

# What is the toughest and smallest organism on Earth?

- ◉ Bacteria
- ◉ Virus
- ◉ Tardigrade
- ◉ Microbes

# What is the toughest and smallest organism on Earth?

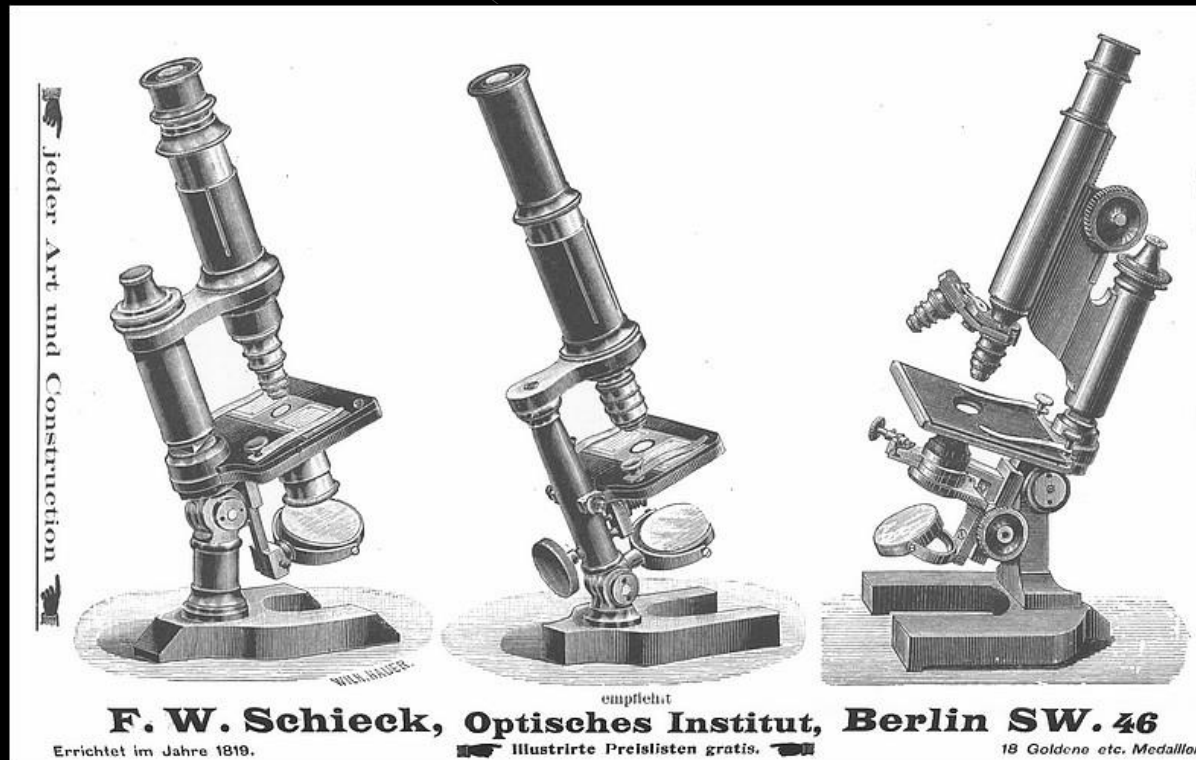
- Bacteria
- Virus
- Tardigrade
- Microbes

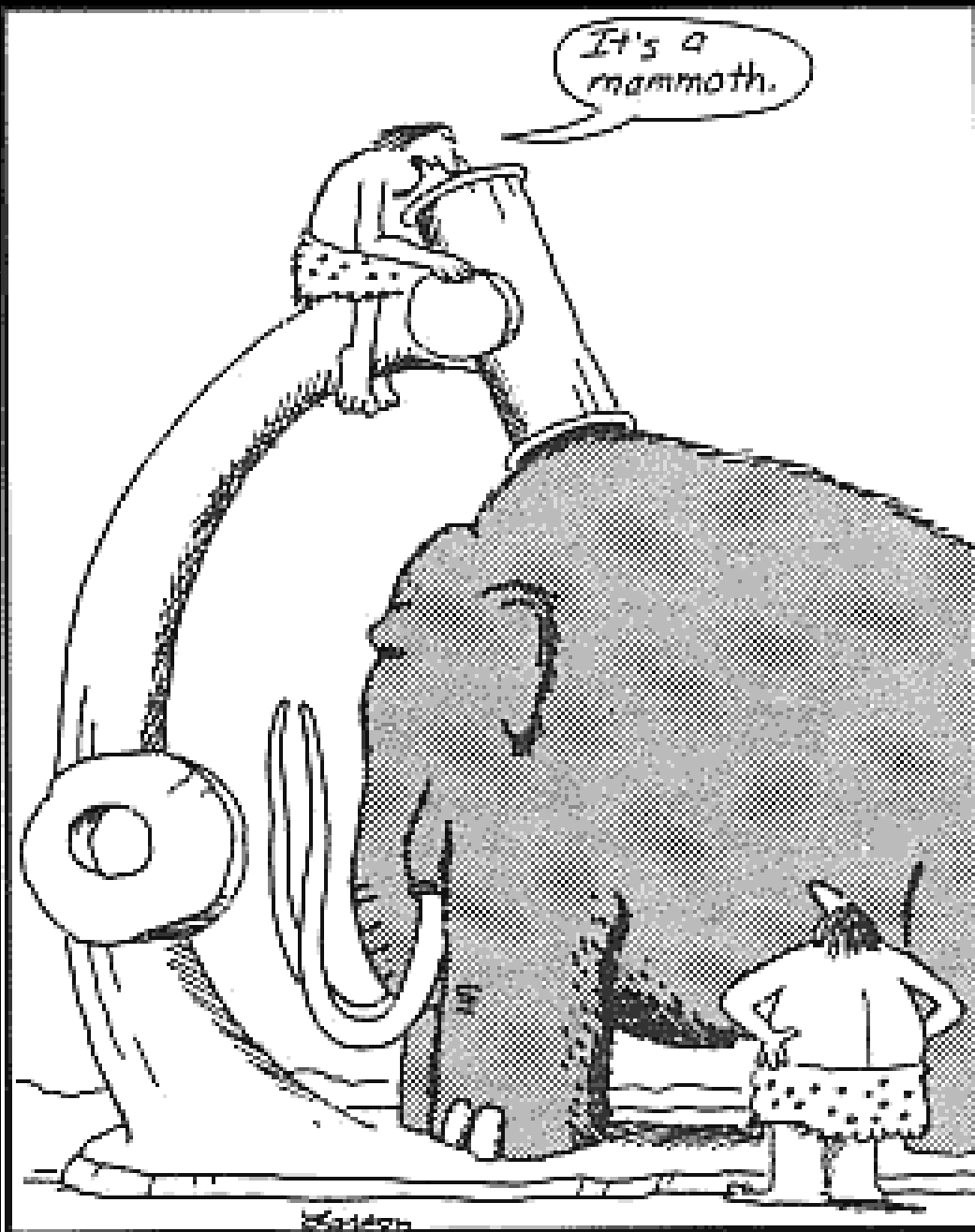


[https://www.youtube.com/watch?v=lxndOd3kmSs&ab\\_channel=TED-Ed](https://www.youtube.com/watch?v=lxndOd3kmSs&ab_channel=TED-Ed)

# Examining Very Small Living Things

## Introduction to Microscopes



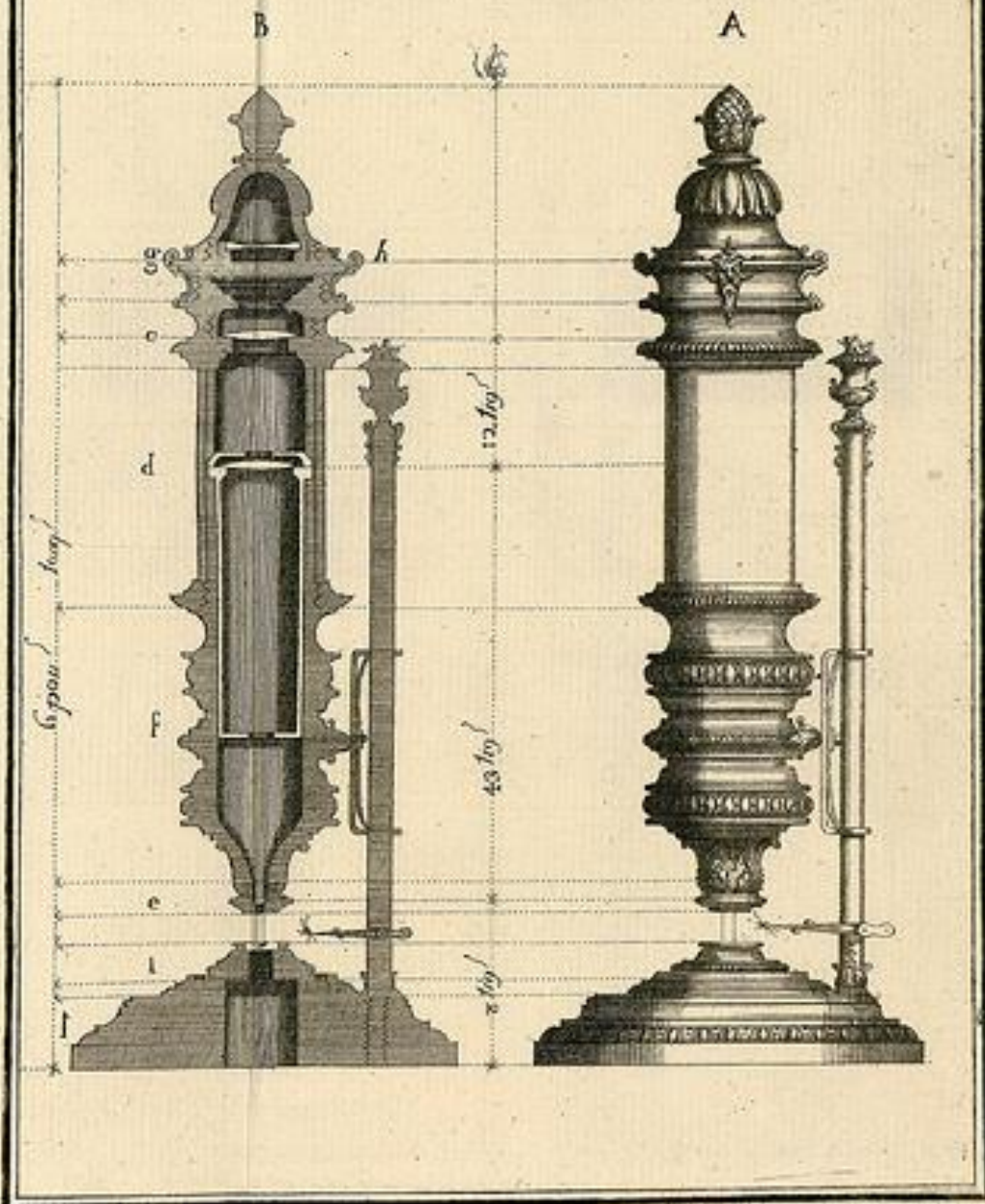


Early microscope

# Early Microscopes

- Built in the late 1600s and early 1700s
- One of the first people to build a microscope was named Anton van Leeuwenhoek
- “No more pleasant sight has met my eye than this of so many thousands of living creatures in one small drop of water”  
- Anton van Leeuwenhoek





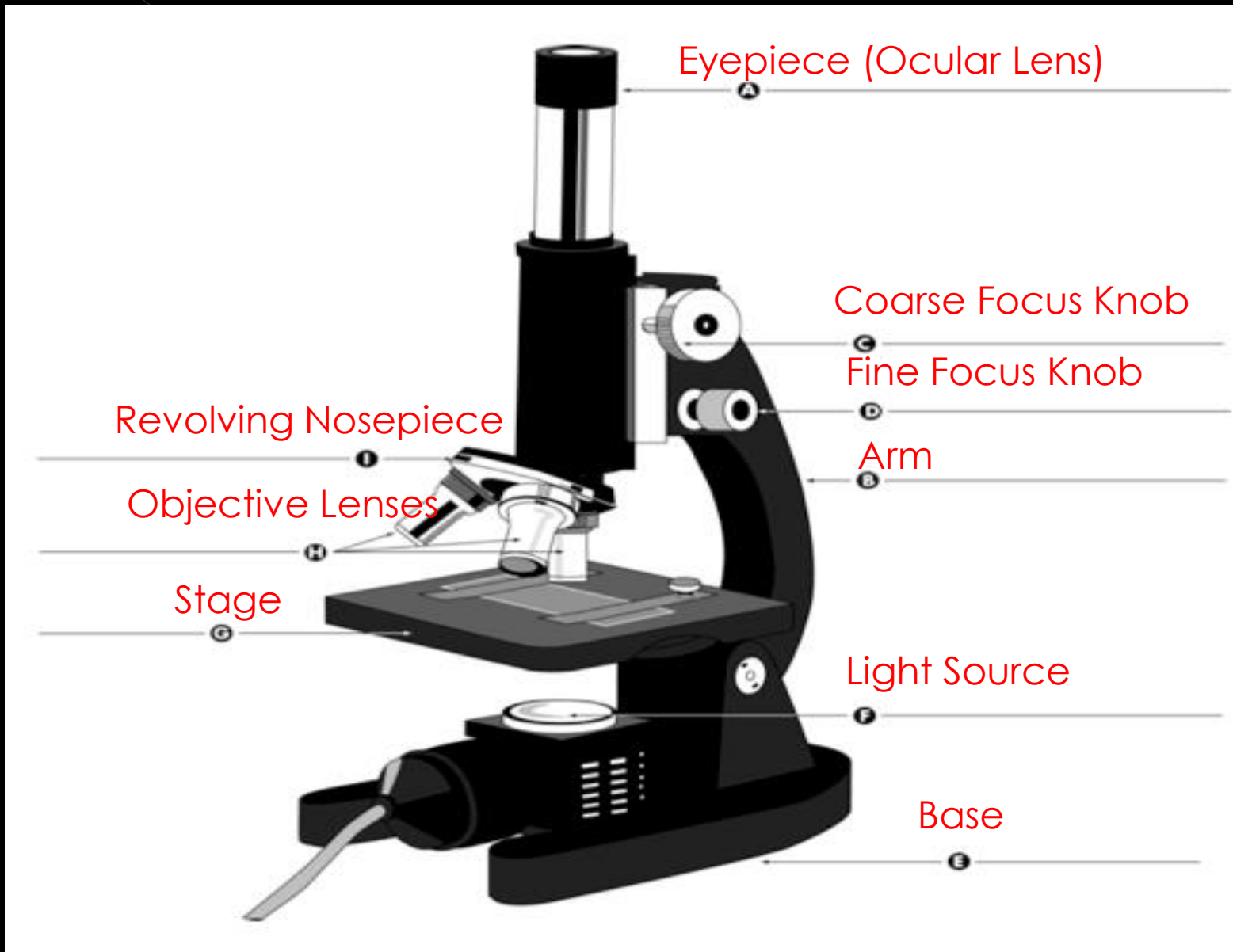






**Compound Light Microscope**

# Compound Light Microscope (pg. 12)

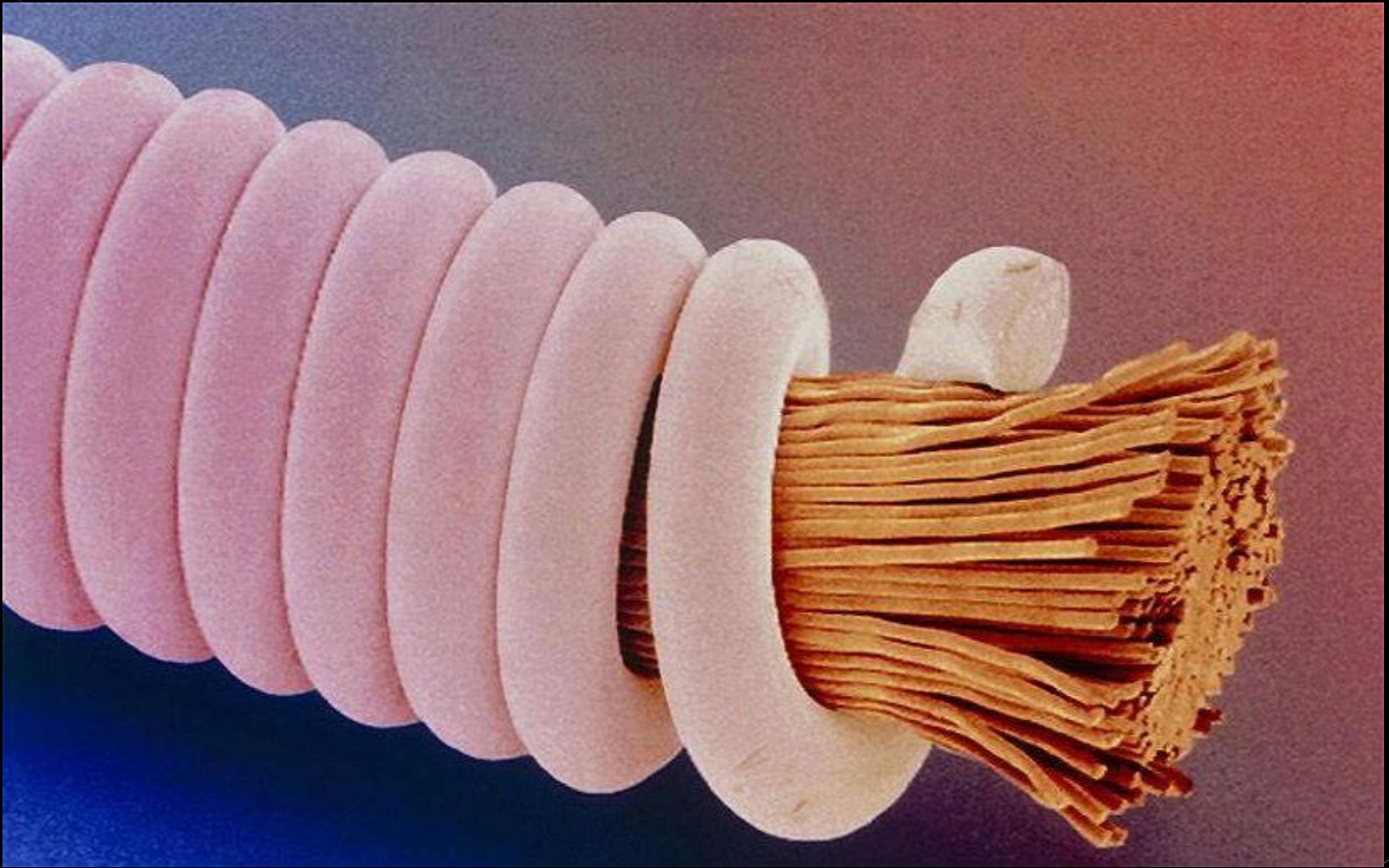


# Parts of the Microscope

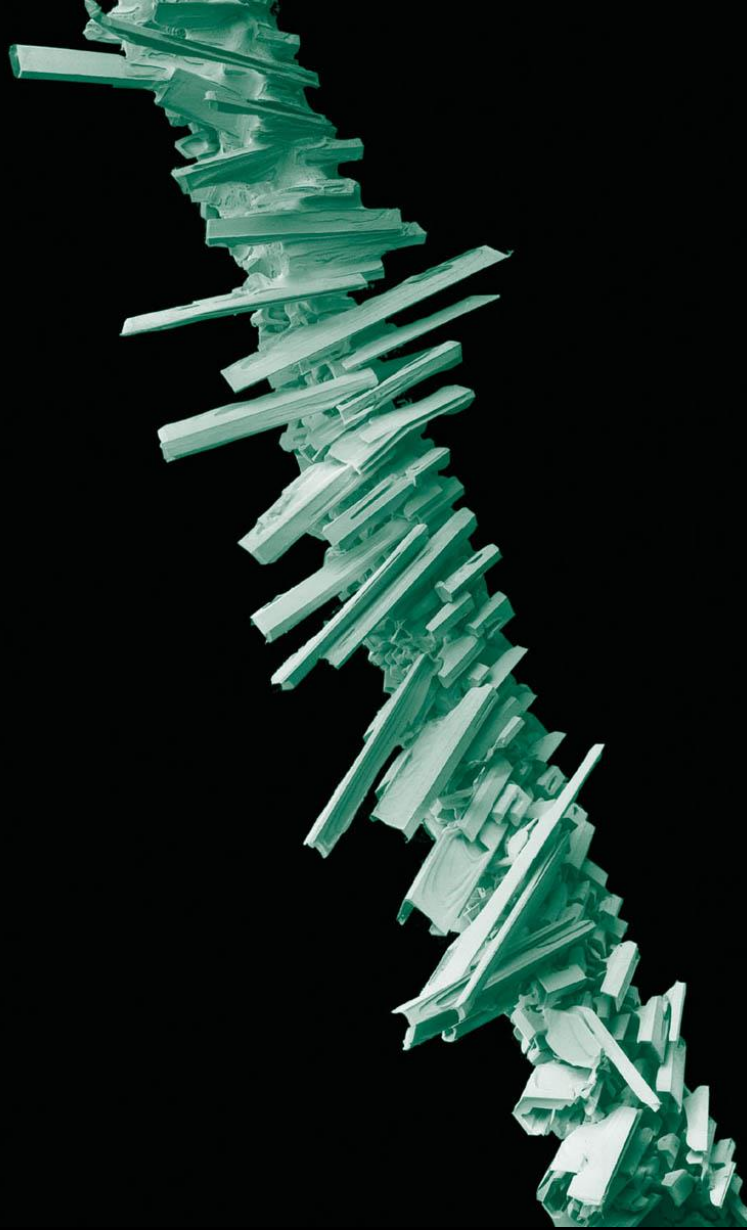
Part	Function



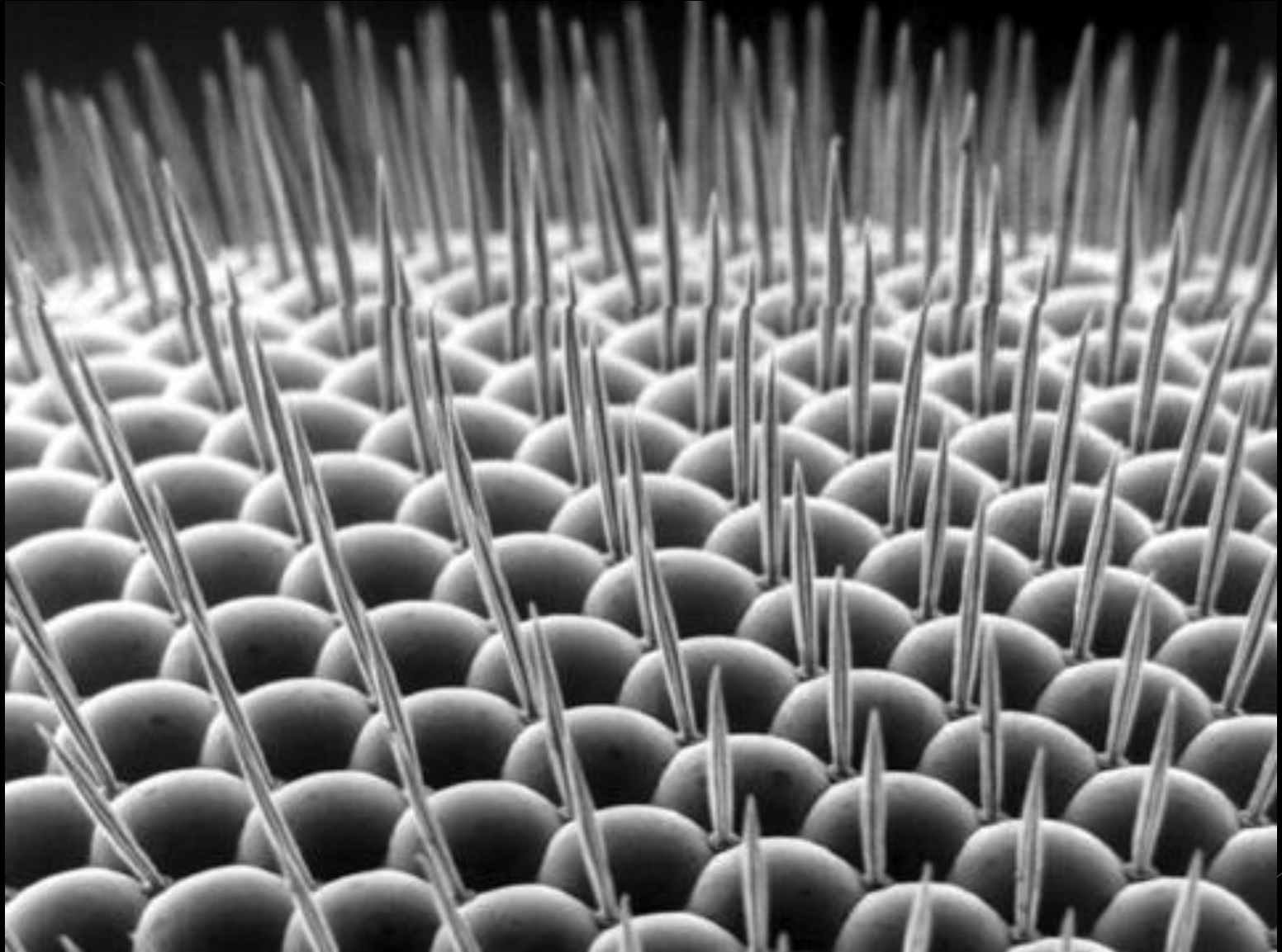
**MOSQUITO**



**GUITAR STRING**



**FROST ON A BLADE OF GRASS**



**FRUIT FLY'S EYE**

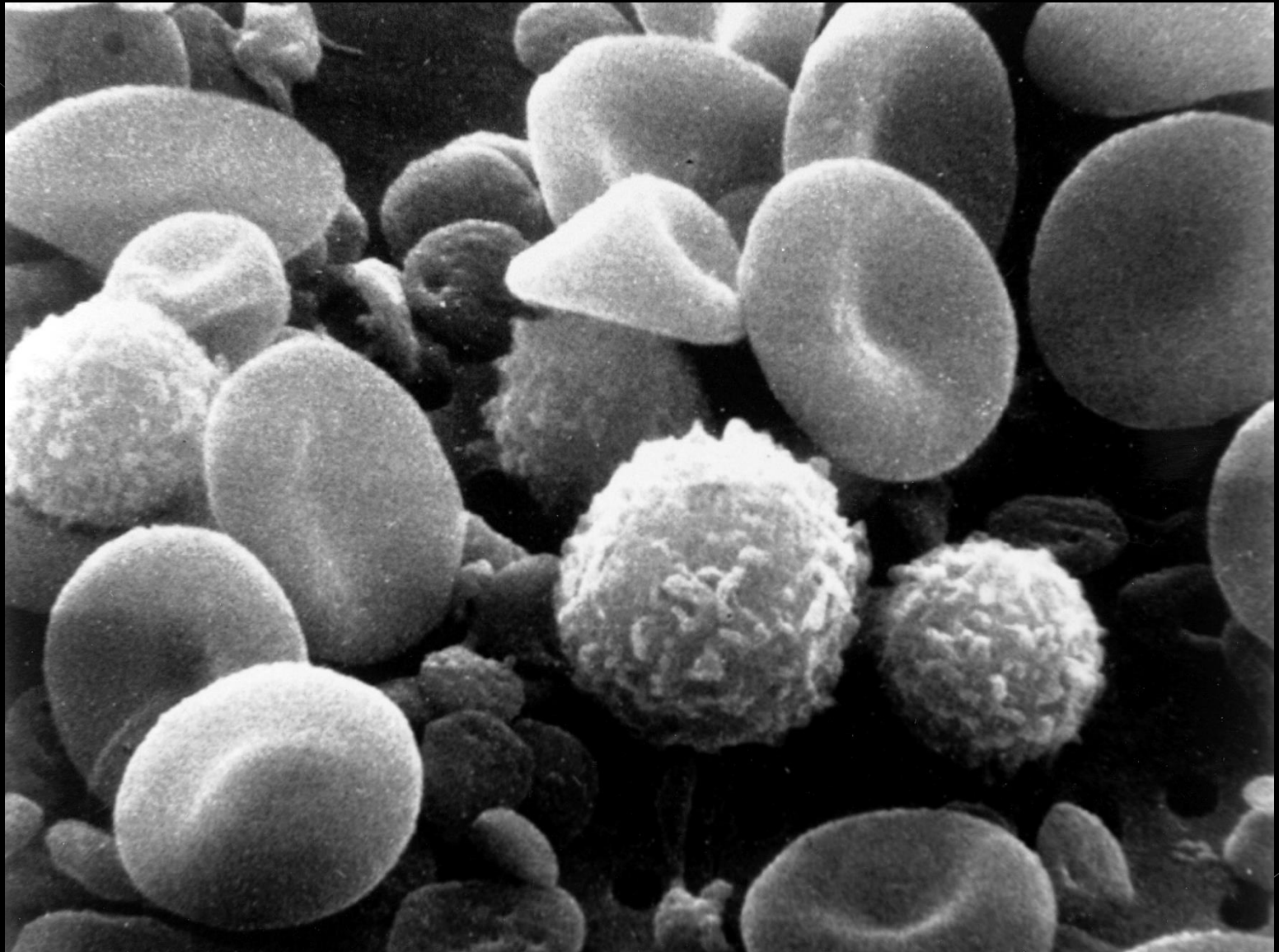


**RAZOR BLADES**





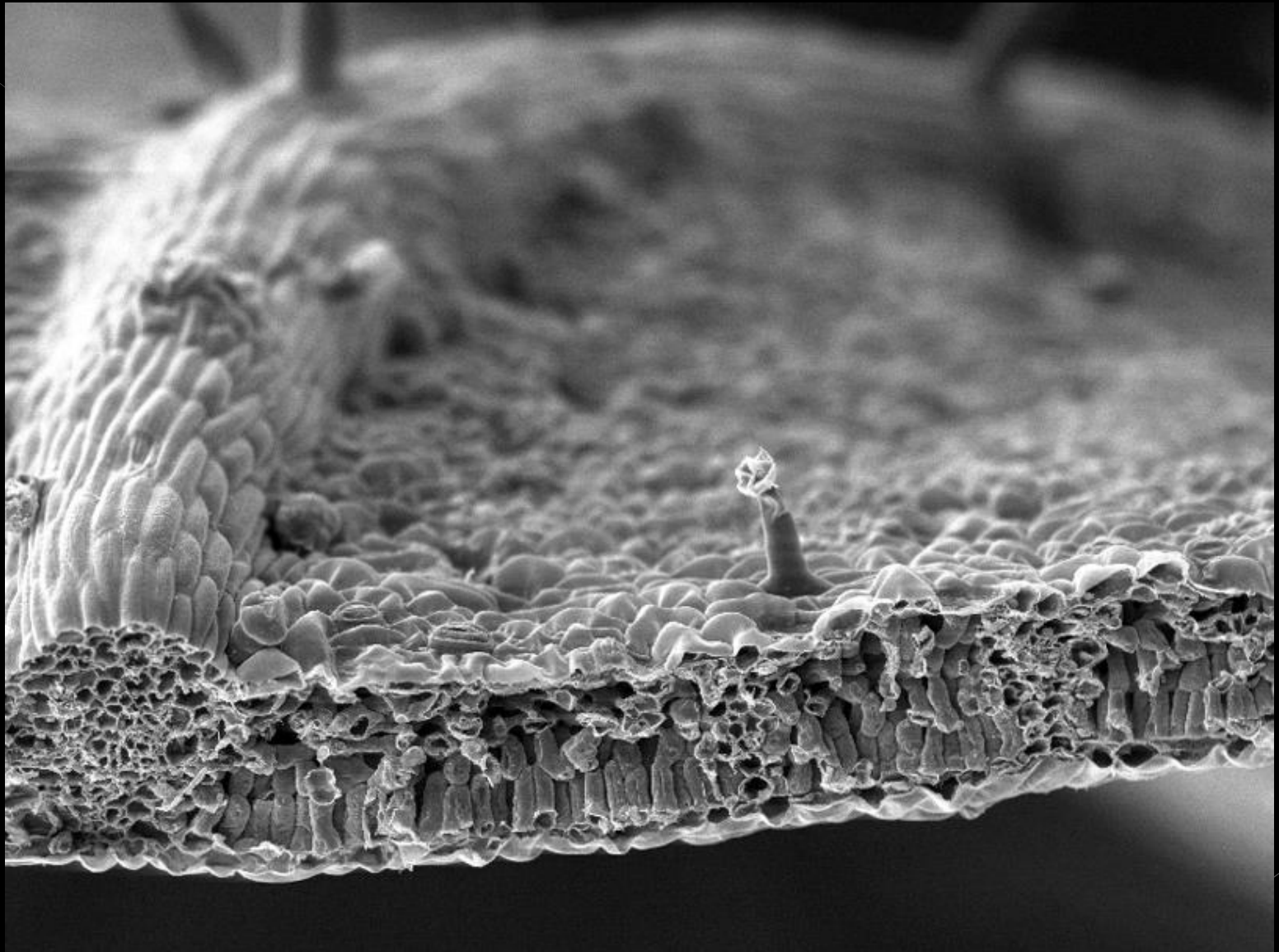
**SALT & PEPPER**



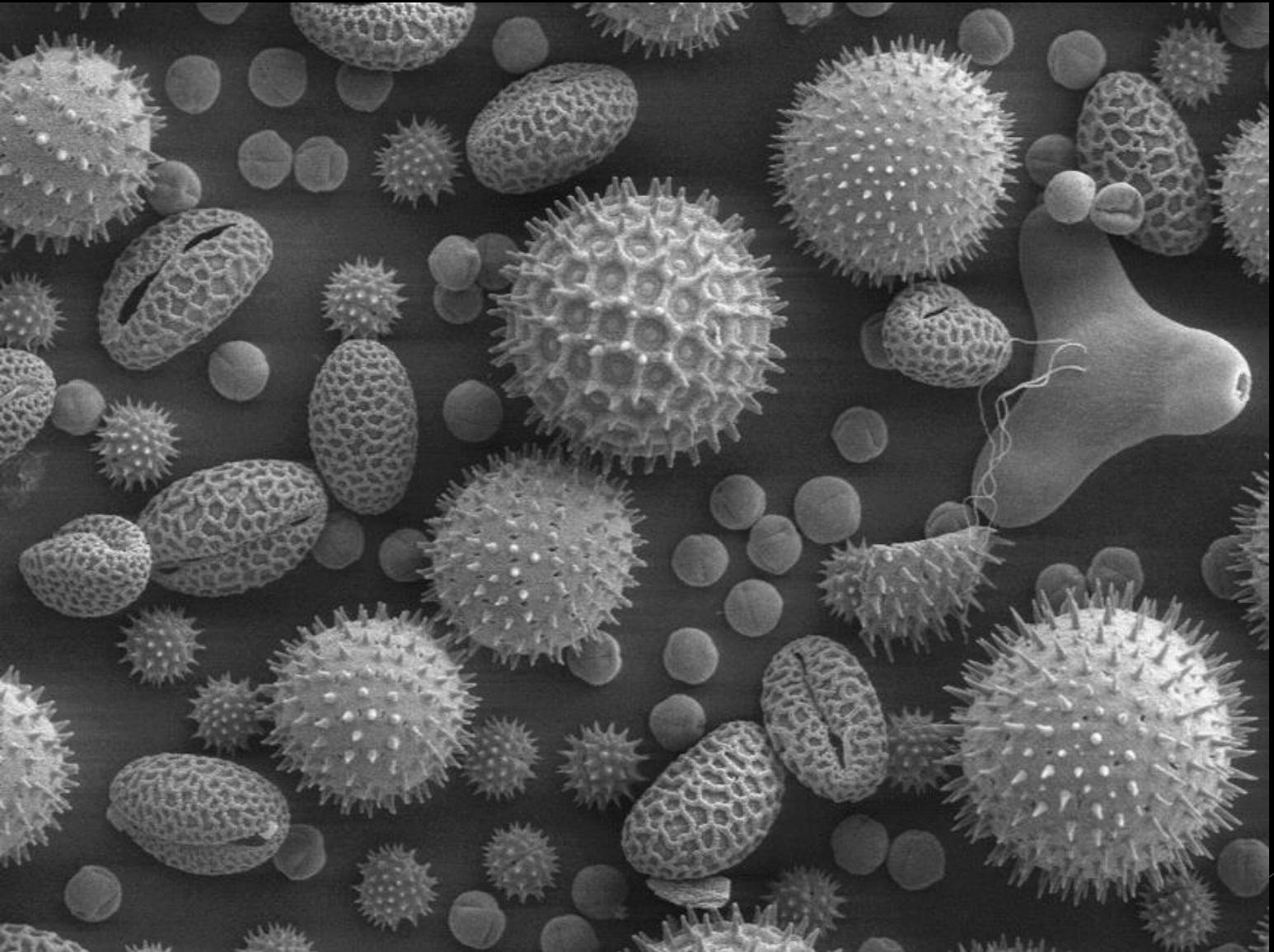
**RED BLOOD CELLS**



**SAND**



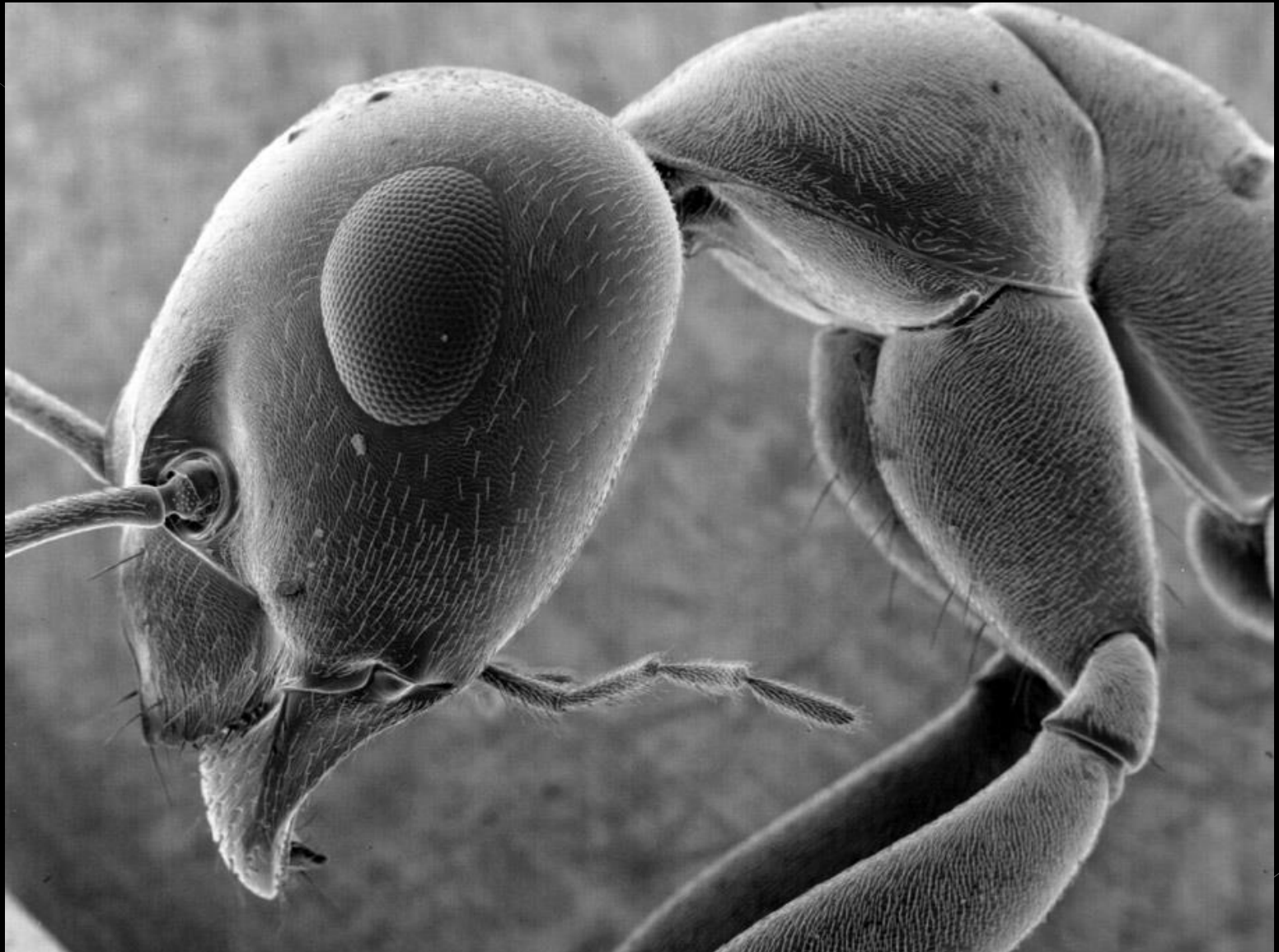
**EDGE OF A CUT LEAF**



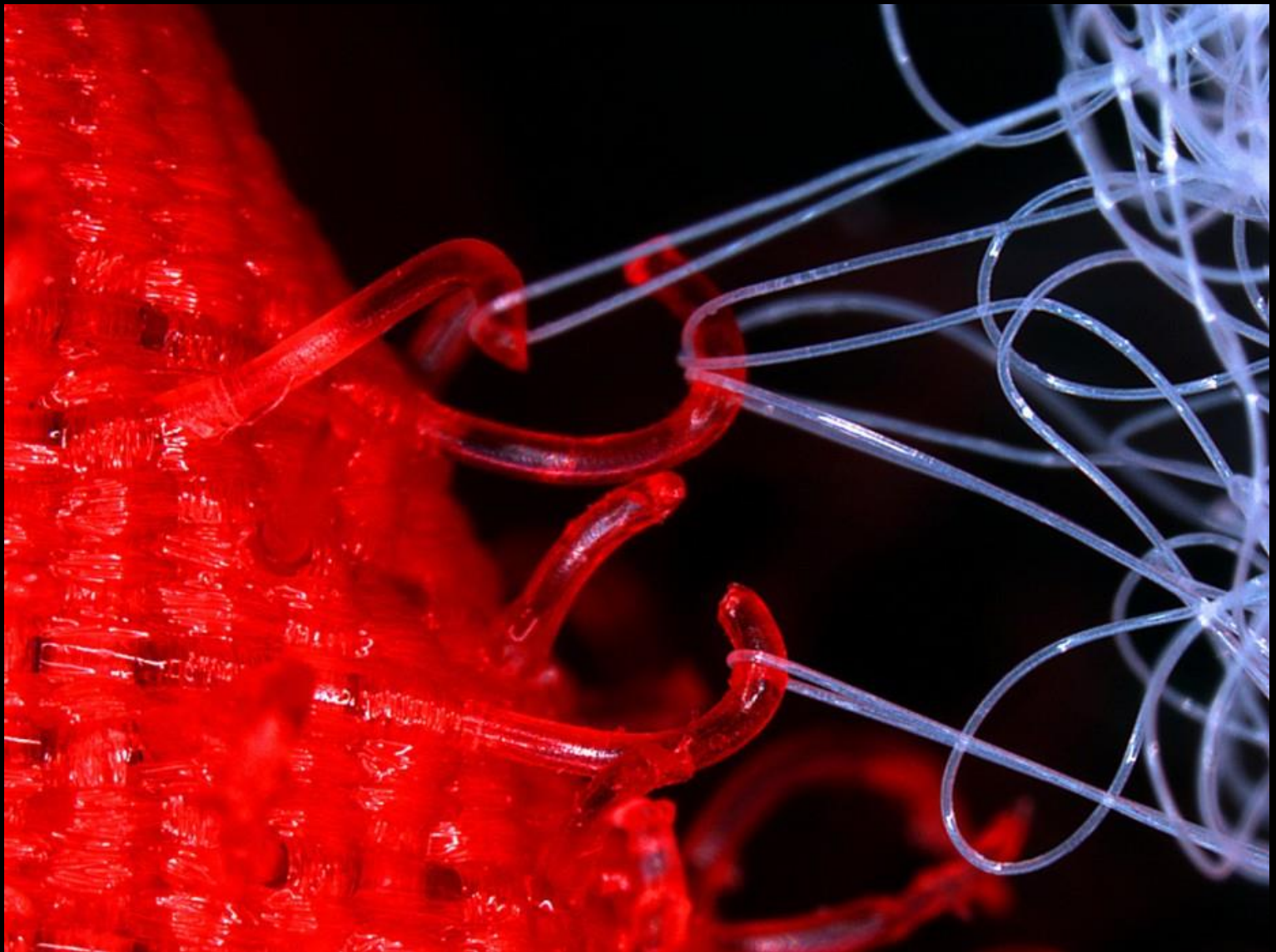
**POLLEN GRAINS**



**TOILET PAPER**



**ANT**

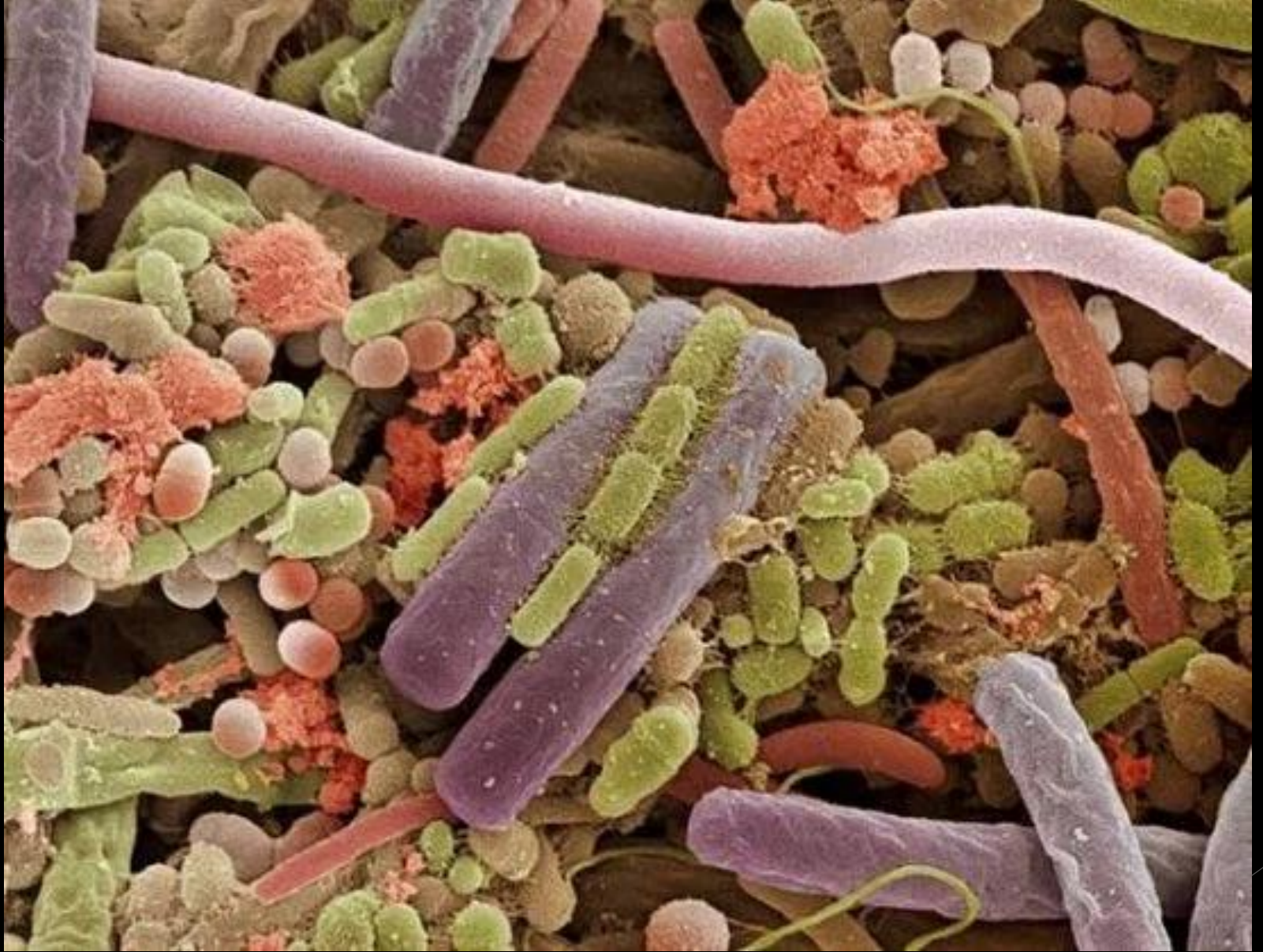


**VELCRO**

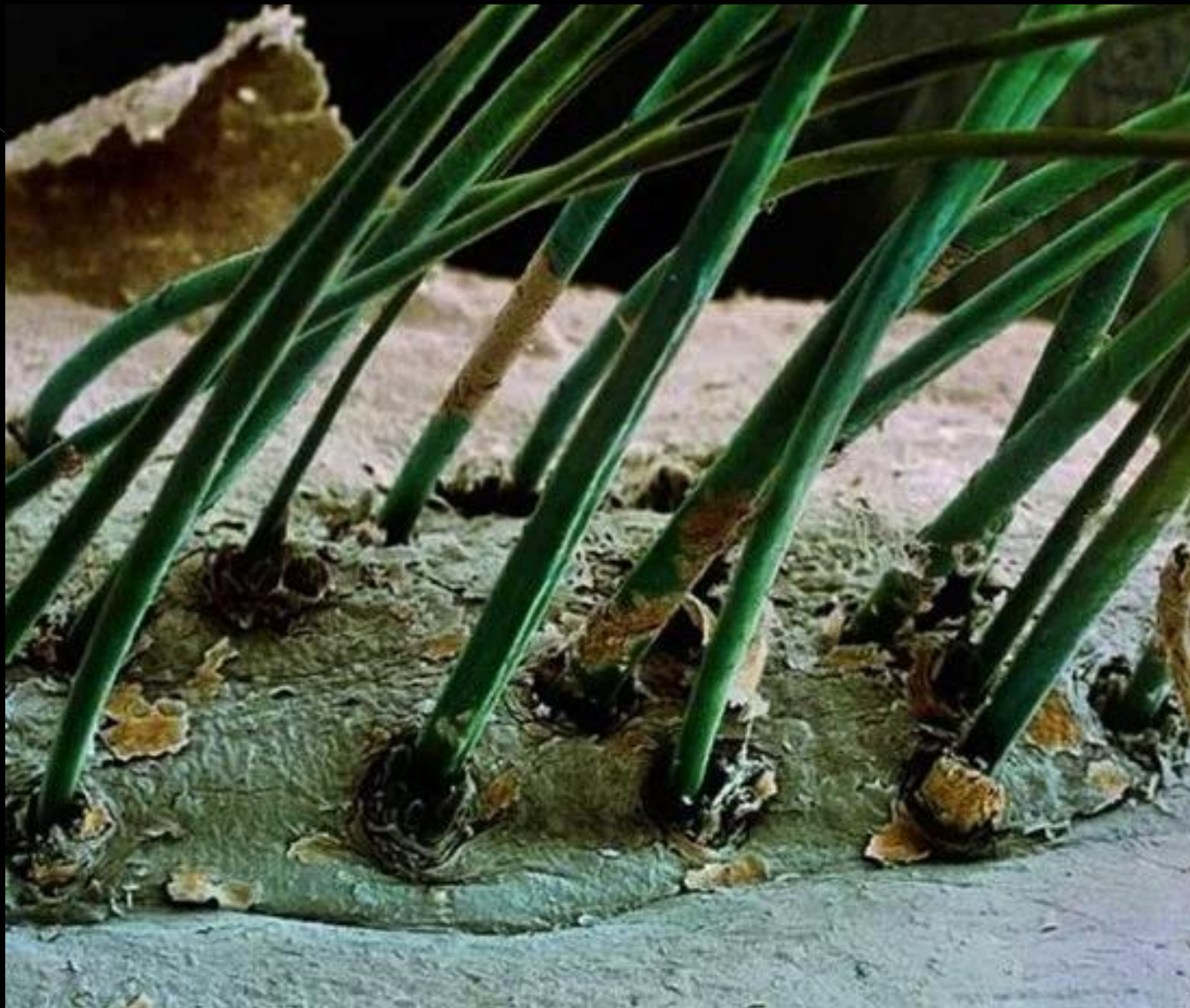




**SNOW**



**HUMAN TONGUE**



**EYELASH**

# Magnification



- Contains two sets of lenses
- Eyepiece lens (ocular lens): 10x
- Objective lenses:
  - > Low-power objective lens: 4x
  - > Medium-power objective lens: 10x
  - > High-power objective lens: 40x

**Eyepiece lens x Objective lens = Total magnification**

# Magnification con't

- Example:
- Total magnification of medium-power lens:
  - > eyepiece x medium power
  - > 10 x 10
  - > 100x total magnification



An eyepiece on a microscope has a magnification of 10x. The objective lenses on the microscope have magnifications of 4x at low power, 10x at medium power, and 40x at high power.

○ (a) Using the information how would you combine lenses on a microscope if you wanted to magnify an object 40x?

> Combine the eyepiece lens (10) with a low-power objective lens (4)

>  $10 \times 4 = 40x$  magnification



An eyepiece on a microscope has a magnification of 10x. The objective lenses on the microscope have magnifications of 4x at low power, 10x at medium power, and 40x at high power.

○ (b) How would you combine lenses if you wanted to magnify an object 100x?

> Combine the eyepiece lens (10) with a medium-power objective lens (10)

>  $10 \times 10 = 100x$  magnification



An eyepiece on a microscope has a magnification of 10x. The objective lenses on the microscope have magnifications of 4x at low power, 10x at medium power, and 40x at high power.

○ (c) How would you combine lenses if you wanted to magnify an object 400x?

> Combine the eyepiece lens (10) with a high-power objective lens (40)

>  $10 \times 40 = 400x$  magnification





If a compound microscope has an eyepiece of 15x magnification and you select an objective lens with a power of 40x, what is the total magnification of the object?

>  $15 \times 40 = 600x$  magnification



# Field of View

- ◉ Describes how much of the specimen you will be able to see under the microscope
- ◉ As the magnification gets greater, the FOV gets smaller
- ◉ You are 'zooming in' to the specimen
- ◉ You will be able to see less of the specimen, but the image you will see will be in greater detail

# Microscope Safety

1. Always carry the microscope with 2 hands - one on the arm and one underneath the base of the microscope.
2. Hold it up so that it does not hit tables or chairs.
3. Never swing the microscope.
4. Do not touch the lens. If they are dirty, please raise your hand and ask the teacher for the special lens paper to clean the lenses.

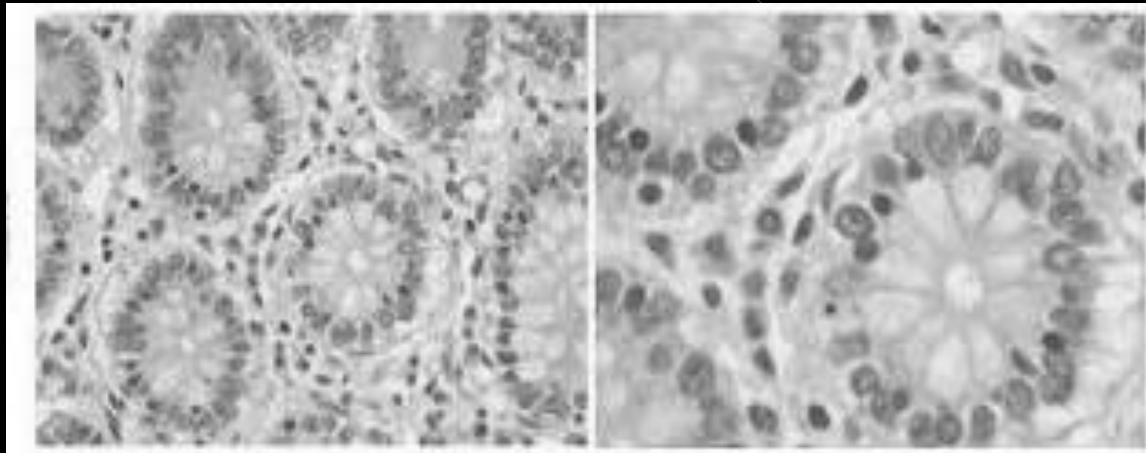
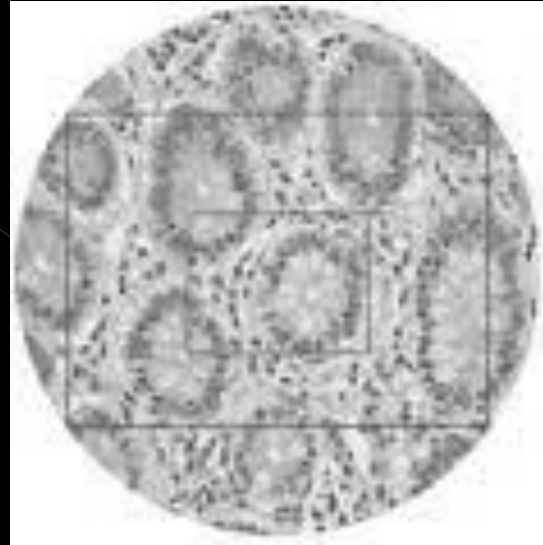
# Microscope Safety

5. Be cautious when handling the microscope slide and cover slip. Please do not handle broken glass - notify teacher.
6. If using a microscope with a light source, turn off the light by the switch and then unplug the microscope

# Microscope Safety

7. Use the low power lens first and use the coarse focus knob to focus the image. Then use the medium power lens and use the coarse focus knob to make further adjustments. To further magnify the image, switch to the high power lens and use the fine focus knob.
8. Always clean slides and microscope when finished. Store microscope set on the low power lens with the stage turned down to its lowest position and furthest away from the lens (using the coarse adjustment knob).
9. Wrap the cord around the microscope safely. Cover microscope with a cover and return microscope to storage if so requested.

# Field of View



# Practice

Complete the Microscope questions #1 – 7  
in your notes.