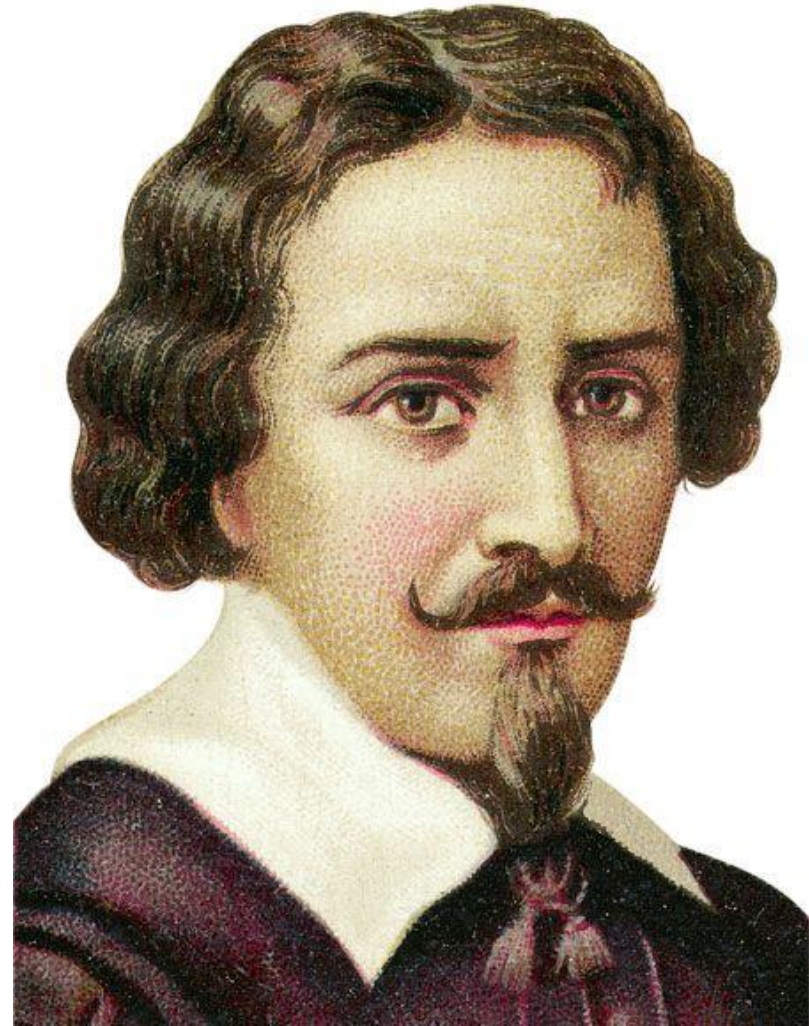


# Cell Discovery & Cell Theory

# It all started with an invention....

The first  
microscope was  
invented by  
**Zacharias**  
**Janssen**, 1595,  
Middleburg,  
Holland



# Janssen's microscope



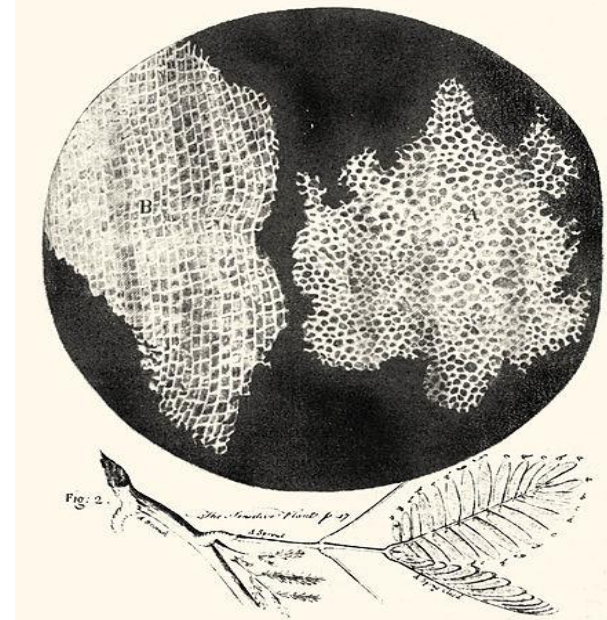
**Total Magnification around 9X**

# Robert Hooke

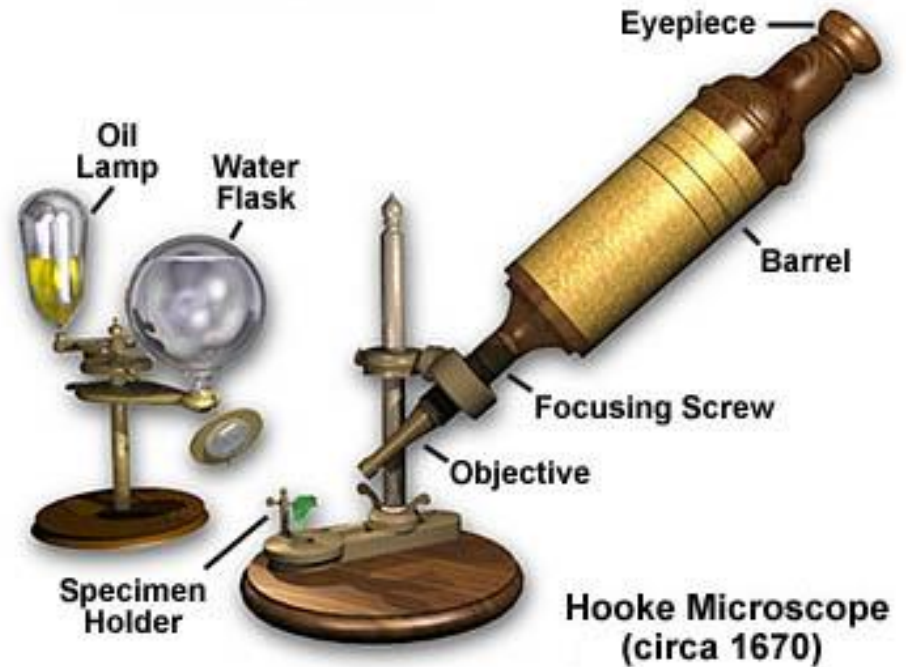
- Improved upon Janssen's microscope.
- Discovered and documented the first "cells" in 1665
- Came up with the term cell, named after the rooms that monks slept in.



Fig. 1.



# Robert Hooke

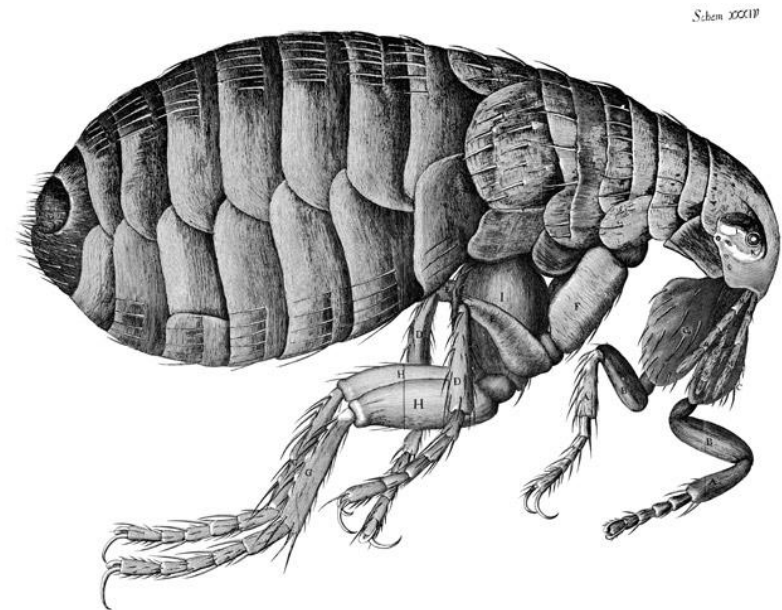
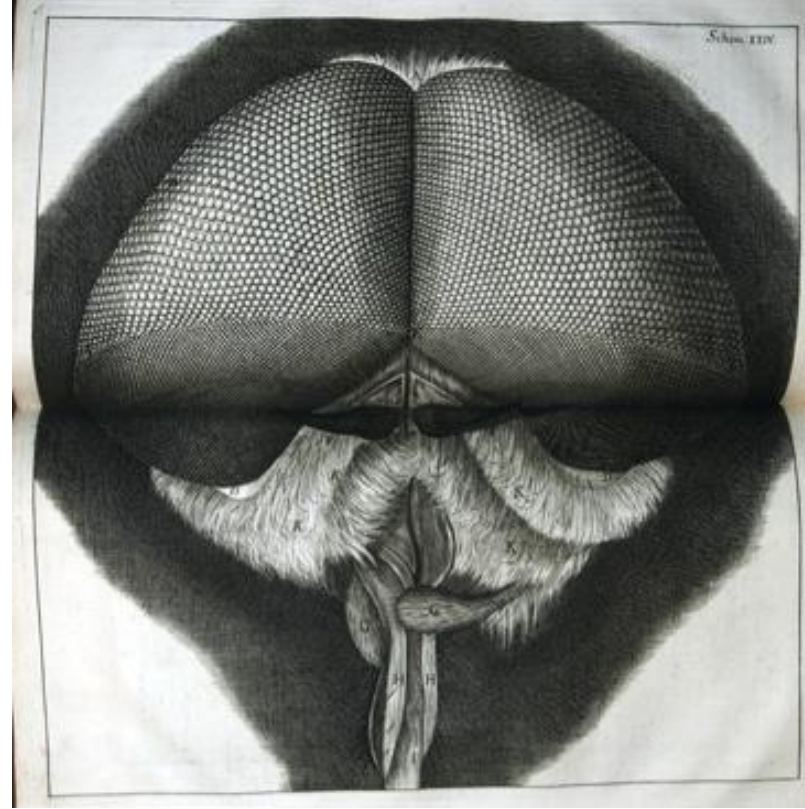


**Total Magnification  
around 55X**

# Robert Hooke

Released book  
of detailed  
drawings and  
observations  
from his  
microscope  
titled:

Micrographia,  
1665



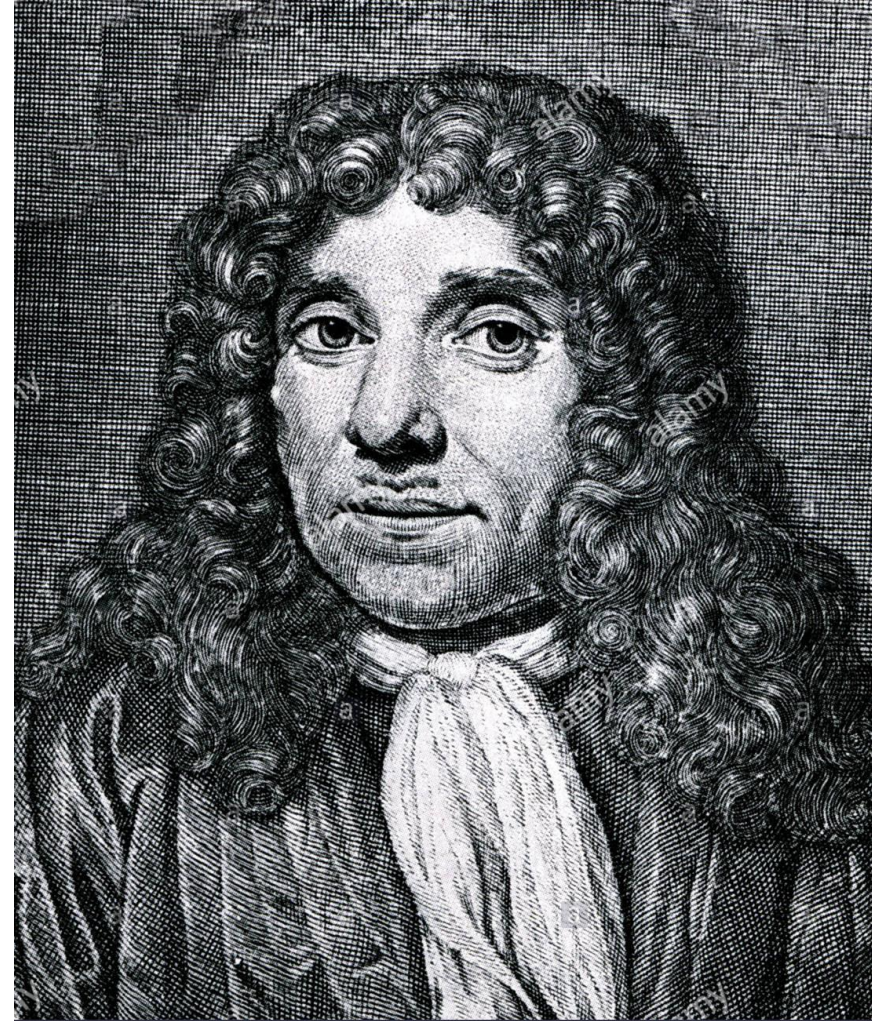
# Images from Micrographia



# Antony van Leeuwenhoek

A tradesman from  
Holland  
who became  
fascinated with  
Hooke's book

Became an expert  
lens grinder and  
made over 500  
simple microscopes

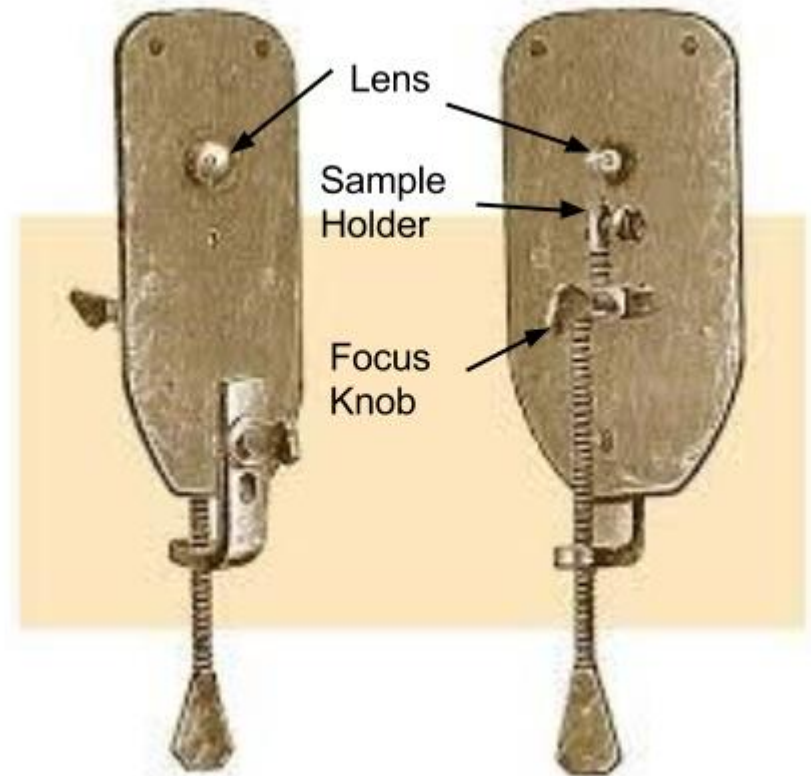




# Antony van Leeuwenhoek

Discovered bacteria, protists, sperm cells, blood cells, nematodes, etc.

Acute eyesight and lens grinding skill let him build microscopes that were nearly 4 times more powerful than what was used before him.



**Total Magnification  
around 200X**

# Antony van Leeuwenhoek



# Cell Theory

In 1838,  
German  
scientist  
**Mattias  
Schleiden**  
stated that all  
plant tissues  
consisted of  
cells

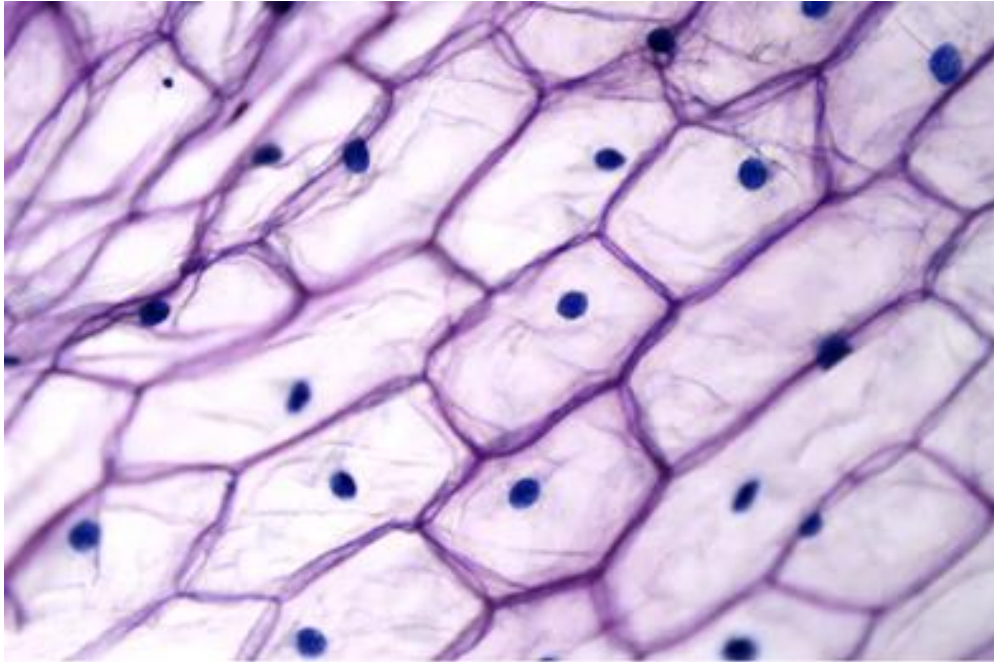


# Cell Theory

In 1839, another German scientist **Theodor Schwann** stated that all animal tissues consisted of cells



# Cell Theory



Both Schleiden and Schwann observed that all plant and animal cells also possessed a nucleus.

# Cell Theory



In 1858, yet another German scientist, **Rudolf Virchow** combined the two ideas and added that all cells come from pre-existing cells, formulating the **Cell Theory**

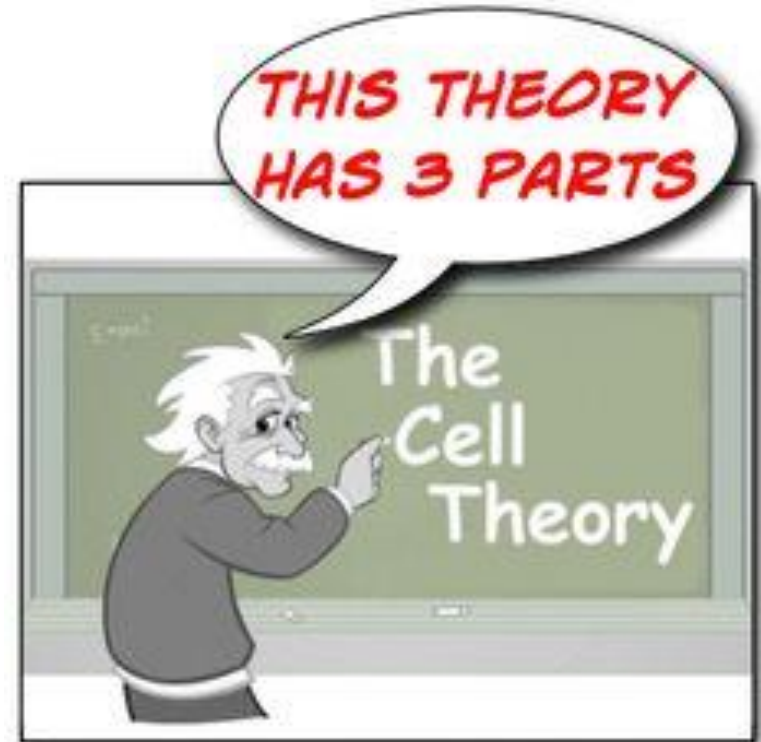
# Cell Theory

1. All living things are composed of one or more cells



1. In organisms, cells are the basic units of structure and function.

1. All cells are produced only from existing cells.



**ALL LIVING THINGS ARE  
COMPOSED OF CELLS  
CELLS ARE THE BASIC UNITS  
OF STRUCTURE AND  
FUNCTION IN LIVING THINGS  
NEW CELLS ARE PRODUCED  
FROM EXISTING CELLS**



**What is a  
Theory?**

# Common Definition of Theory

A *hypothesis* proposed as an explanation; hence, a mere speculation as an individual viewpoint.

- Example: I have a theory that the Skyline Football Team will win state because of the number of seniors on the team.

Problem: There is very limited if no evidence to back this statement up. It is more of a ***hypothesis***.

# Scientific Definition of Theory

An explanation for facts or phenomena that has been **confirmed** or established **by observation or experiments of many types** and over many years. It is accepted as accounting for the known facts. With new technology and increasing knowledge, some theories become refined over time.

# But isn't it Just a Theory?

Having something called a theory in science, means that it is the **BEST** explanation we have for why a phenomenon happens.

- Putting “just” in front of a theory diminishes the true value of a scientific theory.

# Theories vs Laws

Scientific Laws describe **WHAT** is happening.

Examples include:

Newton's Laws of Gravity,  
Kepler's Laws of Planetary Motion,  
Law of Conservation of Energy,  
Laws of Thermodynamics....

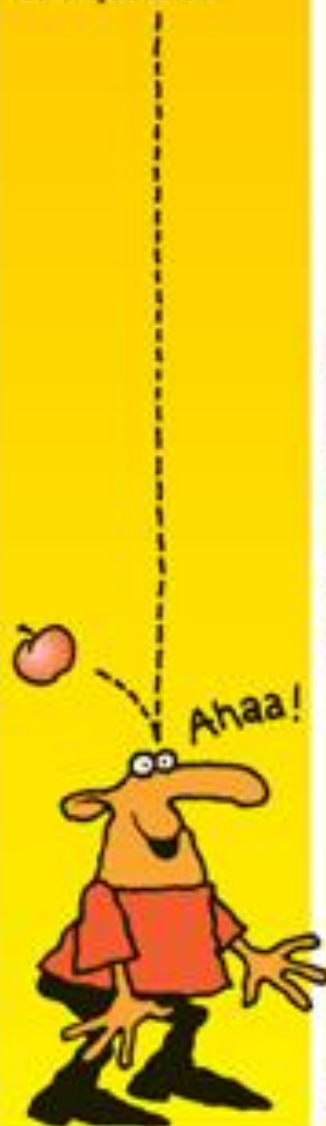
Scientific Theories explain **WHY** something happens.

Examples include:

The Big Bang Theory,  
Cell Theory,  
Theory of Relativity,  
Theory of Evolution...

## HYPOTHESIS vs. THEORY vs. LAW

**HYPOTHESIS:**  
Possible answer  
to a question.



**THEORY:** A  
hypothesis that  
has been tested  
and supported  
many times.  
Theories serve  
as a basis for de-  
scribing patterns  
that we observe  
in nature.



**LAW:** A general  
statement that  
describes some  
pattern in nature.  
The statement  
must hold under  
the specified  
conditions with-  
out exception.

