BIOL three four two

Microbiology class

Doctor Mary Leigh

Spring two thousand seventeen

Graduate this semester

What does “microbes” mean

Definition is too broad

Small things we can’t see

But just because we can’t see,

Doesn’t mean they are the same.

Laurens Baas Becking

Dutch microbiologist

Has a famous quote

“Everything is everywhere;

but environment selects”

There are three branches

Universal ancestor

Map of living things

Bacteria. Archaea.

Don’t forget eukaryotes.

Where did life begin?

Some people say the surface,

Some say deep below.

Most now think the ocean floor

Perhaps hydrothermal vents

Robert Hooke coined “cell”

Used a microscope to draw

*Micrographia*

Anton Van Leeuwenhoek

Used lenses to magnify.

Ignaz Semmelweiss

Hospital experiments

Doctors should wash hands.

Let’s all thank Joseph Lister

For antiseptic techniques.

Florence Nightengale

Improved hygiene during war

The first nursing school.

Without the help of many,

We could not have come this far.

Present in each case

Culture is shown to be pure

Culture gives disease

New culture is same as old

These are Koch’s four postulates.

Meet Louis Pastuer

Prevent food from going bad

Pastuerization

Father of the germ theory

Things can’t appear from nowhere.

Meet Alex Flemming

Contaminated sample

Found penicillin

A lesson for everyone:

Great things come from accidents.

Drug prevents cell walls

Saves the lives of millions

Best. Mistake. Ever.

Viruses have two cycles.

Lytic and Lysogenic

Binary fission

How fast can cells replicate?

Generation time

How can we measure cell counts?

Direct and indirect ways.

Indirect method

Cloudiness of a culture

Turbidity.

Facultative anaerobe

Can survive without O 2.

Cell wall barrier

Crossed linkage of NAG and NAM

Peptidoglycan

Aerobic respiration

Krebbs cycle and E T C

Gram staining technique

Positive or negative?

Different cell walls

Disinfect to reduce growth

Decimal reduction time

Sterilization

Heat things up to kill all cells

Turn on autoclave

The human microbiome

1 to 1 self to non self

Eutrophication

No oxygen for poor fish

Too much algal growth

Sneaky Staphylococcus,

Benign until we are weak.

Chemolithotrophs

Use inorganic compounds

For their energy

O imunnoglobulins,

Why must you be so picky?

Chemoorganotrophs

Prefer carbon molecules

For their E donor

Bioremediation:

The art of cleaning up spills

Some cells learn to share

Horizontal gene transfer

Change without descent

Staph A, we will meet again

For now, we should separate.

By transformation

Cell dies. New cell picks up genes.

Adds to its genome.

Antibiotics kill germs

That is…until they evolve.

Or by transduction.

Virus replicates itself.

Spreads genes of old host.

I would frown at you BOTOX,

If you didn’t prevent that.

Or conjugation

Cells connected by pilus.

Plasmids duplicate.

Innate immunities are:

Skin, chemicals, and pH.

Isolate project

Swab from anywhere you choose

What lives in that space?

Adaptive immunity

B cells. T cells. Specific.