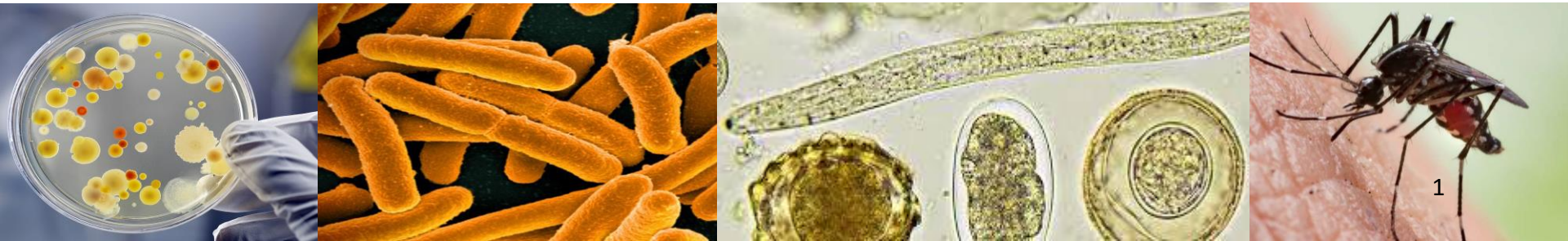




# BPH 1203

# Microbiology and Parasitology





หลักสูตรสาธารณสุขศาสตรบัณฑิต  
**B.Sc. (Public Health)**

**BPH ๑๒๐๓ จุลชีววิทยาและปรสิตวิทยา**

**BPH 1203 Microbiology and Parasitology**

# Lecturer



**Assoc.Prof.Dr.Duangporn Nacapunchai, MD**



**Aj. Anantachai Inthiraj**



**Dr. Roongtawan Muangmoon**

# Lesson plan

Week	Topics	Teaching hours	Teaching Activities	Instructor(s)
1	Introduction to Microbiology - Microbiology -First microorganisms on earth -Earliest known infectious disease -Microbes -Microscopes	3/3	- Lecture & Lab - PowerPoint - Discussion	Assoc. Prof. Dr. Duangporn Aj. Anantachai Dr. Roongtawan

Week	Topics	Teaching hours	Teaching Activities	Instructor(s)
2	Chemical and genetic aspects of microorganisms -Microbial physiology -Metabolic enzymes -Metabolism -Bacterial genetics -Genetic engineering -Gene therapy	3/3	- Lecture & Lab - PowerPoint - Discussion	Dr.Roongtawan
3	Bacterial infections - Skin - Ears - Eyes - Respiratory system - Oral region - Gastrointestinal tract - Genitourinary system	3/3	- Lecture & Lab - PowerPoint - Discussion	Dr.Roongtawan

Week	Topics	Teaching hours	Teaching Activities	Instructor(s)
4	Bacterial infections -Circulatory system -Central nervous system -Diseases caused by anaerobic bacteria -Diseases associated with biofilms -Recap of major bacterial infections of humans -Appropriate therapy for bacterial infections	3/3	- Lecture & Lab - PowerPoint - Discussion	Dr.Roongtawan



Week	Topics	Teaching hours	Teaching Activities	Instructor(s)
5	Fungal infections -Classification of fungal disease - Fungal infections <ul style="list-style-type: none"> <li>-skins</li> <li>- respiratory system</li> <li>-oral region</li> <li>-genitourinary system</li> <li>-circulatory system</li> <li>-central nervous system</li> </ul> -Recap of major fungal infections of humans -Appropriate therapy for fungal infections	3/3	- Lecture & Lab - PowerPoint - Discussion	Dr.Roongtawan

Week	Topics	Teaching hours	Teaching Activities	Instructor(s)
6.	Viral infections -Skin -Ears -Eyes -Respiratory system -Oral region -Gastrointestinal tract	3/3	- Lecture & Lab - PowerPoint - Discussion	Aj. Anantachai
7.	Viral infections - Genitourinary system - Circulatory system - Central nervous system -Recap of major viral infections of humans -Appropriate therapy for viral infections	3/3	- Lecture & Lab - PowerPoint - Discussion	Aj. Anantachai

## Midterm examination

Week	Topics	Teaching hours	Teaching Activities	Instructor(s)
9	Practices for the Microbiology Laboratory	6	<ul style="list-style-type: none"> <li>- Lecture &amp; Lab</li> <li>- PowerPoint</li> <li>- Discussion</li> </ul>	Aj. Anantachai
10	Introduction to Medical Parasitology	3/3	<ul style="list-style-type: none"> <li>- Lecture &amp; Lab</li> <li>- PowerPoint</li> <li>- Discussion</li> </ul>	Assoc. Prof. Dr. Duangporn
11	Parasites of Digestive system (1)	3/3	<ul style="list-style-type: none"> <li>- Lecture &amp; Lab</li> <li>- PowerPoint</li> <li>- Discussion</li> </ul>	Assoc. Prof. Dr. Duangporn

Week	Topics	Teaching hours	Teaching Activities	Instructor(s)
12	Parasites of Digestive system (2)	3/3	<ul style="list-style-type: none"> <li>- Lecture &amp; Lab</li> <li>- PowerPoint</li> <li>- Discussion</li> </ul>	Assoc. Prof. Dr. Duangporn
13	Parasites of Blood and Tissue	3/3	<ul style="list-style-type: none"> <li>- Lecture &amp; Lab</li> <li>- PowerPoint</li> <li>- Discussion</li> </ul>	Assoc. Prof. Dr. Duangporn
14	Ectoparasite	3/3	<ul style="list-style-type: none"> <li>- Lecture &amp; Lab</li> <li>- PowerPoint</li> <li>- Discussion</li> </ul>	Assoc. Prof. Dr. Duangporn

**Final examination**

# การตัดเกรดตามเกณฑ์ของมหาวิทยาลัยราชภัฏสวนสุนันทา

อักษร	ผลการศึกษา	ช่วงคะแนน	ค่าระดับคะแนน
A	ดีเยี่ยม	86-100	4.00
A-	ดีเยี่ยม	82-85	3.75
B+	ดีมาก	78-81	3.50
B	ดี	74-77	3.00
B-	ค่อนข้างดี	70-73	2.75
C+	ปานกลางค่อนข้างดี	66-69	2.50
C	ปานกลาง	62-65	2.00
C-	ปานกลางค่อนข้างอ่อน	58-61	1.75
D+	ค่อนข้างอ่อน	54-57	1.50
D	อ่อน	50-53	1.00
D-	อ่อนมาก	46-49	0.75
F	ตก	0-45	0.00

# เกณฑ์การประเมิน

วิธีการประเมินผลการเรียนรู้	สัปดาห์ที่ประเมิน	สัดส่วนของการประเมินผล
-ส่งงานตรงเวลา -ตรวจสอบการเข้าห้องเรียนและ เข้าทันเวลา และ การเข้าห้องปฏิบัติการ	ทุกสัปดาห์	10%
- การทดสอบกลางภาค	8	15%
-การสอบปลายภาค	17	15%
-การสอบภาคปฏิบัติ	13	30%
- งานที่มอบหมาย ในห้อง	16	15%
-งานกลุ่ม	12 - 15	15%

# **Introduction to Microbiology**

**Dr.Roongtawan Muangmoon**

**I  
CAN'T  
SEE A  
THING**





Can a girl who can't see  
find a boy who's in danger?



# THINGS THE EYE CAN'T SEE

**PENNY JOELSON**

amazon



**MONSTER SOUP** commonly called **THAMES WATER**, being a correct representation of that precious stuff doled out to us





**VIBRIO**  
can be found  
in shellfish  
and can cause  
fever and  
vomiting.

**E. COLI**  
lives in  
undercooked  
meat and  
unwashed  
food and can  
cause bloody  
diarrhea.

**CORONAVIRUS**  
is spread  
mostly through  
the air and  
can cause  
symptoms  
10 times worse  
than the flu.

**SALMONELLA**  
lurks on many  
surfaces  
(including your  
phone!) and  
causes cramps,  
fever, and  
diarrhea.



**Micro + Biology**

**เล็กมาก + มีชีวิต**

# LEARNING OBJECTIVES

- 1. Define microbiology, pathogen, nonpathogen & opportunistic pathogen**
- 2. Define microorganisms & list several examples of each**
- 3. List several reasons why microbes are important**
- 4. Explain the relationship between microbes & infectious disease**



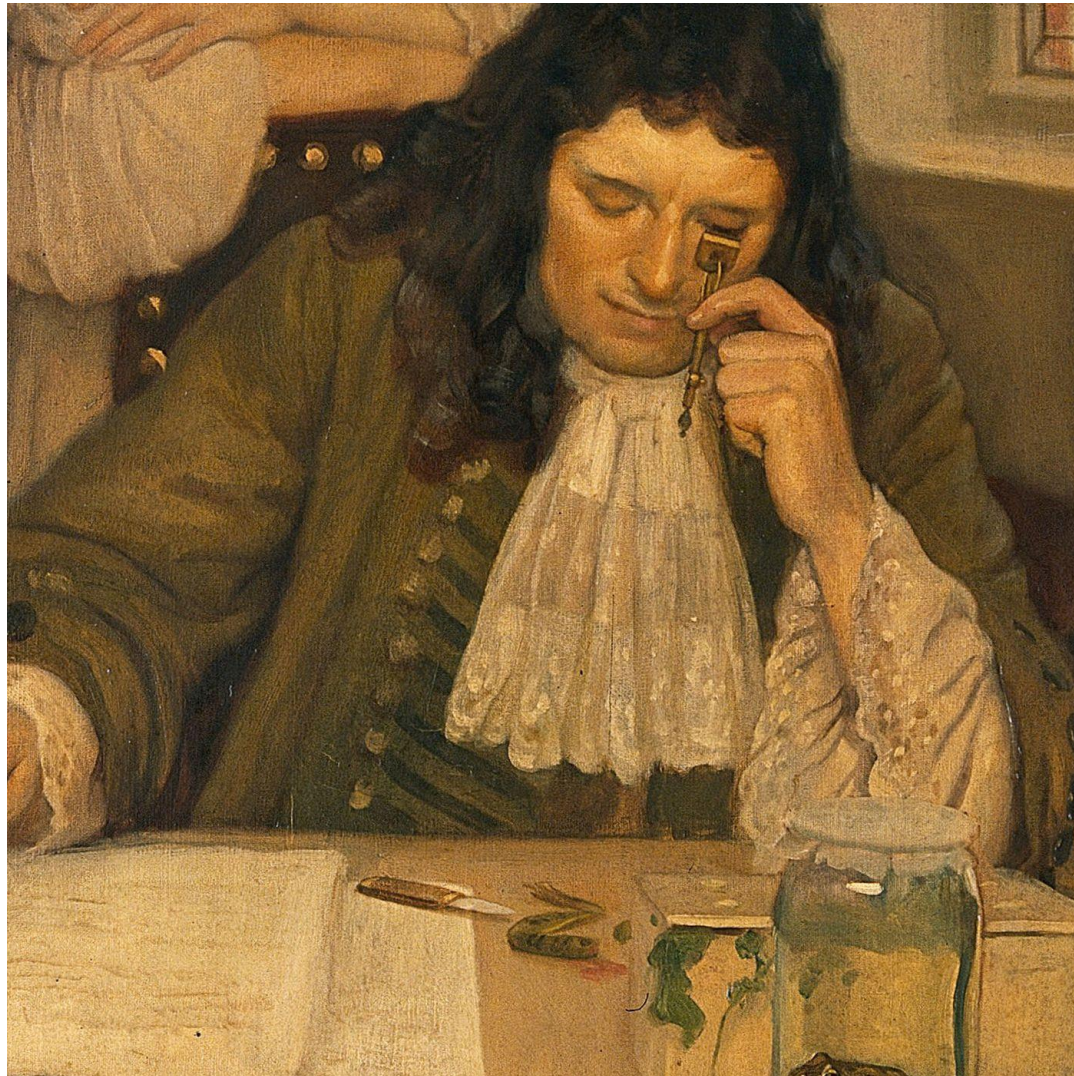




**Netherlands**

# Anton van Leeuwenhoek (1632–1723)

“Father of Microbiology,”







**IRELAND**

**UNITED KINGDOM**

*ATLANTIC OCEAN*

**NETHERLANDS**

**BELGIUM**

**GERMANY**

**LUXEMBOURG**

PARIS ★

**FRANCE**

**SWITZERLAND**

**AUSTRIA**

**ITALY**

**ANDORRA**

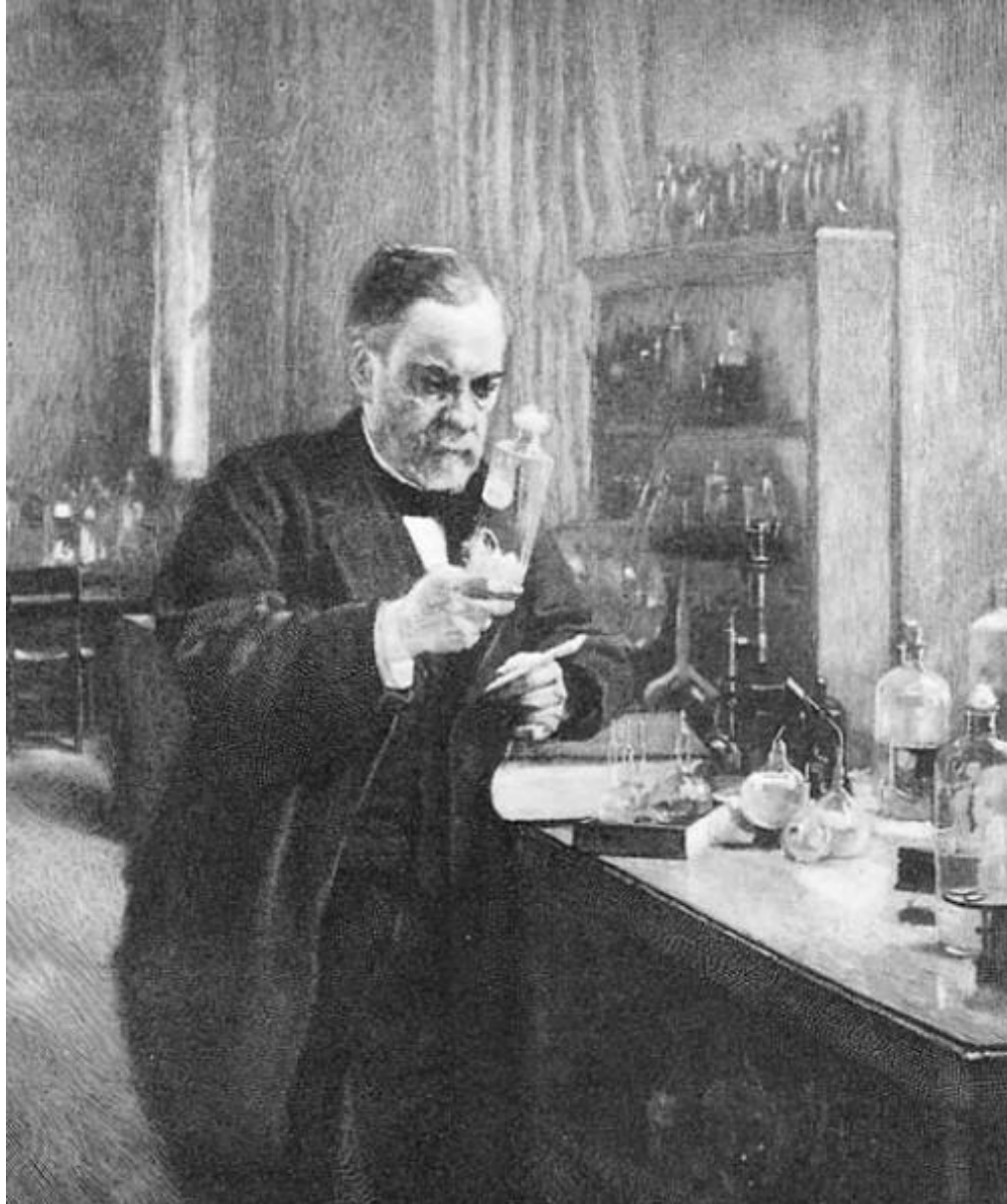
**SPAIN**

**CORSICA**

**SARDINIA (ITALY)**

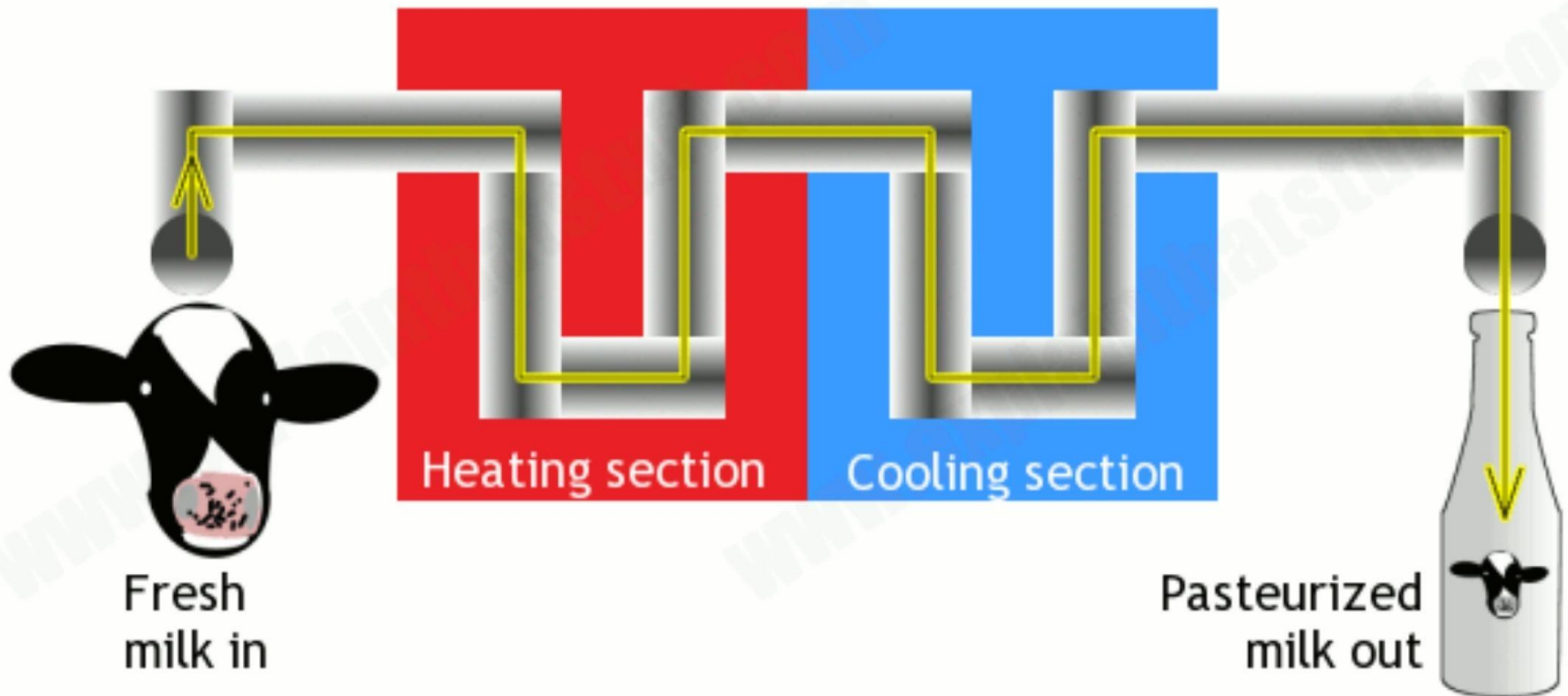
*MEDITERRANEAN SEA*

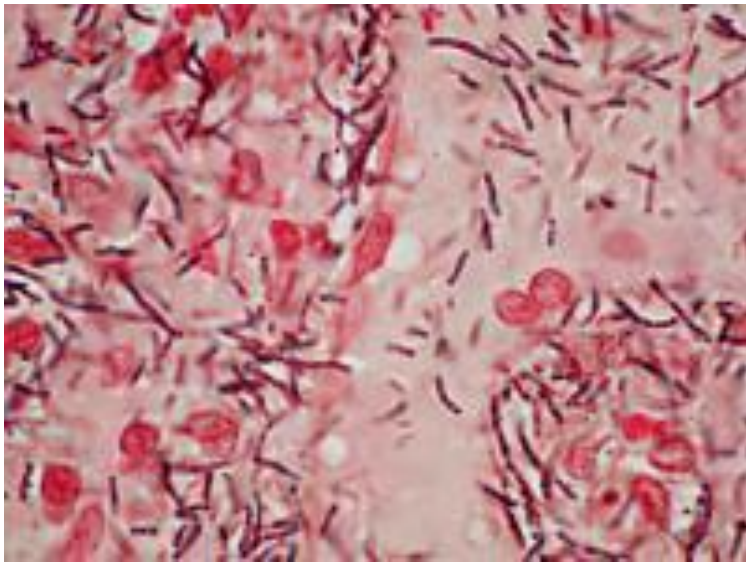
# Louis Pasteur (1822–1895)



# Pasteurization

## Milk Pasteurization





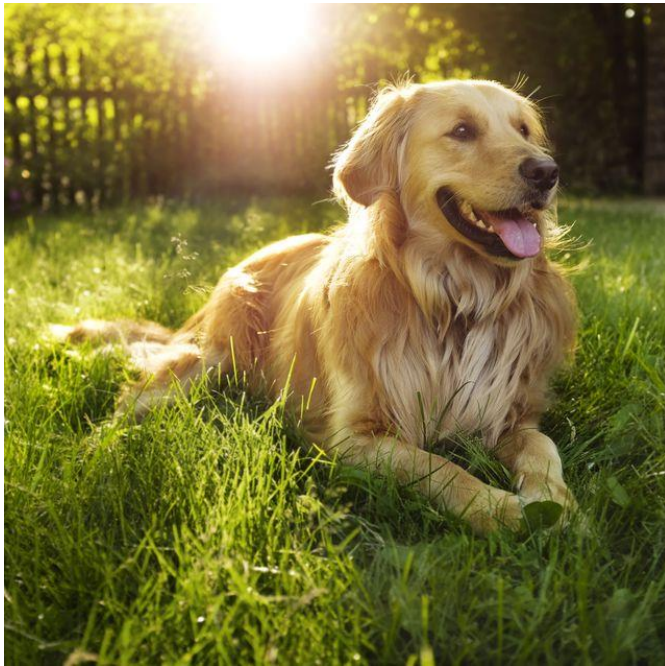
## ***Bacillus anthracis***

A.



B.

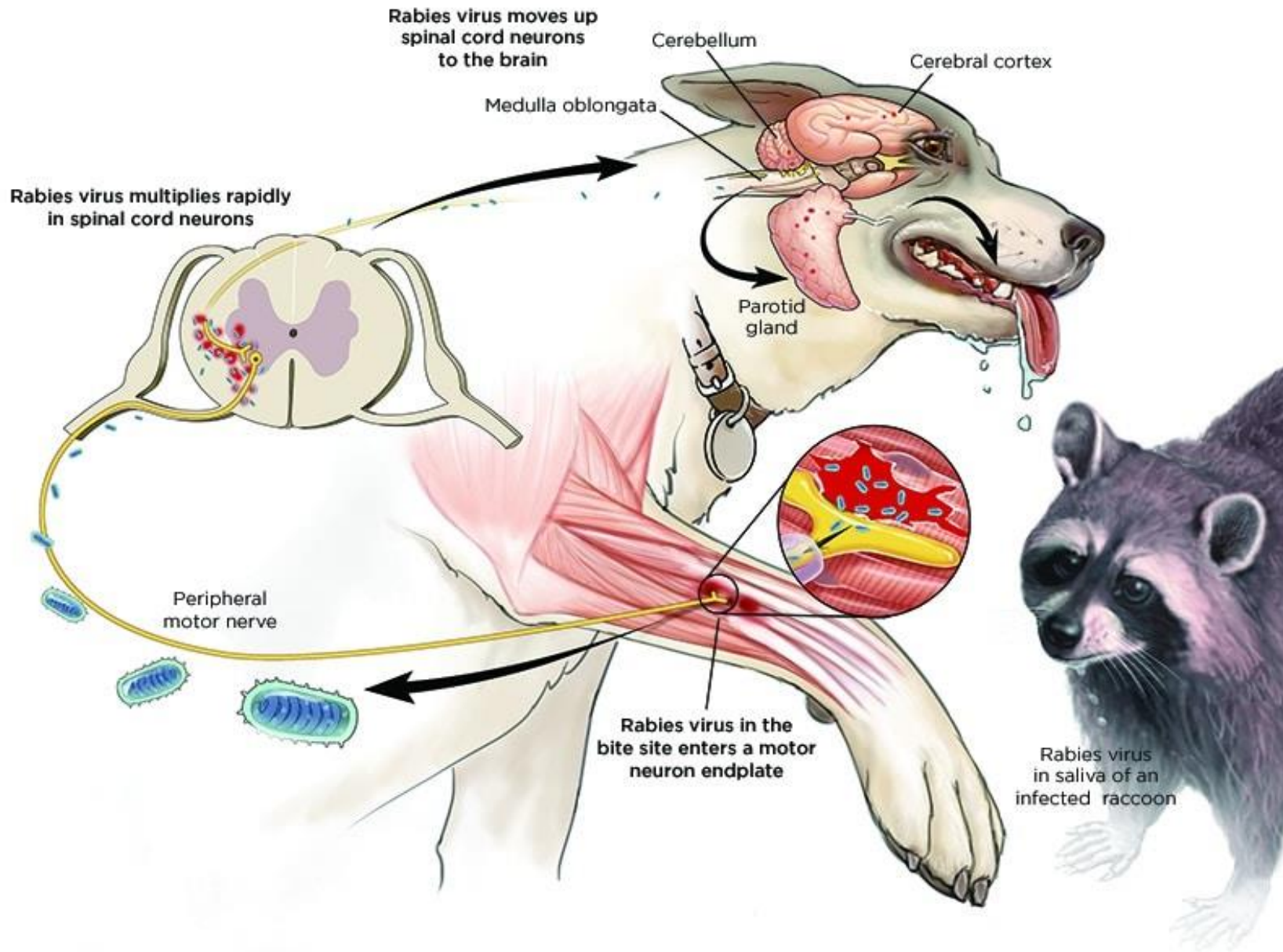




# Rabies virus







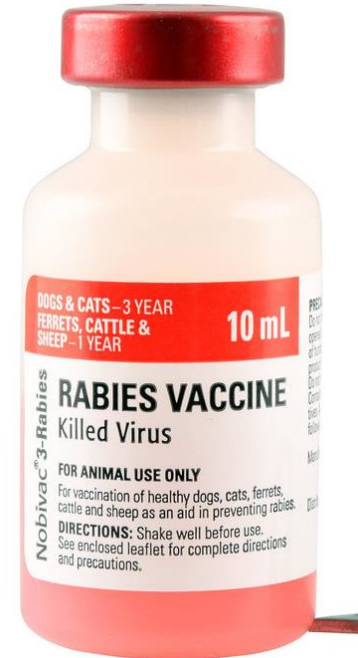
Brain inflammation



Virus transmitted by infected saliva through bite or wound



ADAM.





**SWEDEN**

*NORTH  
SEA*

**DENMARK**

*BALTIC  
SEA*

**UNITED  
KINGDOM**

**NETHERLANDS**

**BERLIN** ★

**POLAND**

**GERMANY**

**BELGIUM**

**CZECH  
REPUBLIC**

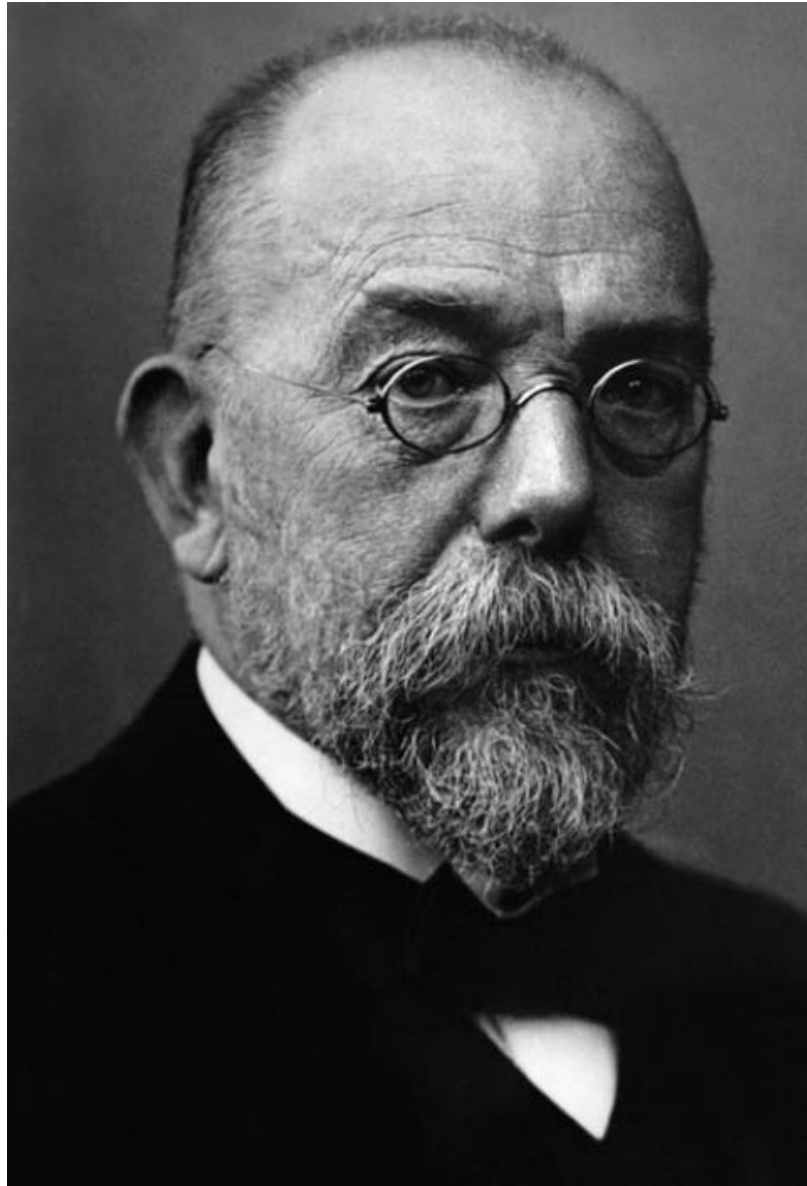
**LUXEMBOURG**

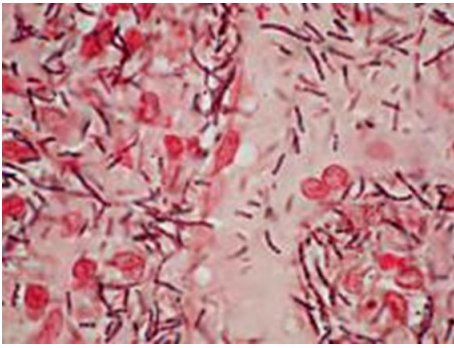
**AUSTRIA**

**FRANCE**

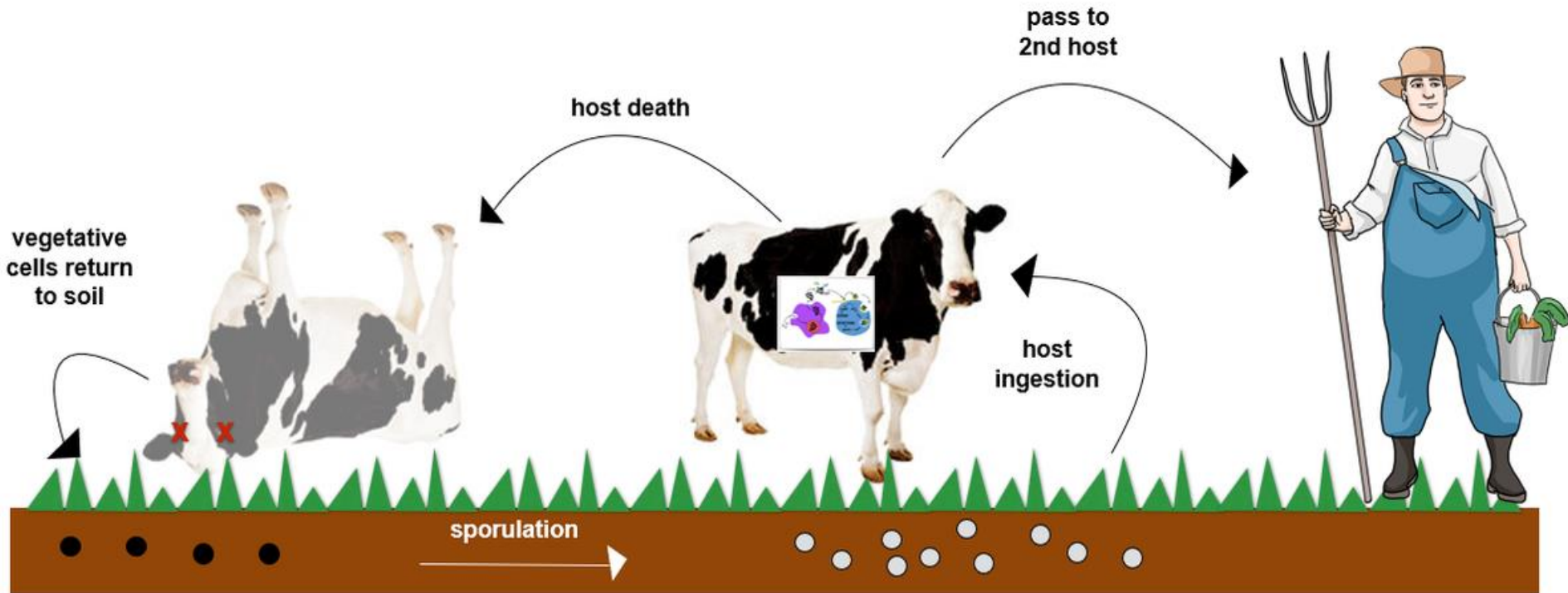
**SWITZERLAND**

## Robert Koch (1843–1910)

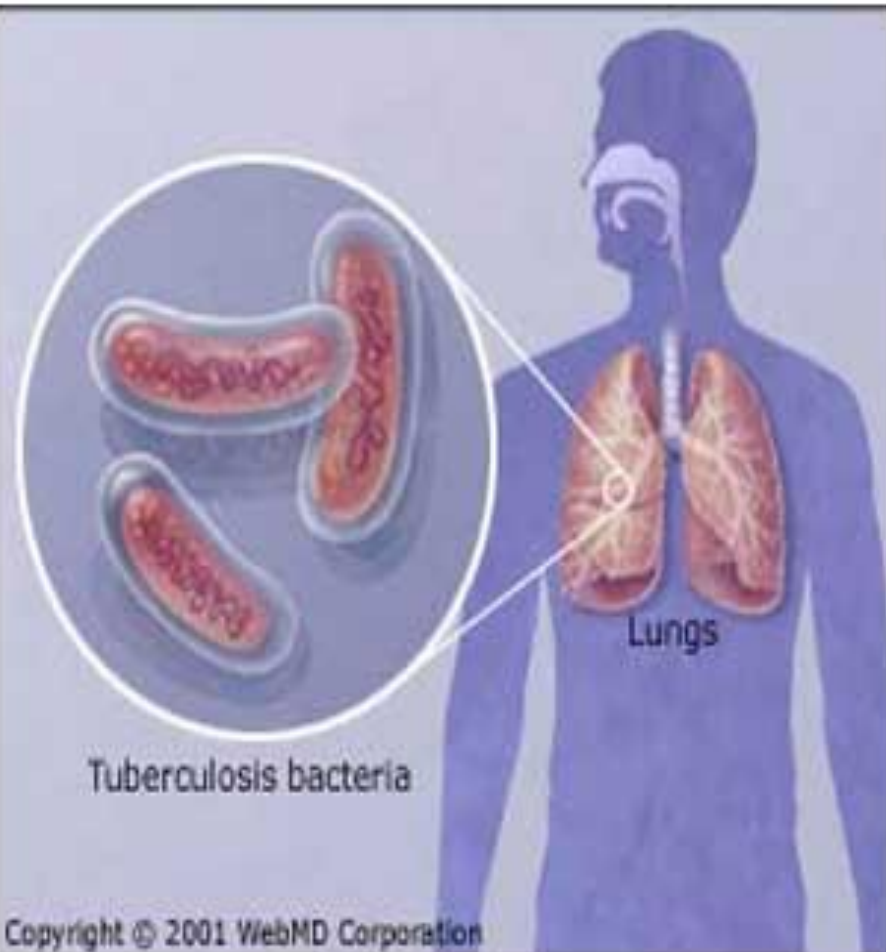




# Anthrax Life Cycle



# Habitat and Morphology of *Mycobacterium tuberculosis*





*TO THE INHABITANTS OF THE PARISH OF*  
**CLERKENWELL.**

His Majesty's Privy Council having approved of precautions proposed by the Board of Health in London, on the alarming approach  
OF THE  
**INDIAN CHOLERA**

It is deemed proper to call the attention of the Inhabitants to some of the Symptoms and Remedies mentioned by them as printed, and now in circulation.

**Symptoms of the Disorder;**  
 Giddiness, sickness, nervous agitation, slow pulse, cramp beginning at the fingers and toes and rapidly approaching the trunk, change of colour to a leaden blue, purple, black, or brown; the skin dreadfully cold, and often clammy, the tongue moist and loaded but flabby and chilly, the voice much affected, and respiration quick and irregular.

**REMEDIES;**

All means tending to restore circulation and to maintain the warmth of the body should be had recourse to without the least delay.

The patient should be immediately put to bed, wrapped up in hot blankets, and warmth should be maintained by other external applications, such as repeated frictions with Alcohol and camphorated spirits, positions of mustard and linseed (equal parts) to the stomach, particularly where pain and vomiting occur, and similar positions to the feet and legs to restore their warmth. The remaining heat of the body may be preserved by bags containing flax or bran applied to different parts, and for the same purpose of restoring and sustaining the circulation white wine very weakly spiced, hot lemon and water, or salubrious tea in a dose of a tea spoon full in hot water, frequently repeated; or from 5 to 40 drops of some of the essential oils, as peppermint, cloves or Cayenne, in a wine glass of water may be administered with the same view. When the stomach will bear it, warm broth with opium may be employed. In every severe case, or where medical aid is difficult to be obtained, from 20 to 40 drops of laudanum may be given in any of the warm drinks previously recommended.

These simple means are proposed as resources in the earliest stages of the Disease, until Medical aid can be had.

**THOS. KEY,**  
**GEO. TINDALL,** Churchwardens.

The following Notice, that is published within by one of the parishes of the County, is recommended to be printed and published being, and it shall be printed, the parishes, and in case of death or other death the following shall be printed and published to be given in form to be made in a separate Pamphlet and Printed.

NOTE. The particulars inserted in this Paper may be printed, and that the Remedy given in the Paper where it is left may be made separate with its contents.

T. COOTE, RAILWAY CROSS STREET, WILLIAMSBURG, LONDON.



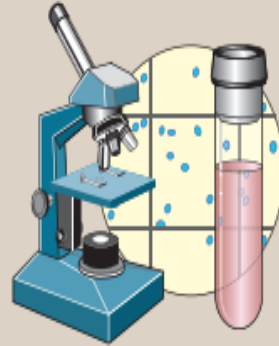
**Vibrio cholerae**

# Koch's Postulates



Sick

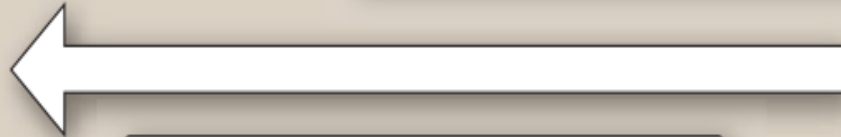
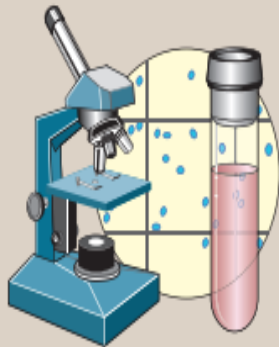
**1** The microorganism must always be found in similarly diseased animals but not in healthy ones.



**2** The microorganism must be isolated from a diseased animal and grown in pure culture.



**3** The isolated microorganism must cause the original disease when inoculated into a susceptible animal.



**4** The microorganism can be reisolated from the experimentally infected animal.



Sick





Health Topics ▾

Countries ▾

Newsroom ▾

Emergencies ▾

Data





Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives, Protecting People™

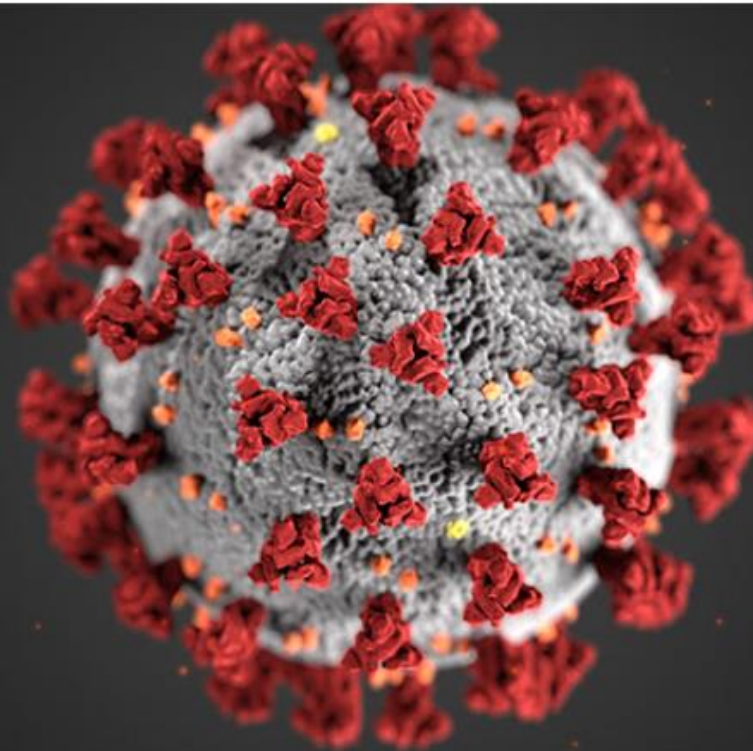
<https://www.cdc.gov/>

Health Topics

Travelers' Health

Outbreaks

FEATURED



<https://www.moph.go.th/>



กระทรวงสาธารณสุข  
MINISTRY OF PUBLIC HEALTH



เกี่ยวกับ สธ. บริการ สำหรับเจ้าหน้าที่ ติดต่อ ค้นหา



# ฉีดวัคซีนโควิด 19

อย่างน้อย **4** เข็ม

เพิ่มภูมิคุ้มกัน เพิ่มความปลอดภัย



**Microbiology is the study of microbes.  
Individual microbes can be observed only  
with the use of various types of microscopes.**



**The two major categories of microbes are called acellular microbes (also called infectious particles) & cellular microbes (also called microorganisms).**



**Acellular microbes include viruses & prions.  
Cellular microbes include all bacteria, all archaea,  
some algae, all protozoa, & some fungi**

# Microbes

## Acellular Infectious Agents

Prion  
Viruses

## Cellular Microorganisms

### Prokaryotes

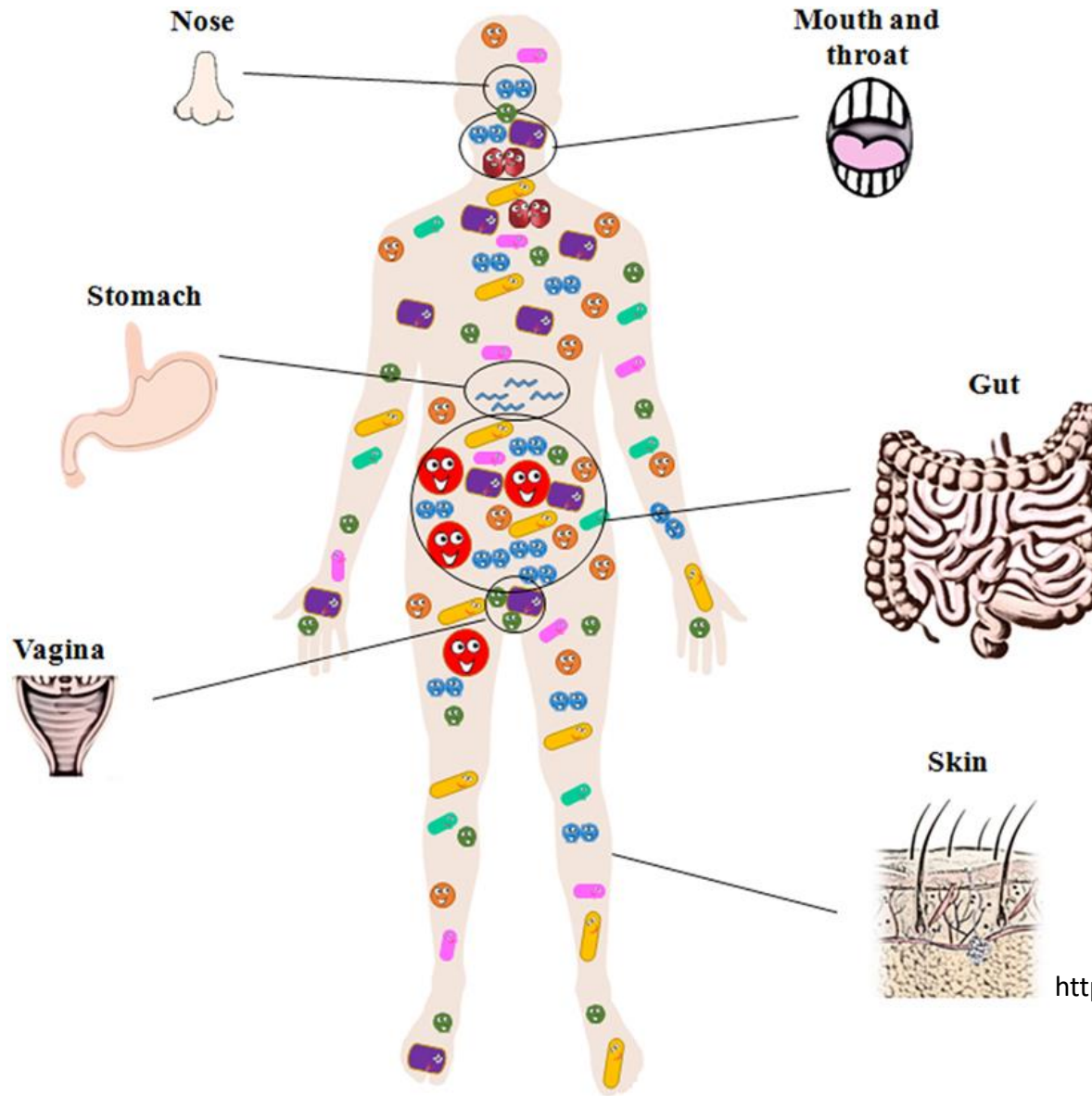
Archaea  
Bacteria

### Eukaryotes

Algae  
Fungi  
Protozoa

- **Microbes** that cause disease are known as **pathogens**. Those that **do not** cause disease are called **nonpathogens**.





<https://kids.frontiersin.org/>

**The microbes that live on & in the human body are referred to as our indigenous microflora.**

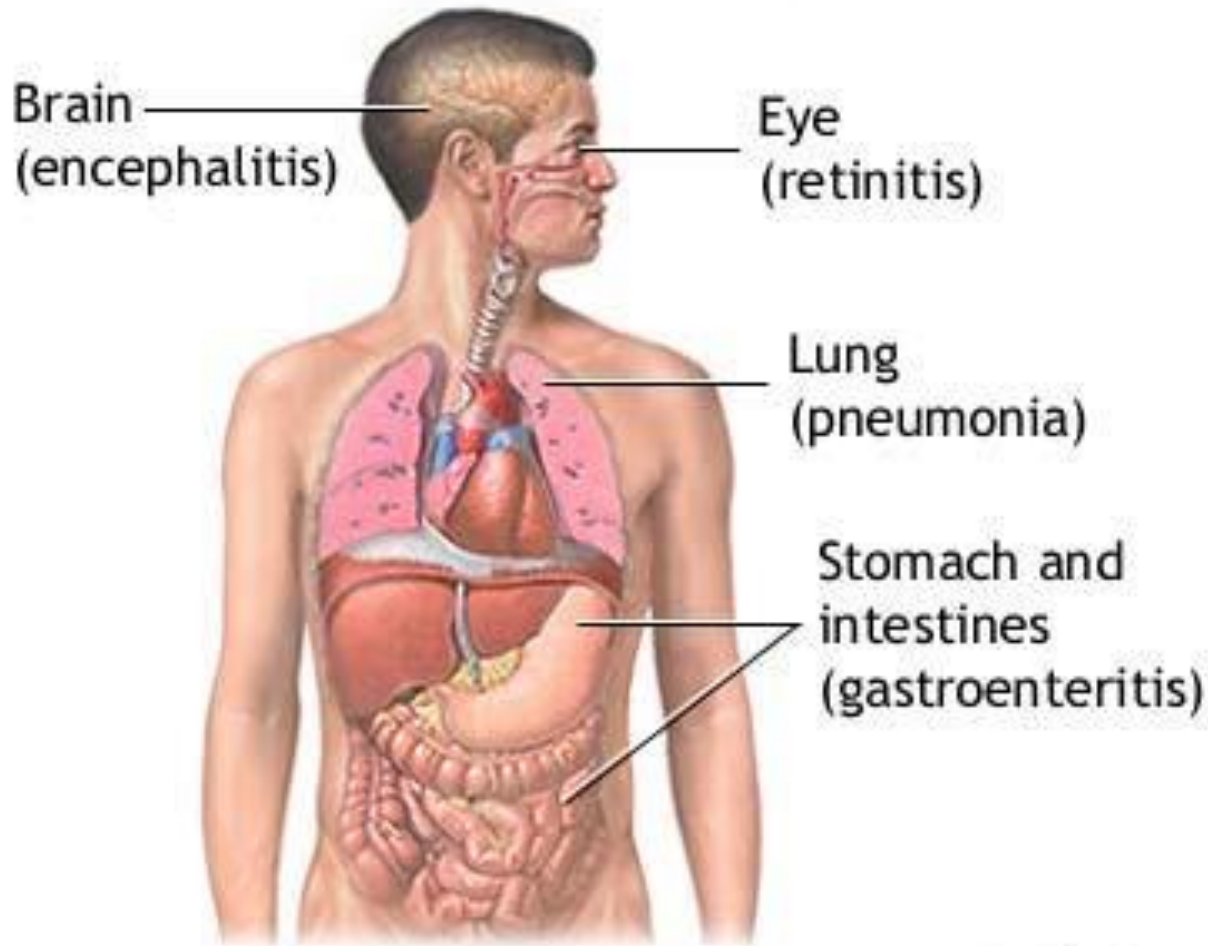
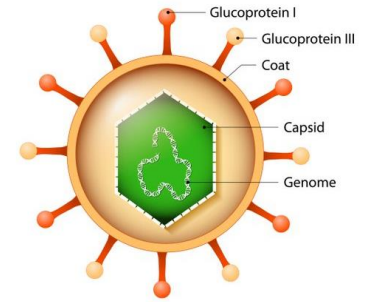
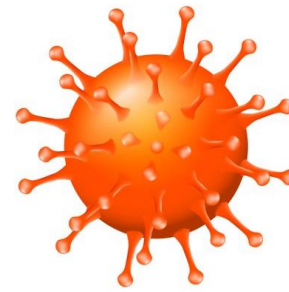


**Opportunistic pathogens** do not cause disease under ordinary conditions, but have the potential to cause disease should the opportunity present itself.

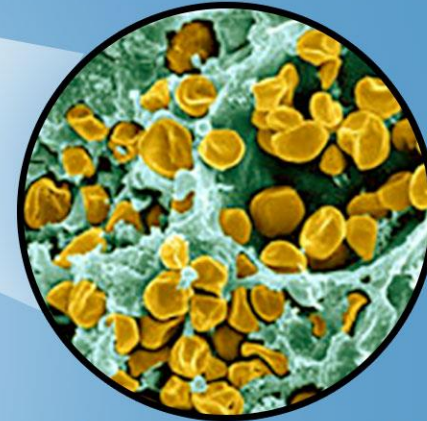
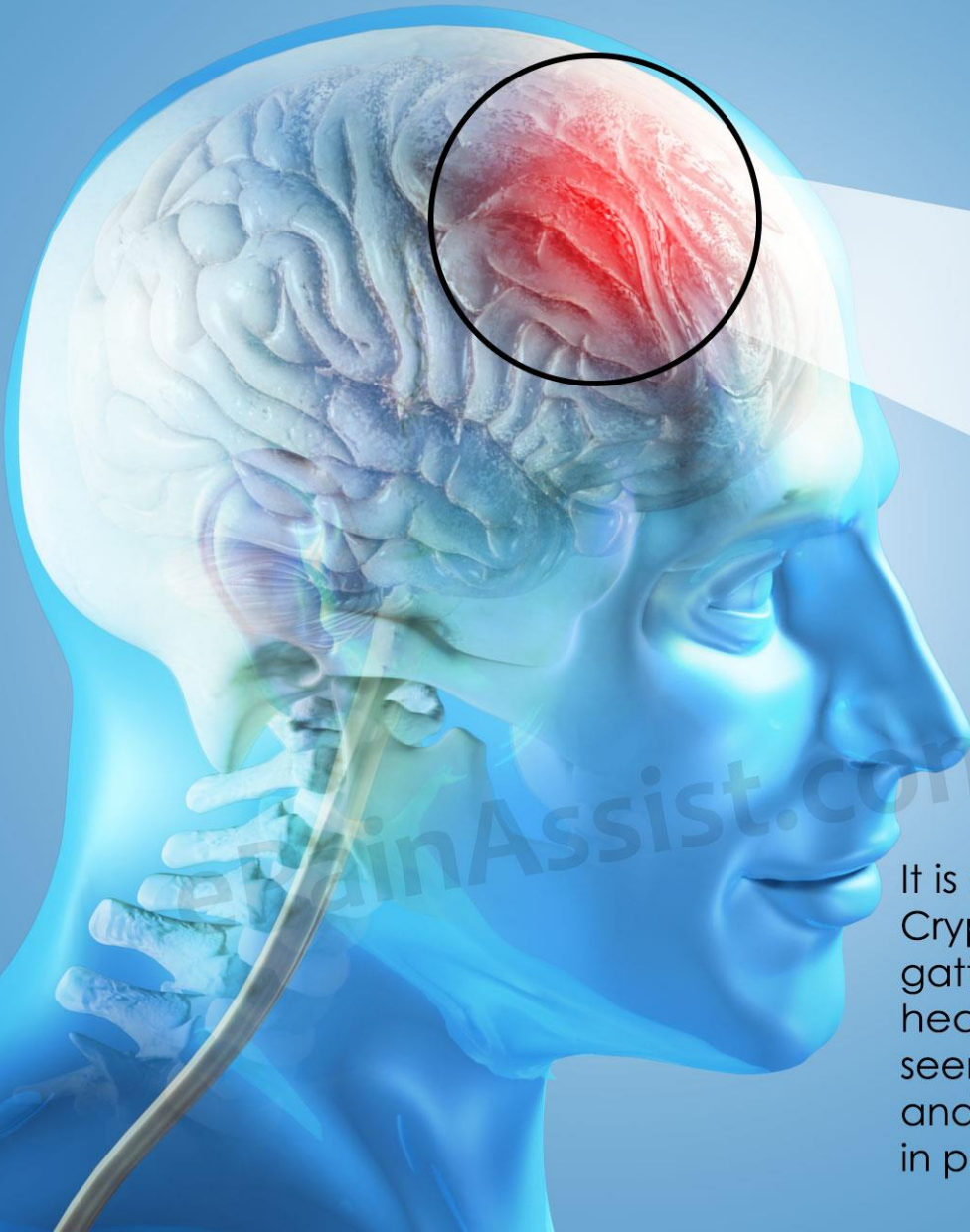
# candidiasis



# Cytomegalovirus



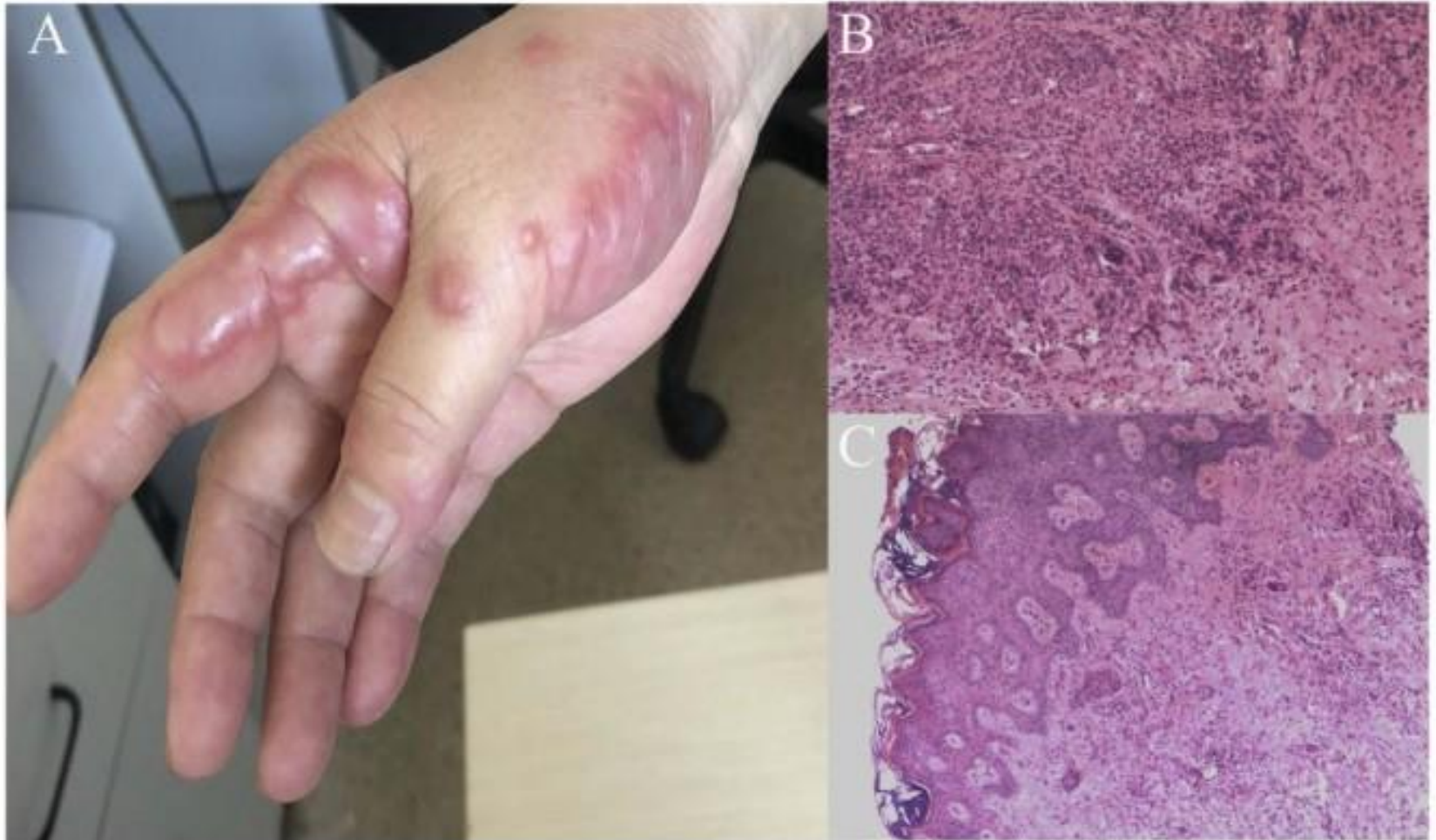
# Cryptococcal Meningitis



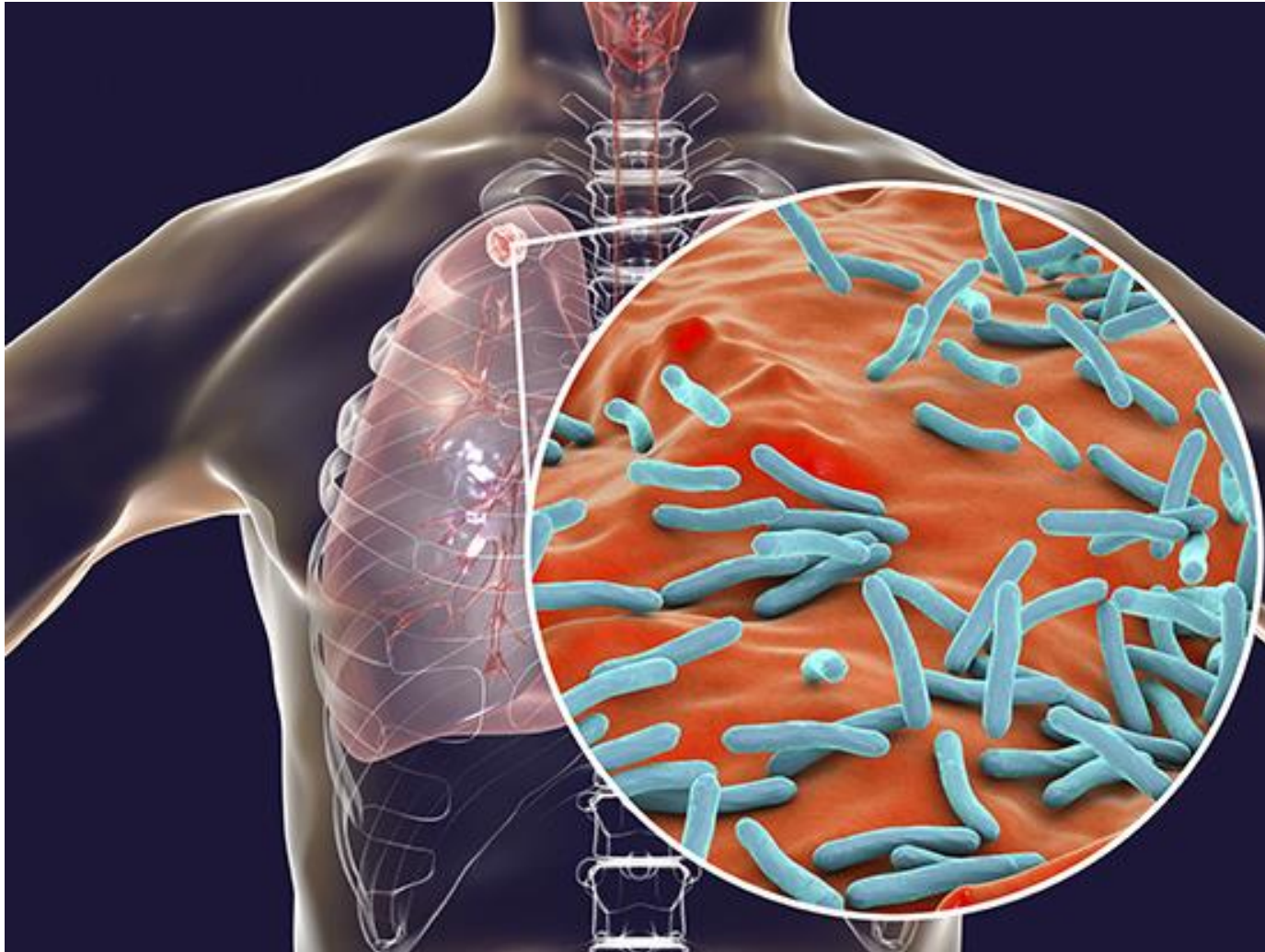
*Cryptococcus gattii*

It is one such fungal infection caused by fungi *Cryptococcus neoformans* and *Cryptococcus gattii*. This infection can sometimes affect healthy people but is more commonly seen in immune-compromised patients and as an opportunistic infection in persons having AIDS.

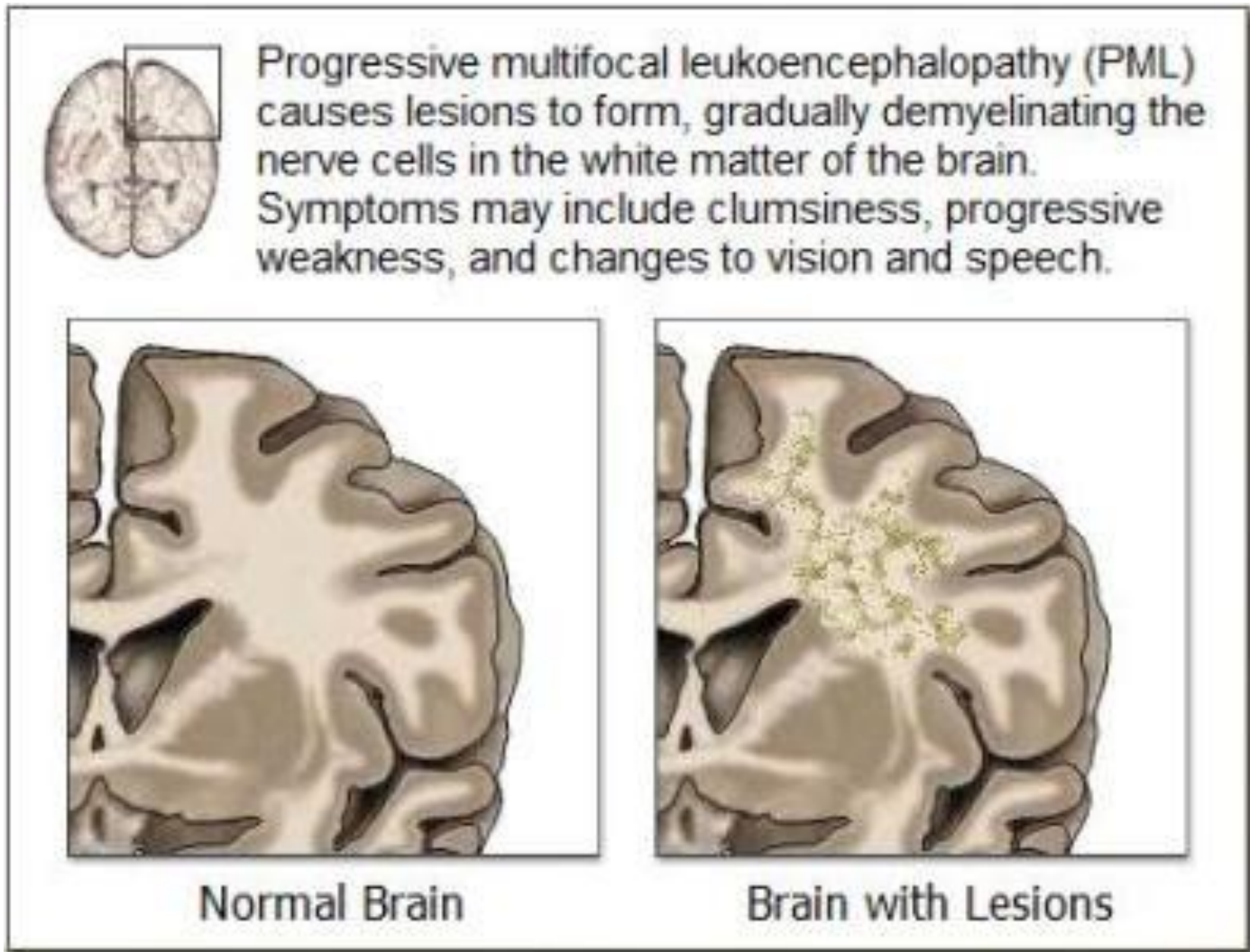
# *Mycobacterium avium*



# *Mycobacterium tuberculosis*

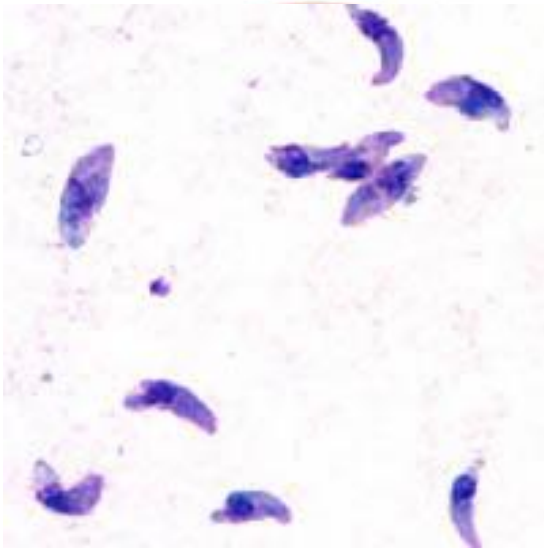


# Progressive multifocal leukoencephalopathy (PML)



NEGLECTED PARASITIC INFECTION:

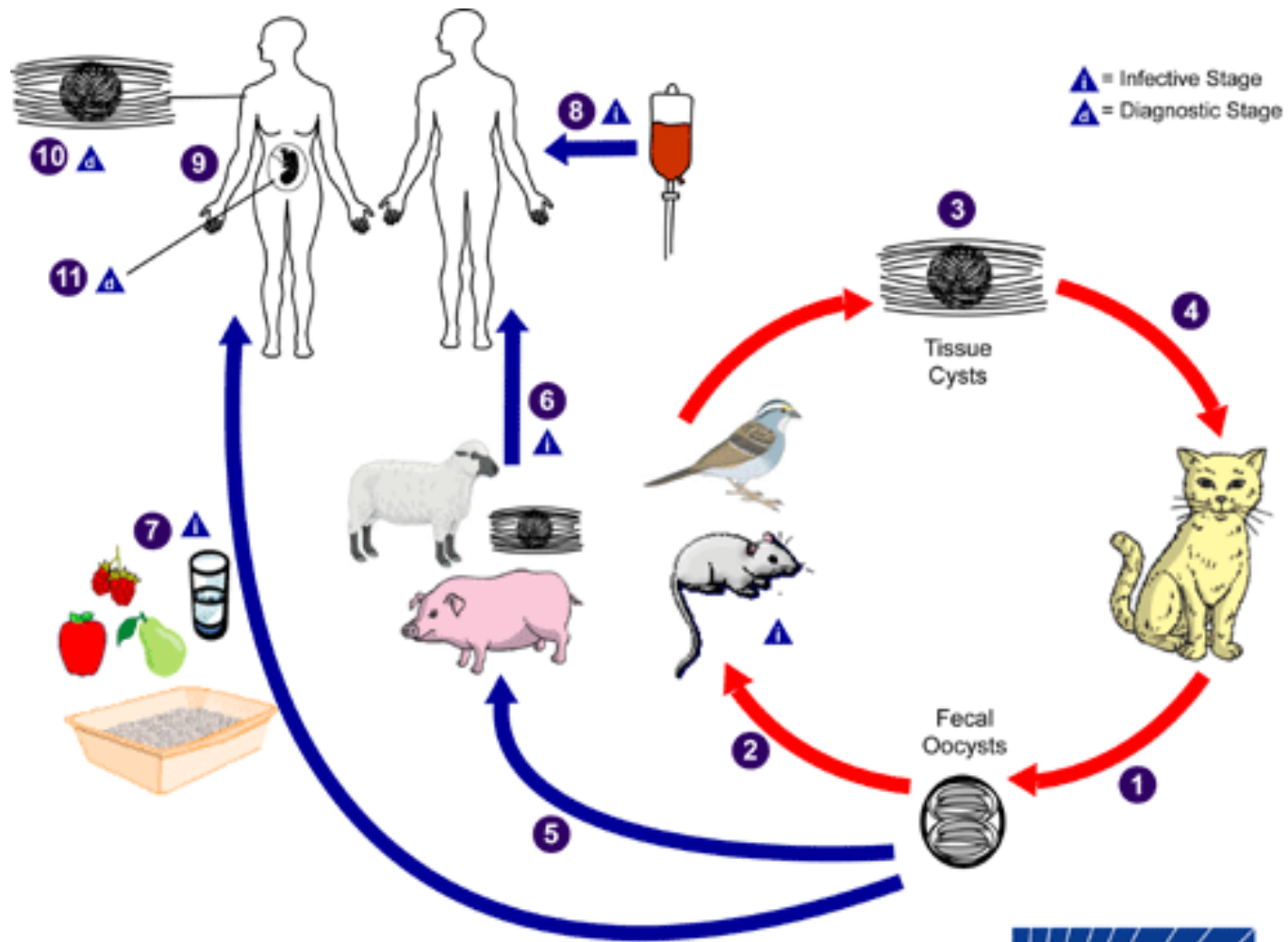
# Toxoplasmosis



Learn more: [www.cdc.gov/parasites/npi/](http://www.cdc.gov/parasites/npi/)



# *Toxoplasma gondii*



# Congenital toxoplasmosis



***Clinical manifestations.*** Hydrocephalus, lesions in the organs of the vision (chorioretinitis), cirrosis of the liver and enlargement of the spleen.



# *Pneumocystis pneumonia*

Normal lung



Infection of lungs by *Pneumocystis carinii*



# Infectious Disease

**A pathogen colonizes  
a person's body.**



**The pathogen  
Causes a disease.**



**This type of disease is known  
As an infectious disease.**

# Binary fission

