

Micro/macro comparison examples

It's a small world: using microscopy to link science, technology, and art

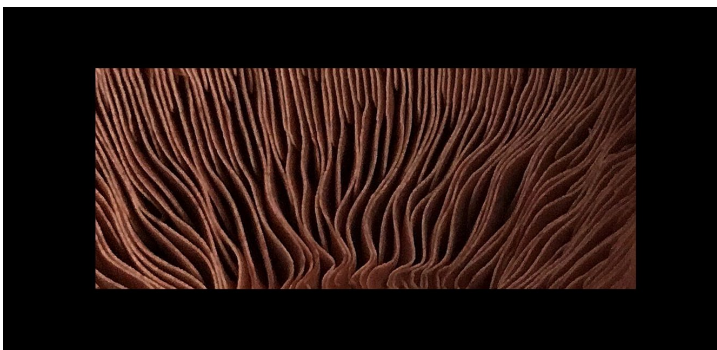
Example 1:

Below you can see an image of mushroom lamellae captured using reflectance microscopy (meaning the sample was lit from above) using 40× magnification.

The lamellae are the ribbed structures under the cap of many mushroom species. They are used for spore dispersal during reproduction.

For this example, no prior sample preparation was necessary; the sample was simply placed on the coverslip and directly imaged.

The structures resemble a radiator, so one can use 'radiator' as a search keyword.



Left: Lamellae (2017). Right: a radiator

Images: Left: ©Julianna Patricia Varga. Right: Image courtesy of Rosaria Cercola

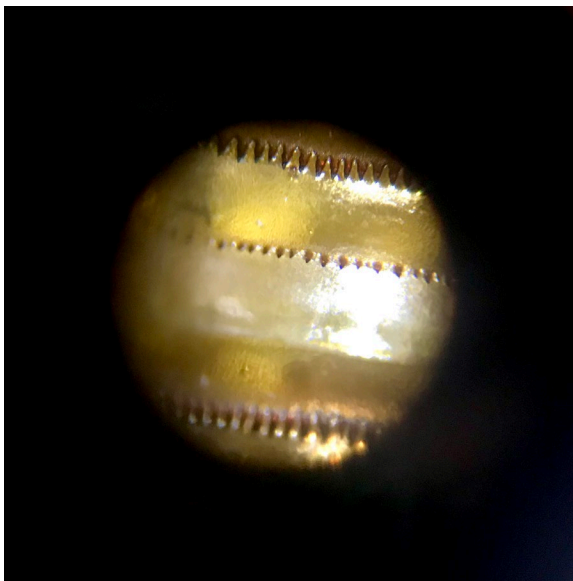
Link to functionality? Yes: mushroom lamellae and radiator vanes both function to increase surface area for spore dispersal and heat transfer, respectively.

Example 2:

The following image was also taken using reflectance microscopy and shows the surface of an insect's chitin exoskeleton at 100× magnification.

Chitin forms the exoskeleton, also colloquially known as the 'shells', of insects and crustaceans. During growth and development, chitin is replaced and renewed several times.

This photo was taken through a microscope eyepiece; thus, the visible part appears round. The round shape, alongside the patterns on the insect, are reminiscent of a baseball.



Left: chitin (2020). Right: a baseball

Images: Left: ©Julianna Patricia Varga. Right: Anomie/[Wikipedia](#), [CC BY-SA 2.0](#)

Link to functionality? Probably: the round shape is an artifact, but the zigzag patterns likely help to join the two chitin plates together in the same way that the stitching on the baseball joins the leather pieces together.

Example 3:

Below you can see a microscope image of a thinly sliced plant stem taken at 20× magnification using transmission microscopy (meaning the sample was lit from below).

The cell-wall shapes and the pattern they form all together are reminiscent of honeycombs built by bees.



Left: Plant stem (2015). Plant stems consist of different layers and components. Pictured here is the parenchyma, the ground tissue of nonwoody structures. Right: honeycombs built by bees.

Images: Left: ©Julianna Patricia Varga. Right: [Flickr](#), [CC BY-NC-SA 2.0](#)

Link to functionality? Yes: the hexagonal packing structure is remarkably efficient and stable.^[1]

References

[1] Information about honeycomb structures made by bees and wasps:

<https://asknature.org/strategy/honeycomb-structure-is-space-efficient-and-strong/>