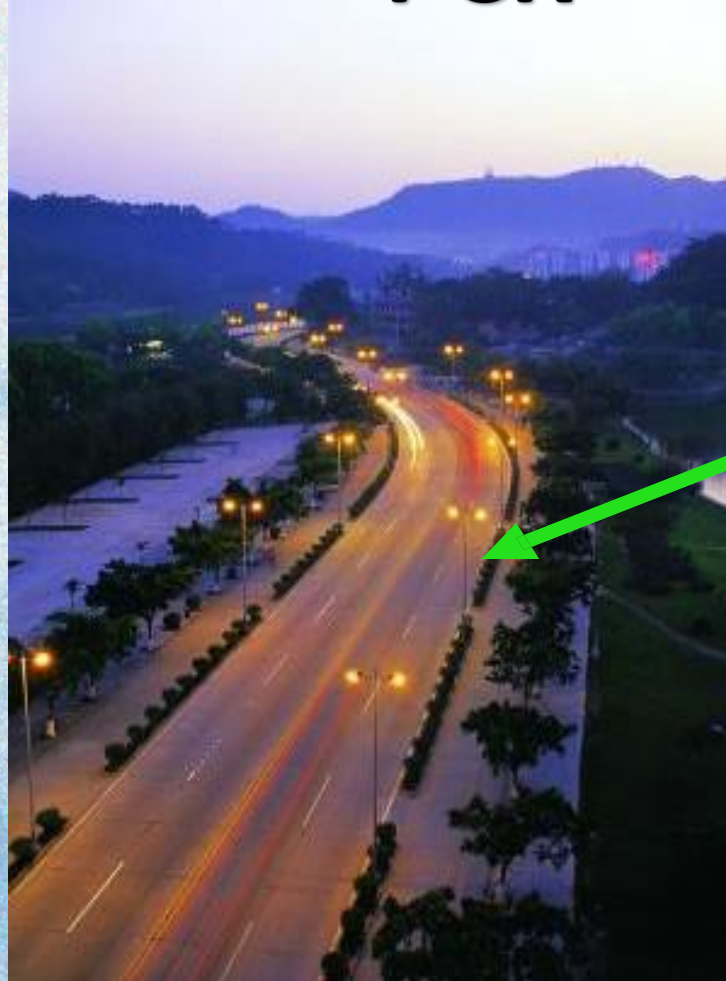
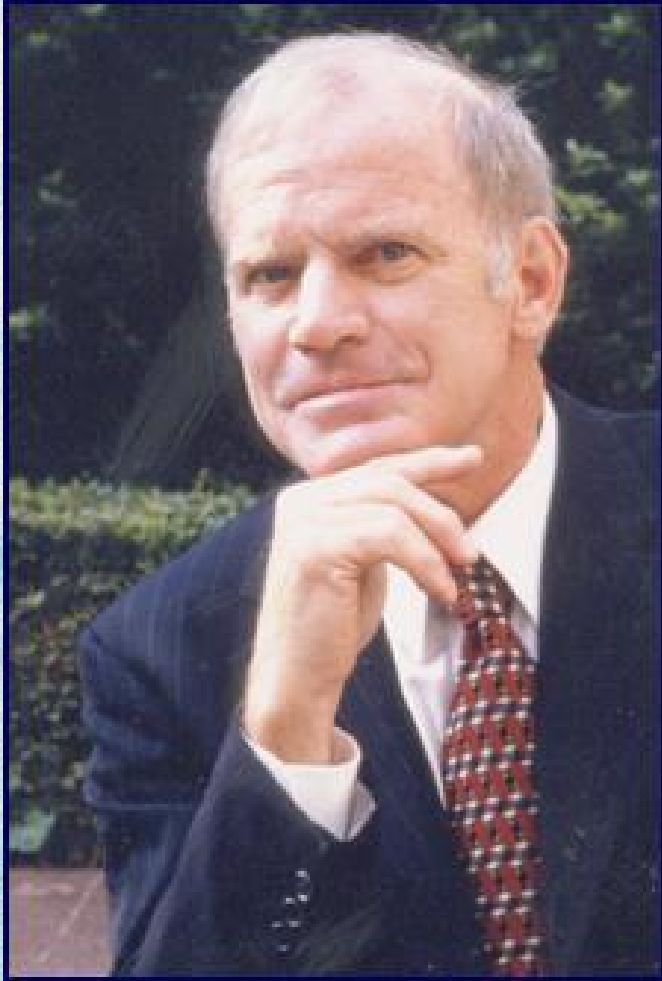
- (1) Real-time RT-PCR detection is positive for COVID-19 nucleic acid.
- (2) The viral gene identified by gene sequencing is highly homologous with known COVID-19;

Molecular Diagnostics

PCR(Polymerase Chain Reaction) is an in vitro method for enzymatic synthesis of specific DNA sequences



PCR



When Mullis was driving, he felt that the two rows of street lights were the two strands of DNA. His car and the car on the opposite side were like DNA polymerase, which synthesized DNA face to face.

Real time RT-PCR

quantitative

RNA → DNA

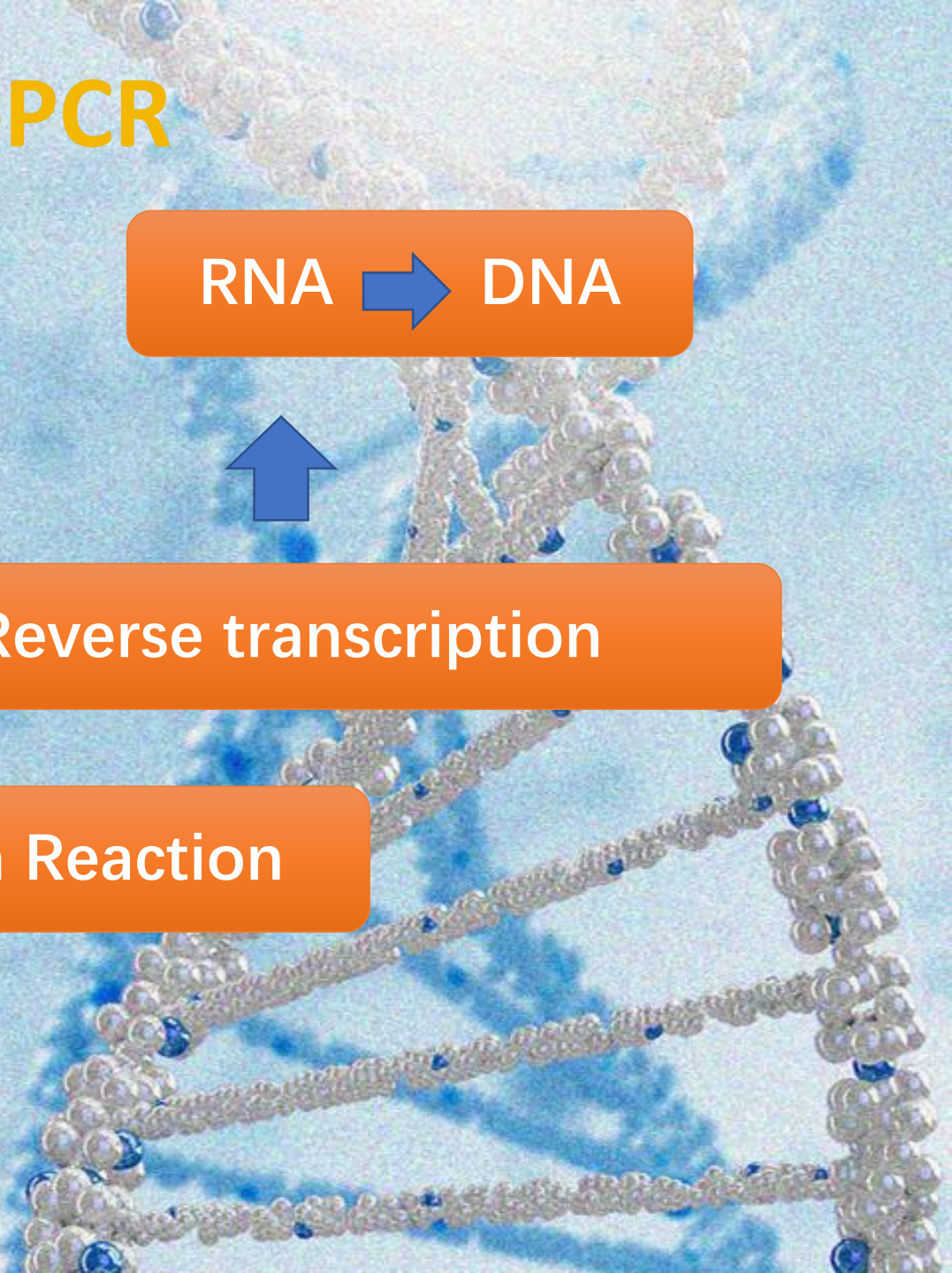


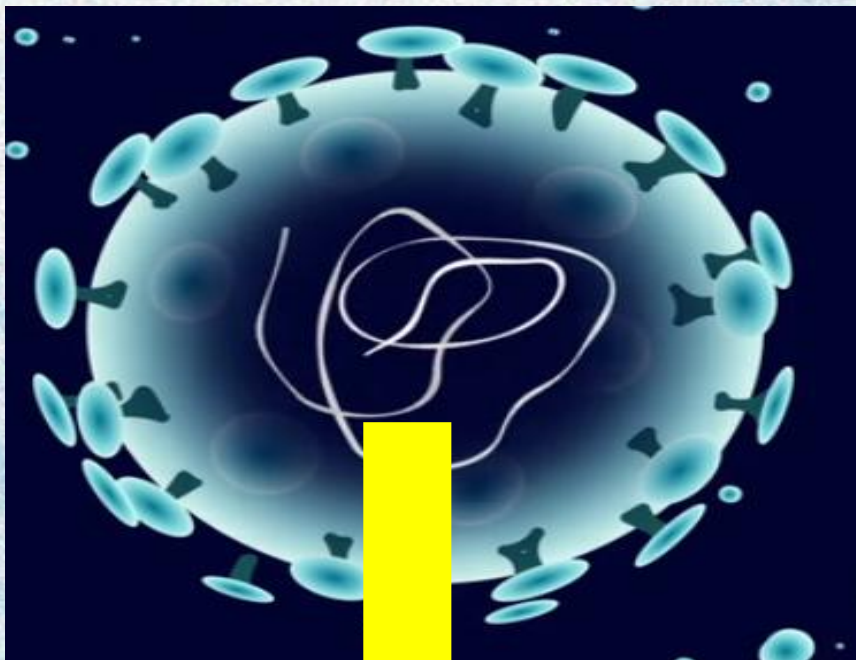
Real time RT-PCR:

Real-time

Reverse transcription

Polymerase Chain Reaction





Primer

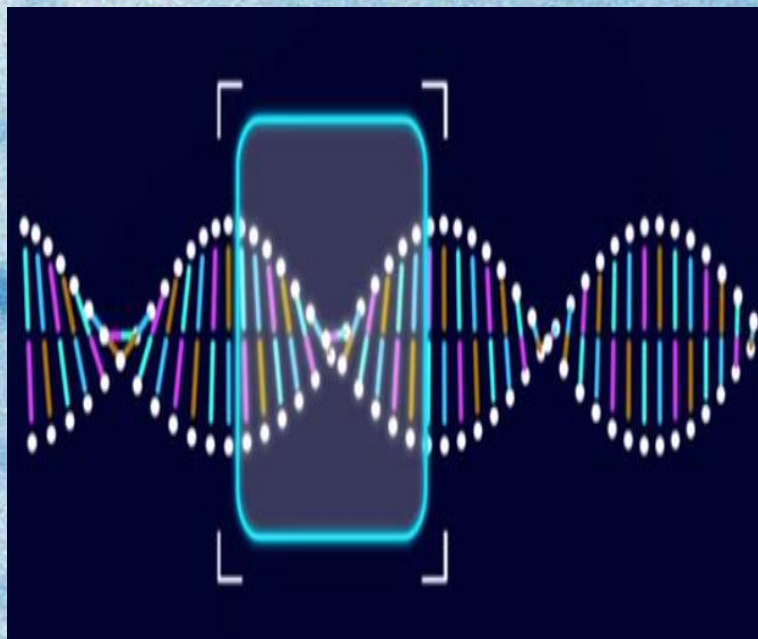
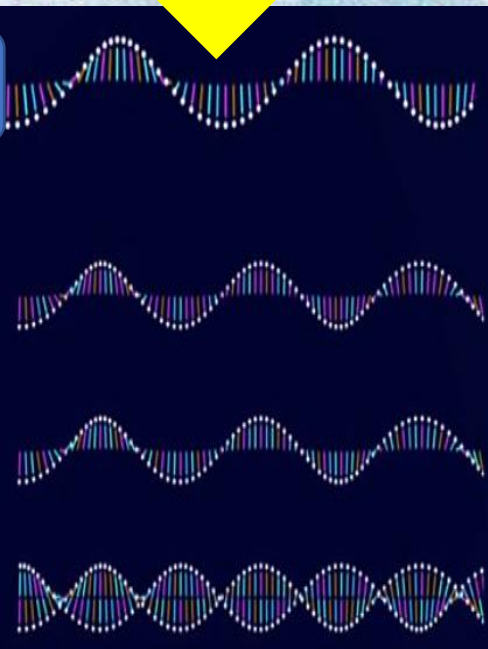


Covid-19

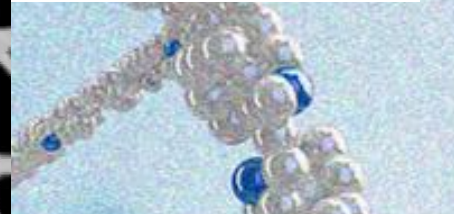
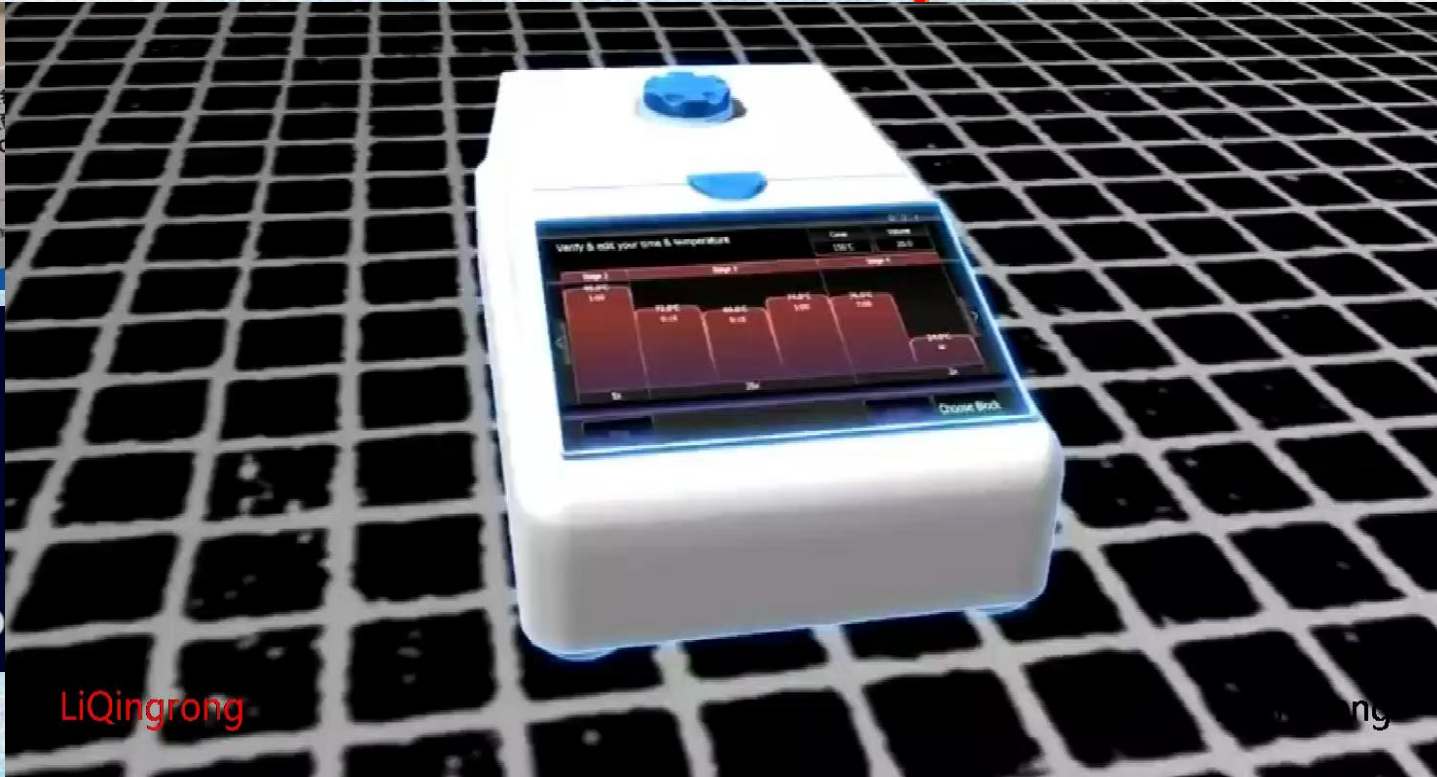
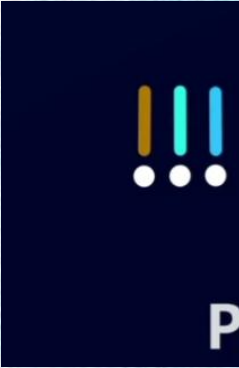
SARS

MERS

ViRus 1



Reverse Transcription

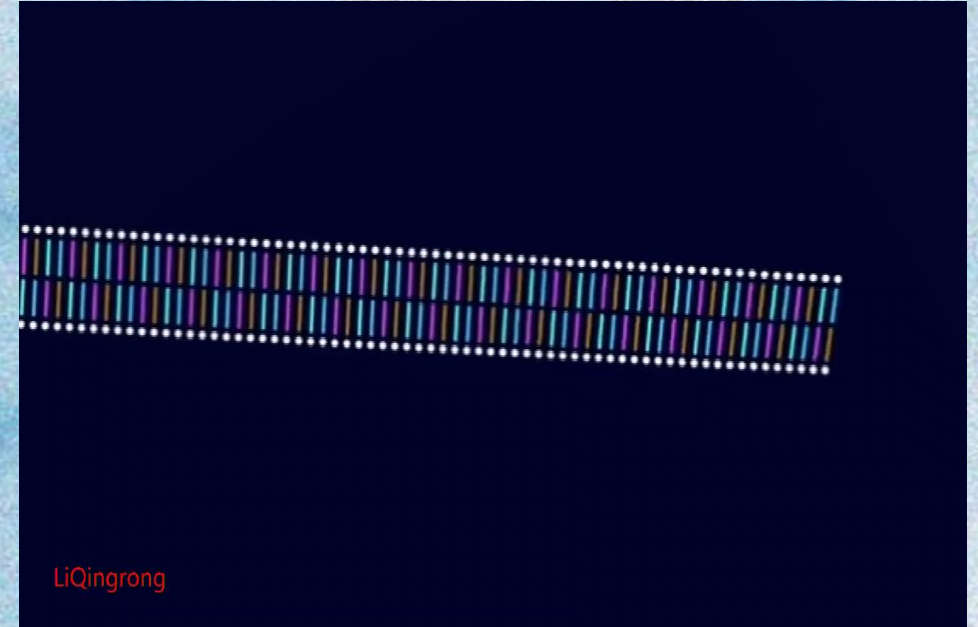


cDNA

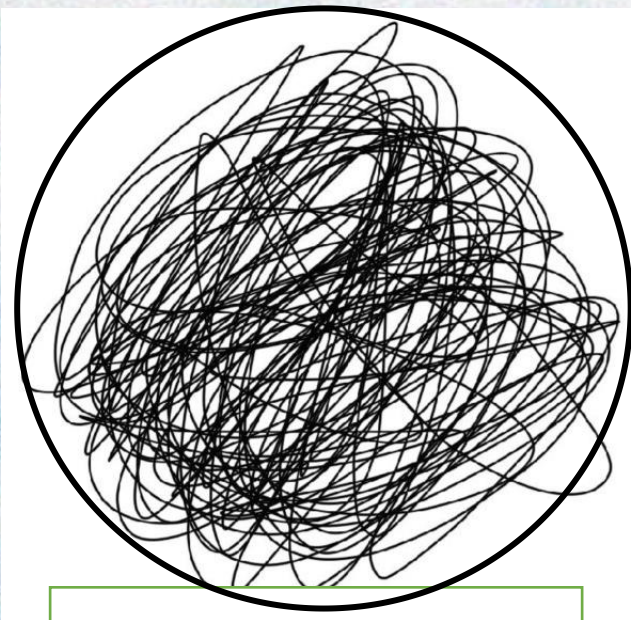


Replication

Denaturation



**Melting
temperature: 95°C**



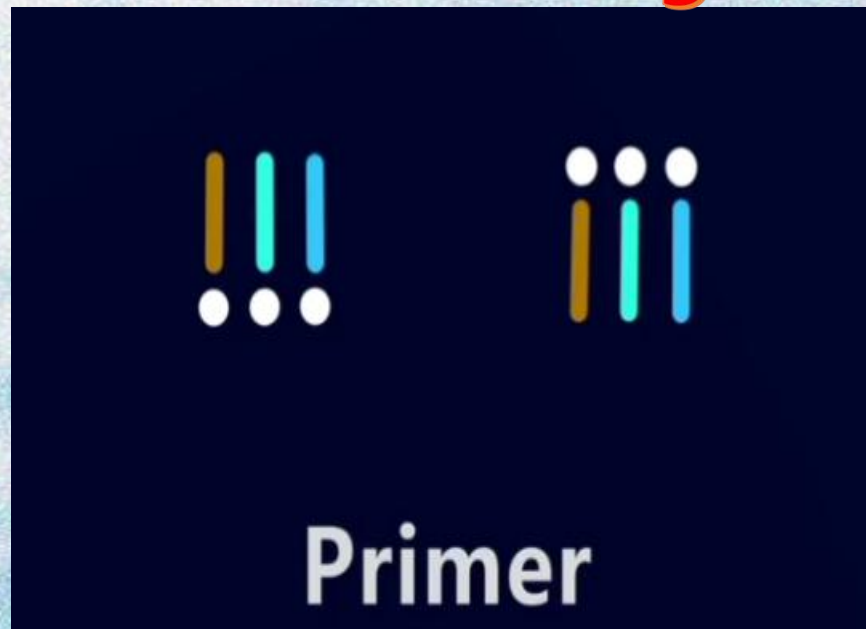
sample: mess of DNA
fragments from
everything



Patients' own
Harmless bacteria
Virus



Annealing



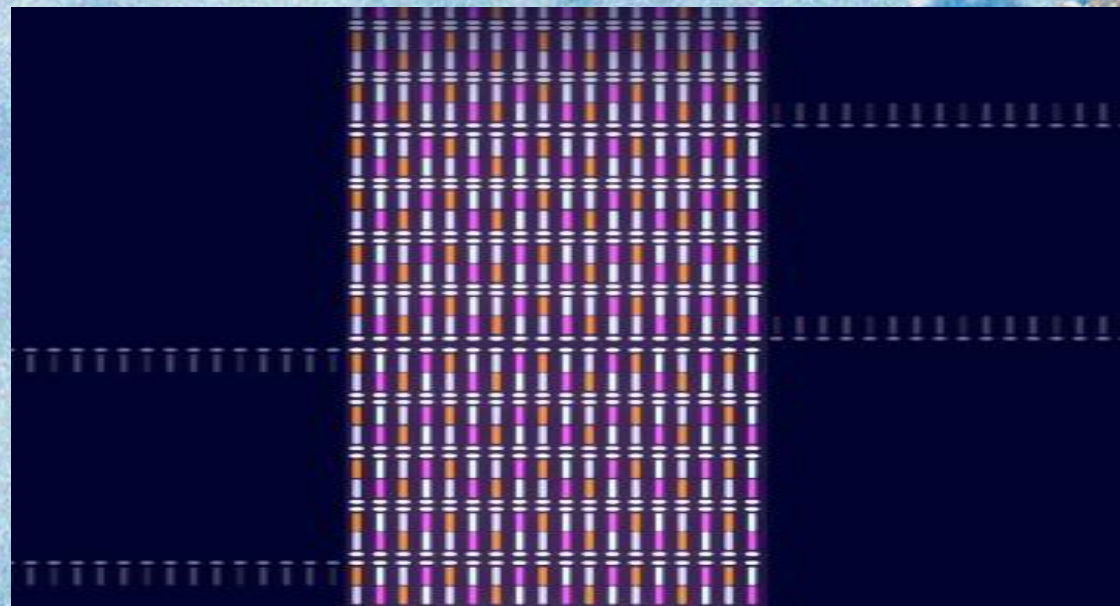
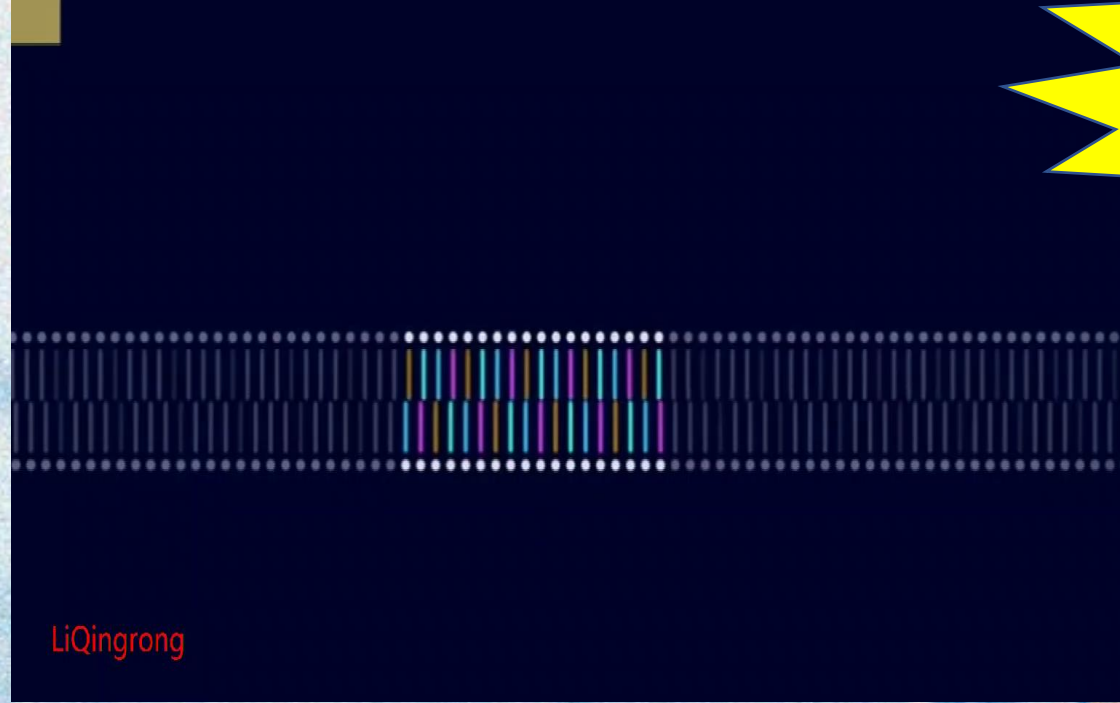
Annealing
temperature
55°C



Extension



Fluorescent
labels

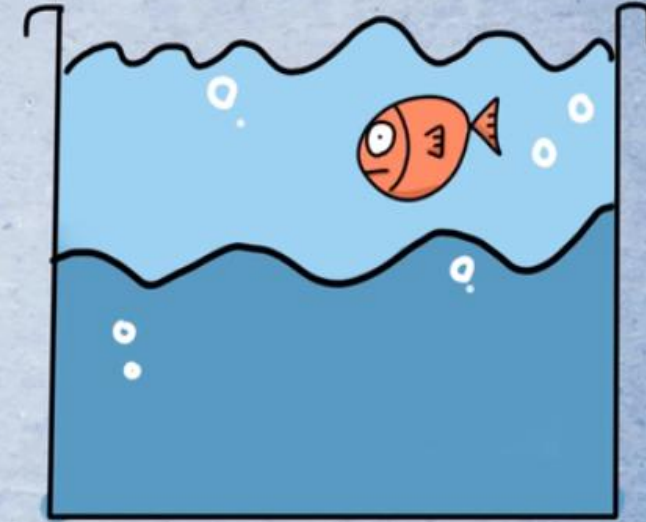
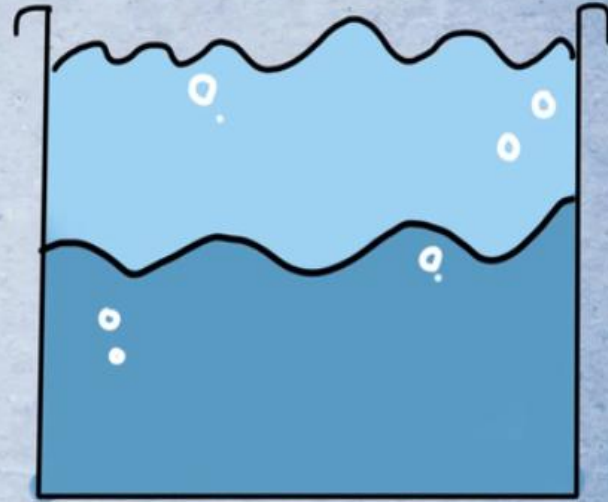


72°C

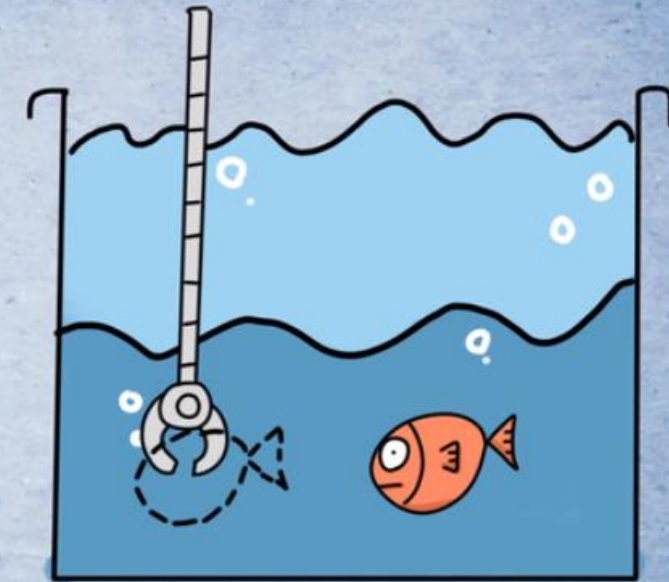
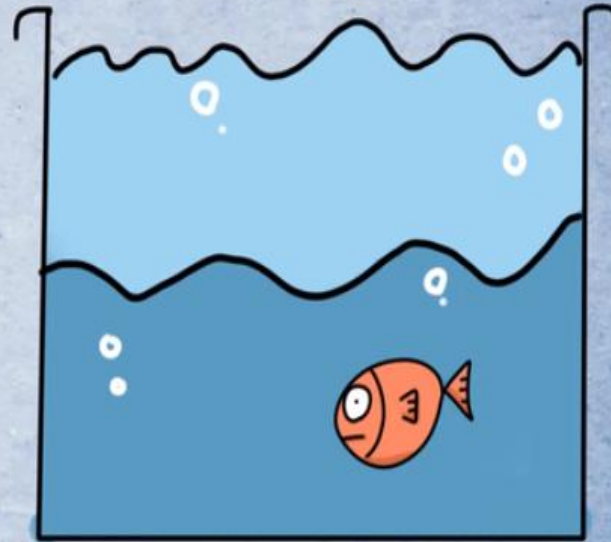
35-40
cycles



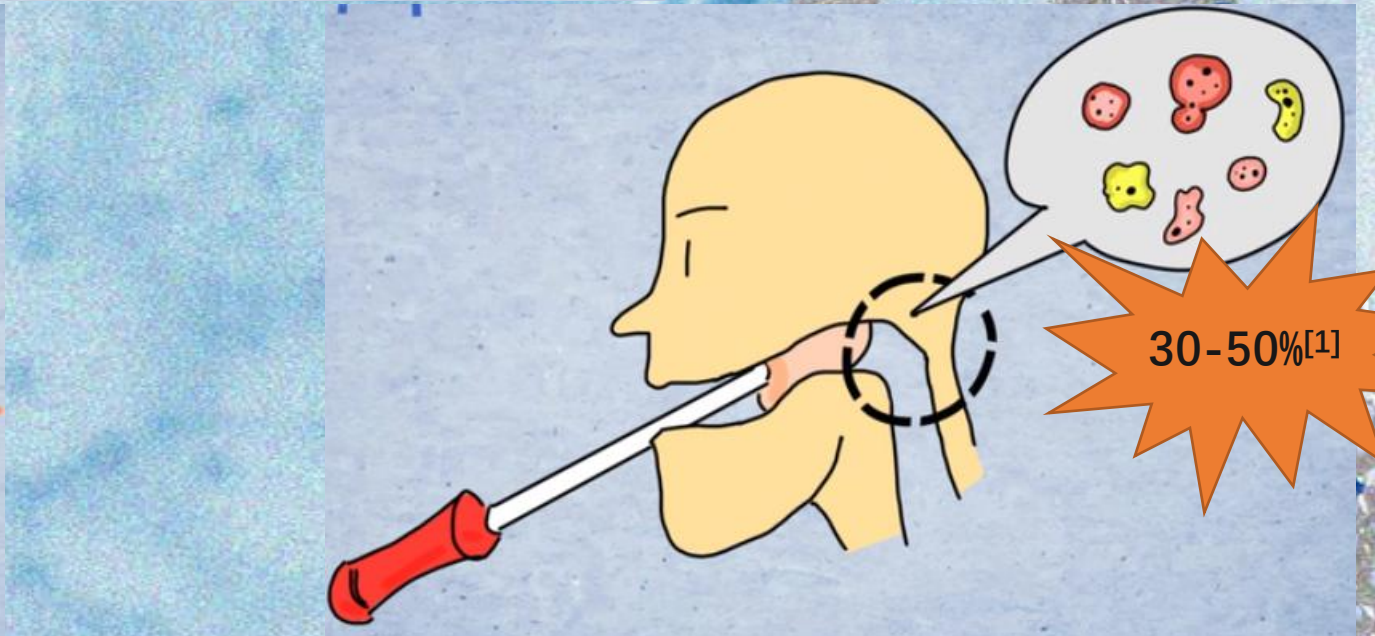
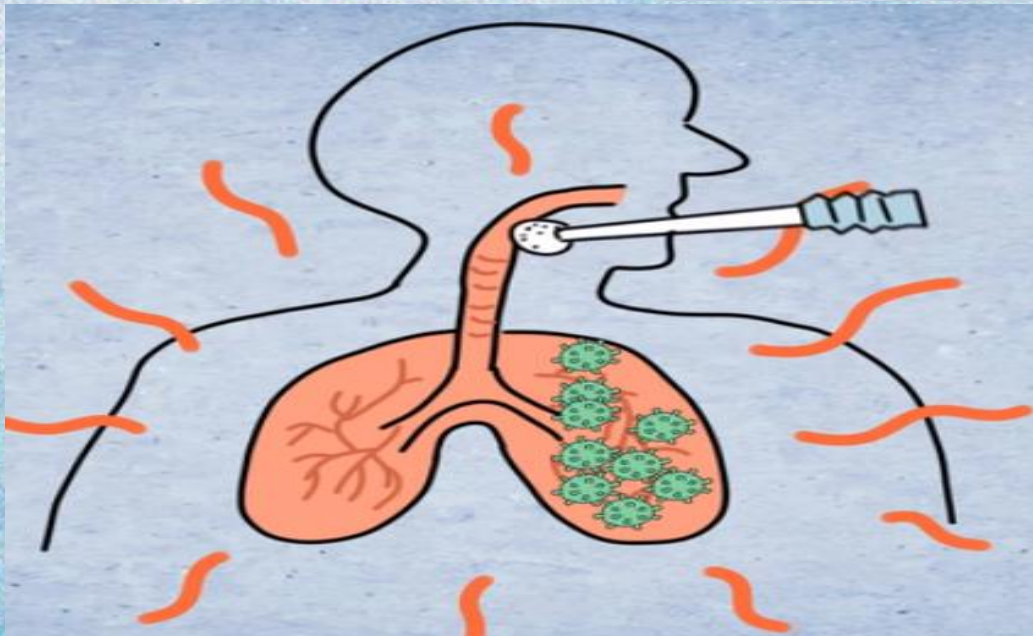
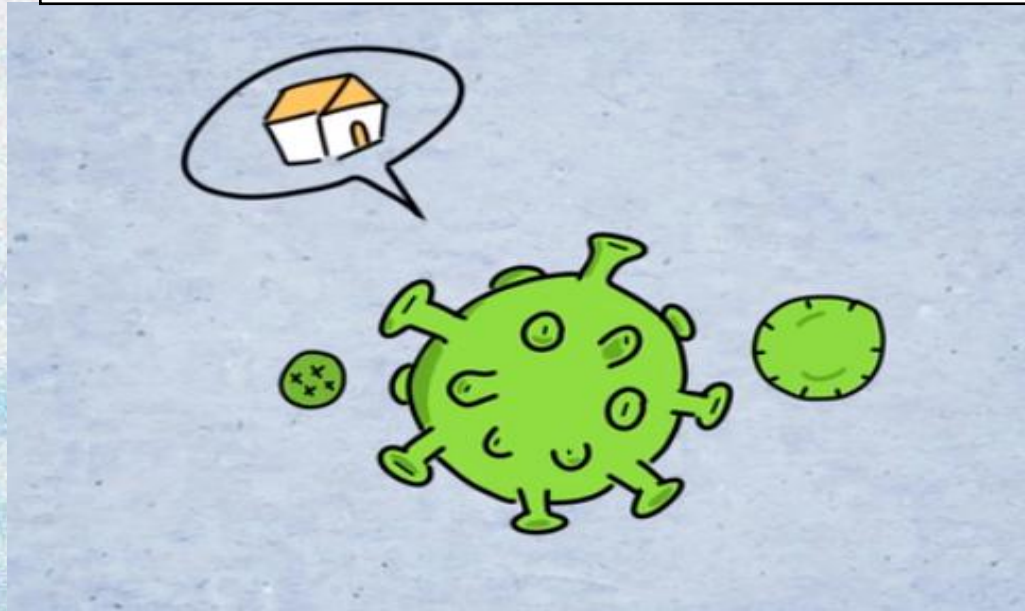
False-negative?



974 x 489



False-negative?



钟慧钰,赵珍珍,宋兴勃等.新型冠状病毒核酸临床检测要点及经验[J/OL].国际检验医学杂志:1-8[2020-02-17]

Specimen collection

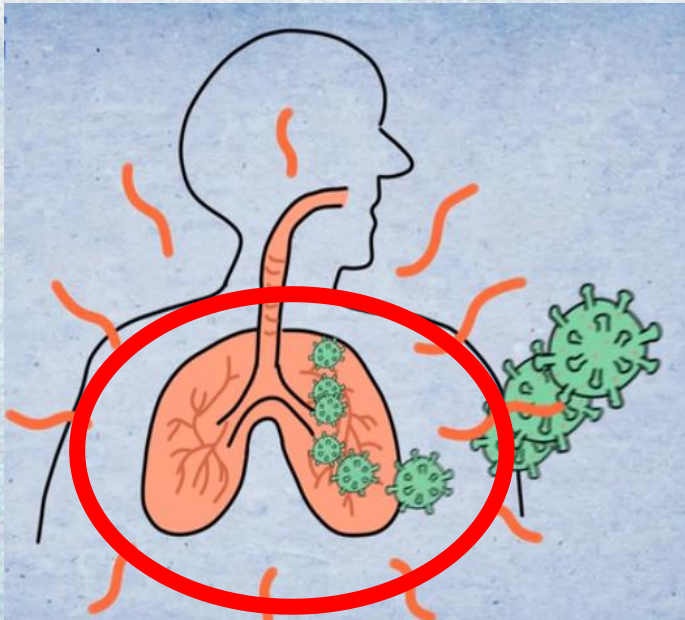
Lung



Broncho alveolar lavage (BAL)



**Sputum from
low respiratory
tract**



Summary

VIRUS

What is coronavirus

Diagnosis of viral disease

**Molecular
diagnostics**

Biochemical tests

**Immunological
tests**

**Hematological
tests**

**PCR、
Real time RT-PCR**

False-negative?

We are going to win this war in the end !
Thanks to the fighters , all of them are heros !



Thanks for your attention