



thermoscientific

Tips & Tricks TEM Imaging

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- 1) Comparing TEM vs. STEM**
- 2) Elemental composition with EDS**

STEM:

Scanning transmission electron microscopy



Pros:

- Flexible scanning time
- High elemental contrast (useful for immunogold staining, e.g.)
- 2D elemental mapping with EDS

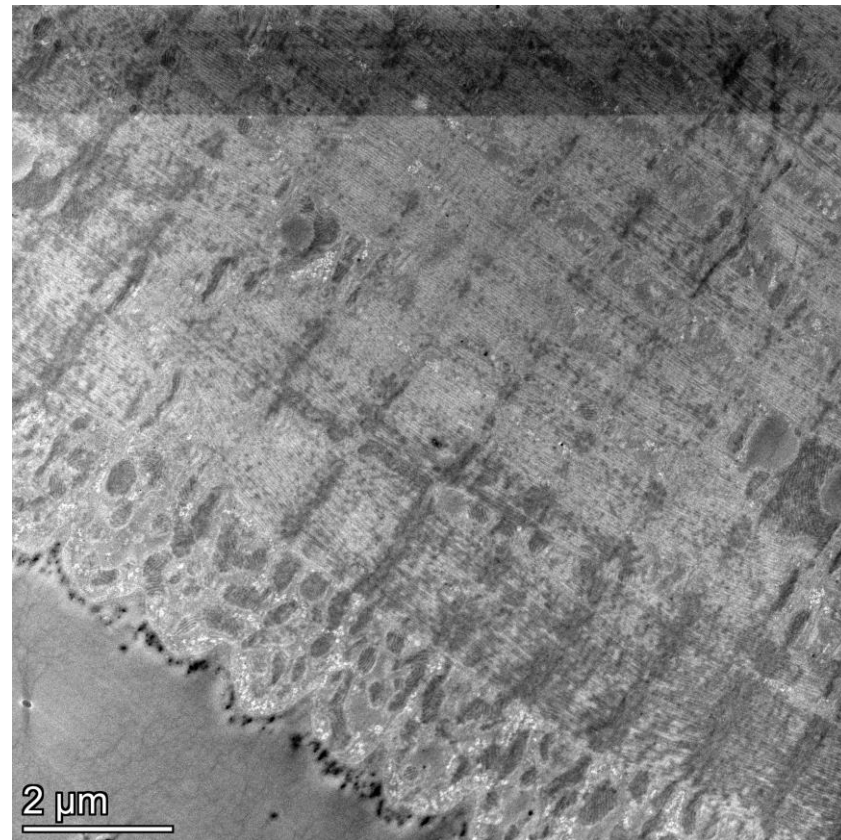
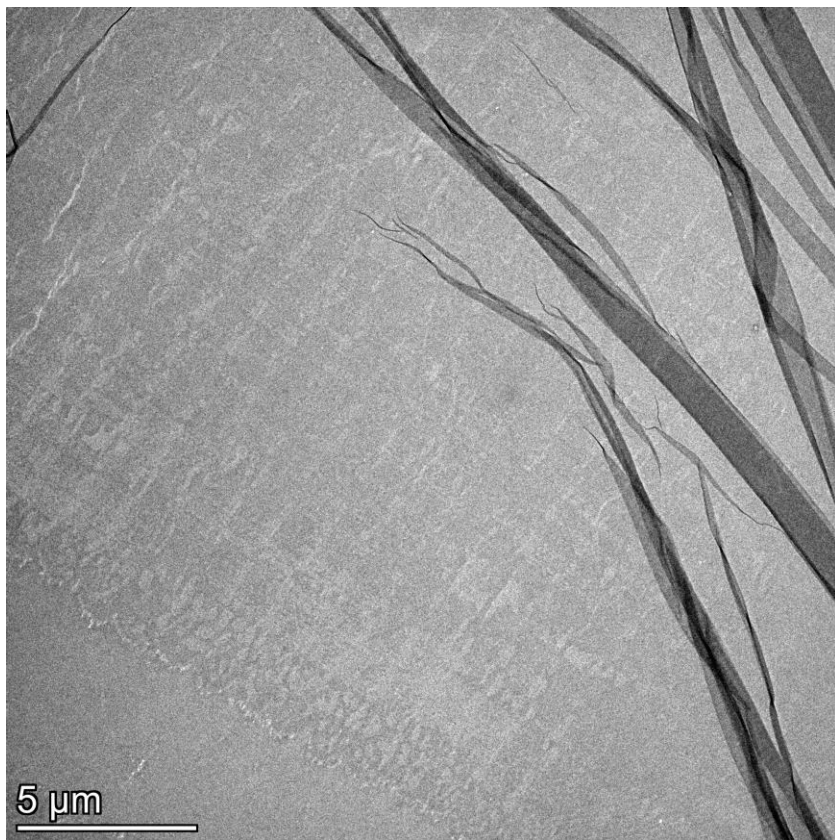
Cons:

- Increased time per image acquisition
- Increased beam damage
- Beam sensitive samples are usually too unstable to perform high magnification

TEM

vs.

STEM

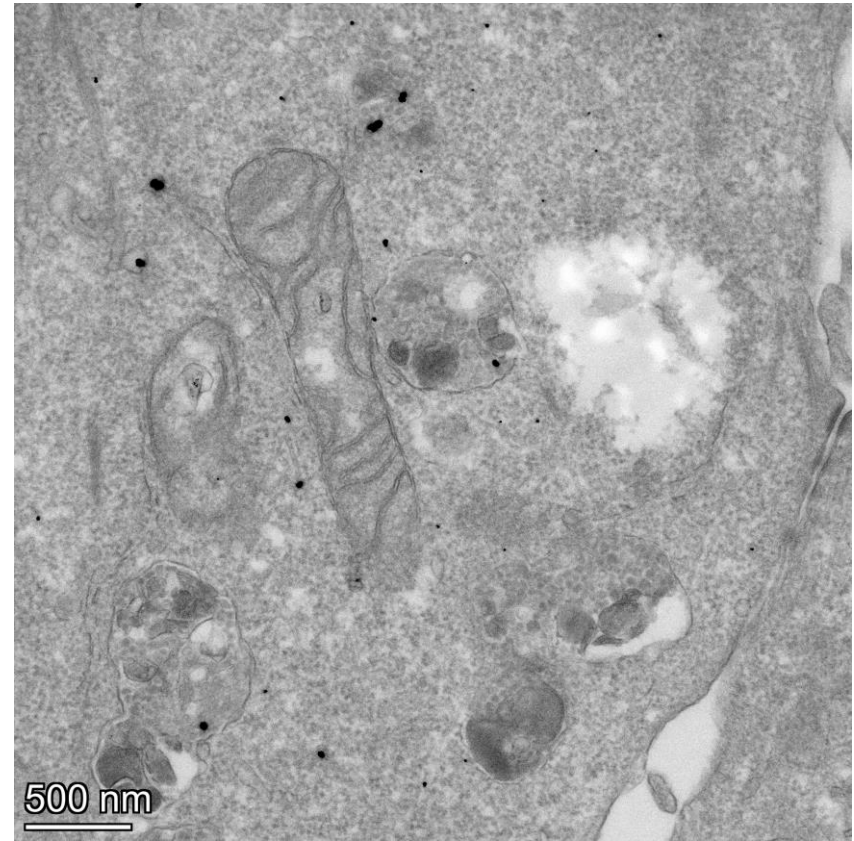
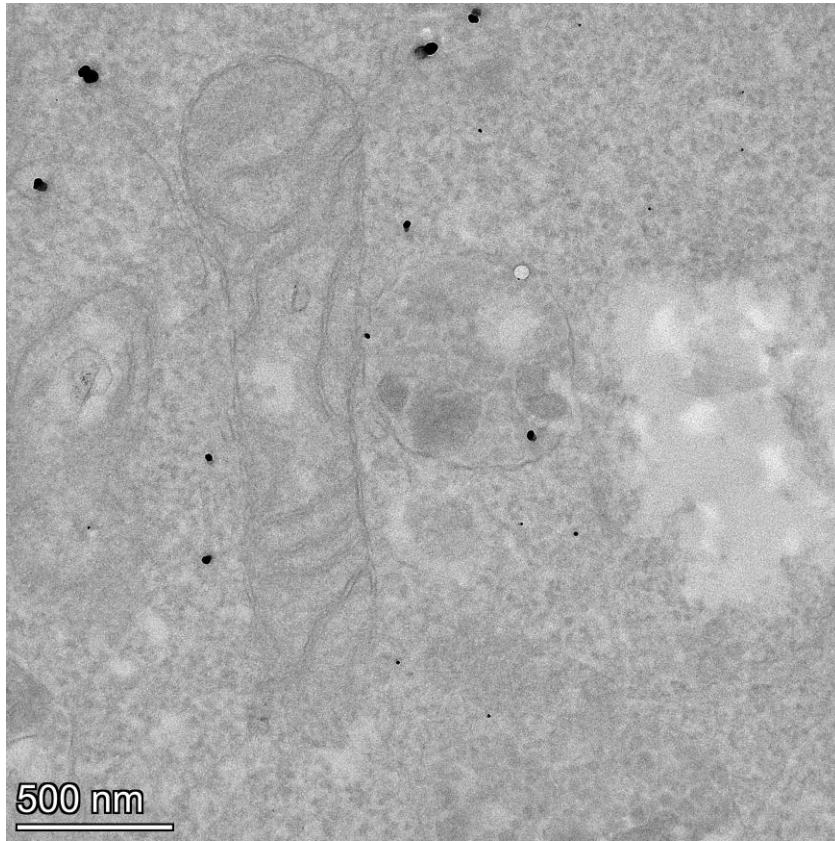


Sample: Dr. Hiroshi Saito, Dr. Jian Pu, 2021

TEM

vs.

STEM

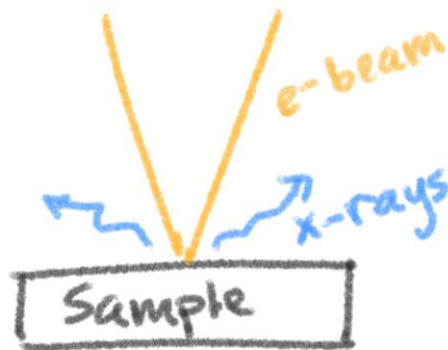


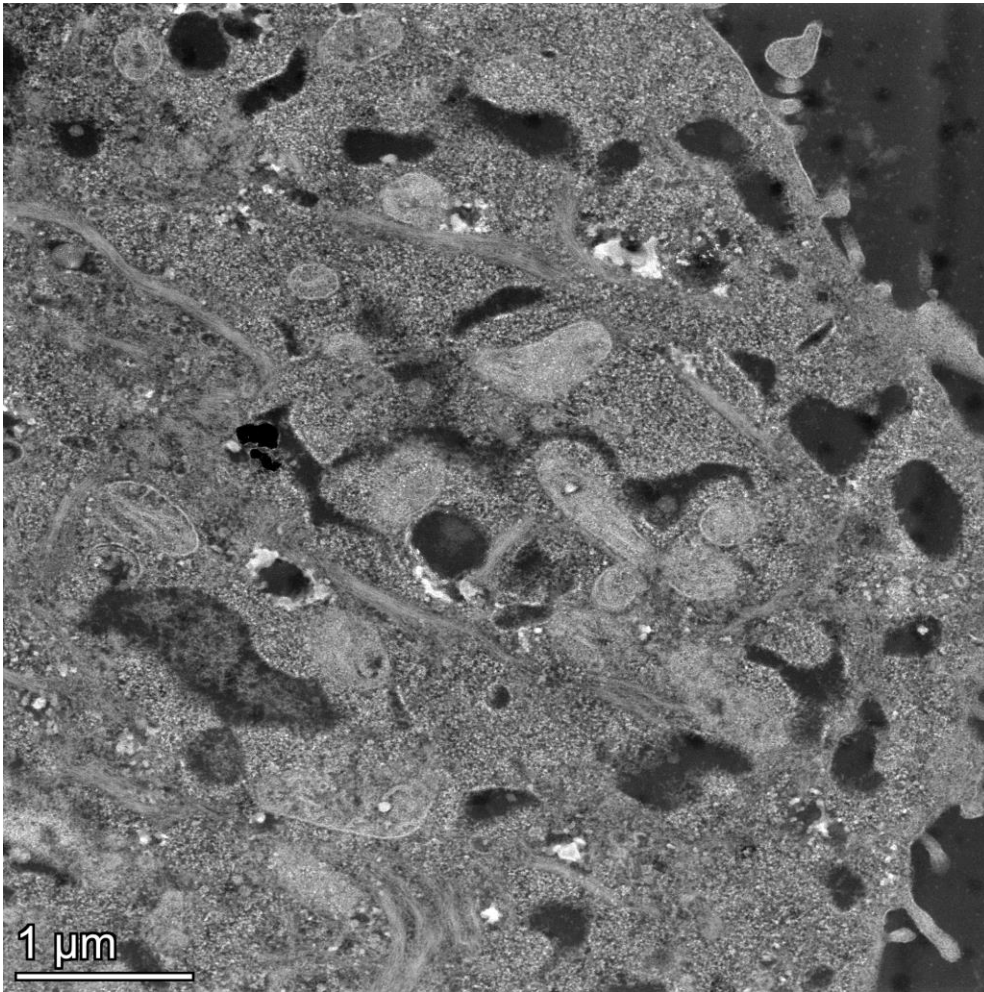
Sample: Dr. Simone Crivelli, prepared by Dr. Jian Pu, 2022

EDS – Confirming elemental composition

What is EDS?

- Energy dispersive spectroscopy, detects characteristic x-rays of elements
- In STEM, we can scan while detecting x-rays to produce 2-dimensional elemental maps
- In biological samples, can be useful for investigating contaminants, staining, etc.

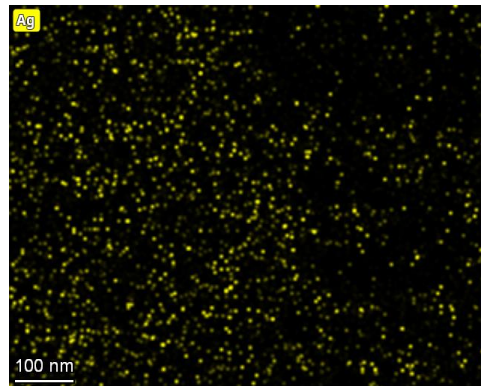
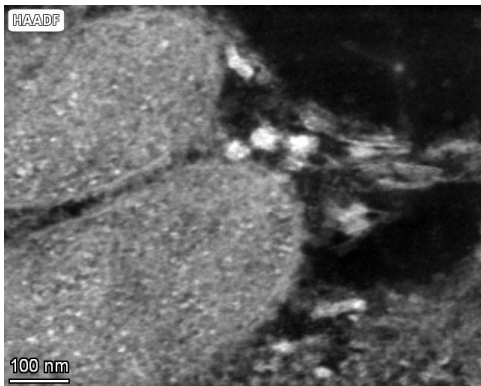
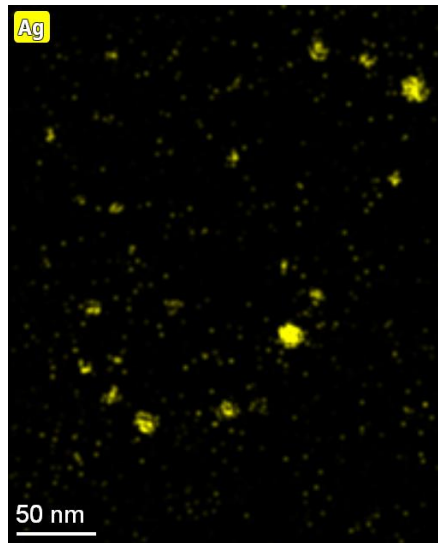
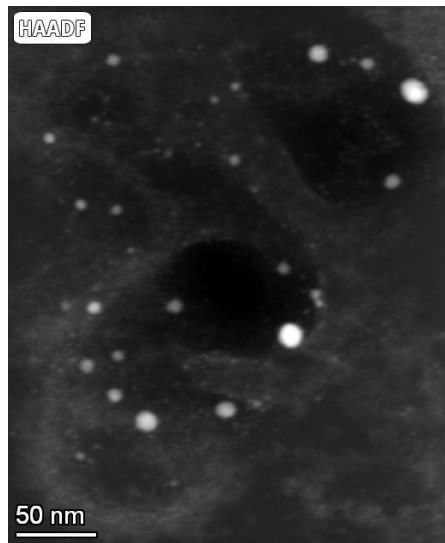




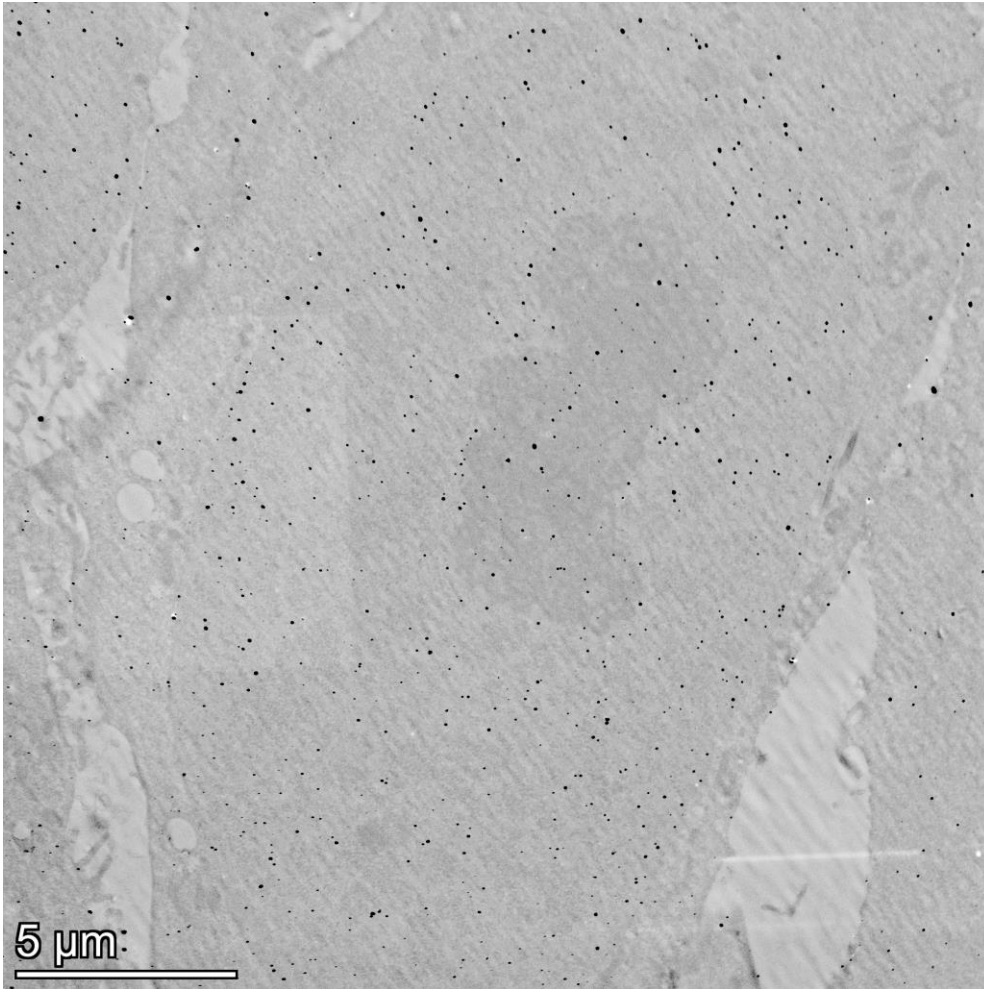
Use case: Brain tissue

Where is the staining in this image?

Sample: Dr. Wangxia Wang, prepared by Doug Price, 2021



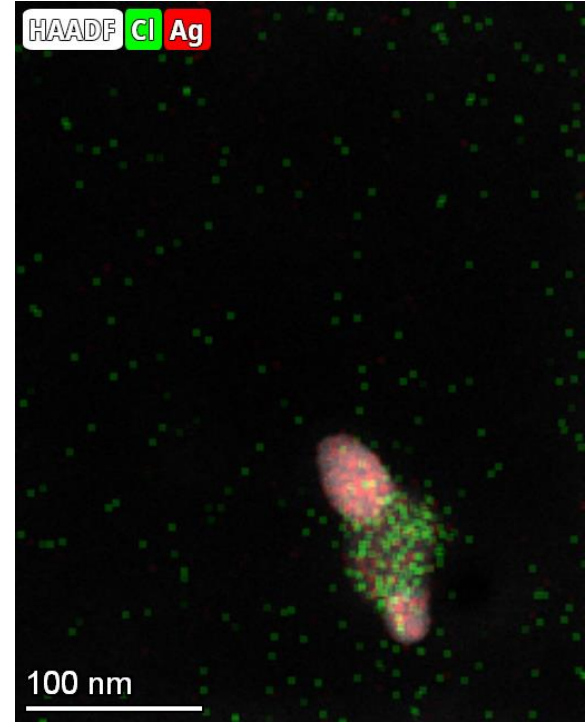
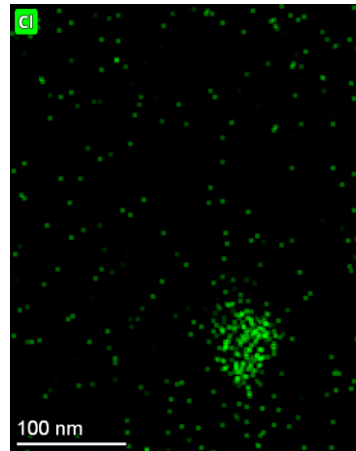
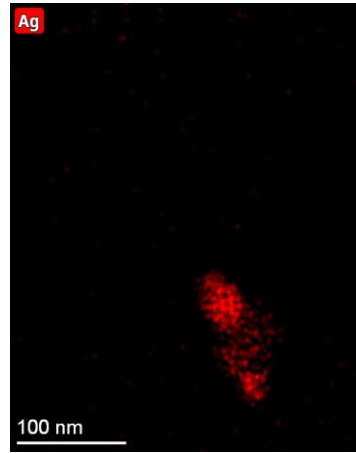
Sample: Dr. Wangxia Wang, prepared by Doug Price, 2021



Use case: Cell sections

Are **all** of these black dots immunogold staining?

Sample: Dr. Namrata Anand, prepared by Dr. Jian Pu, 2022





Thank you!