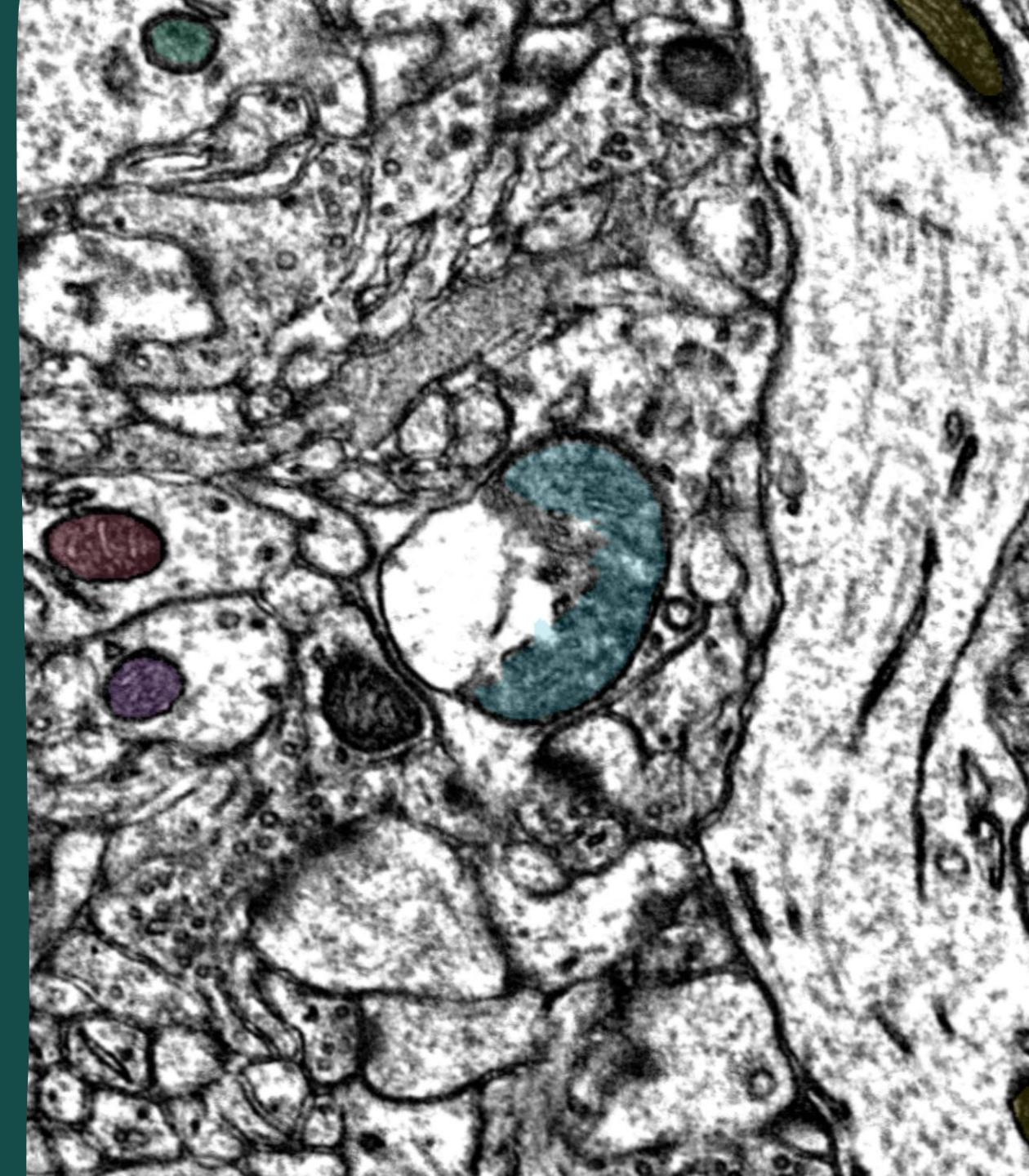
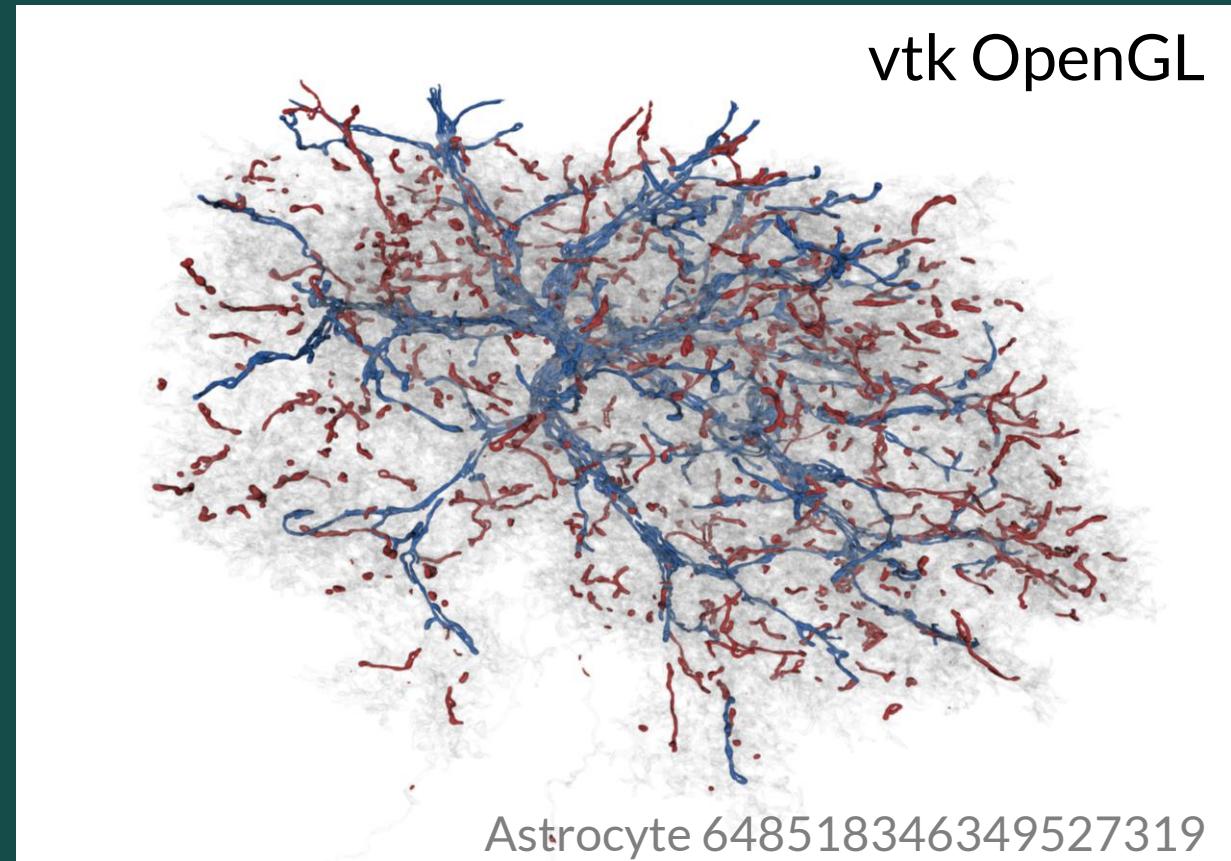
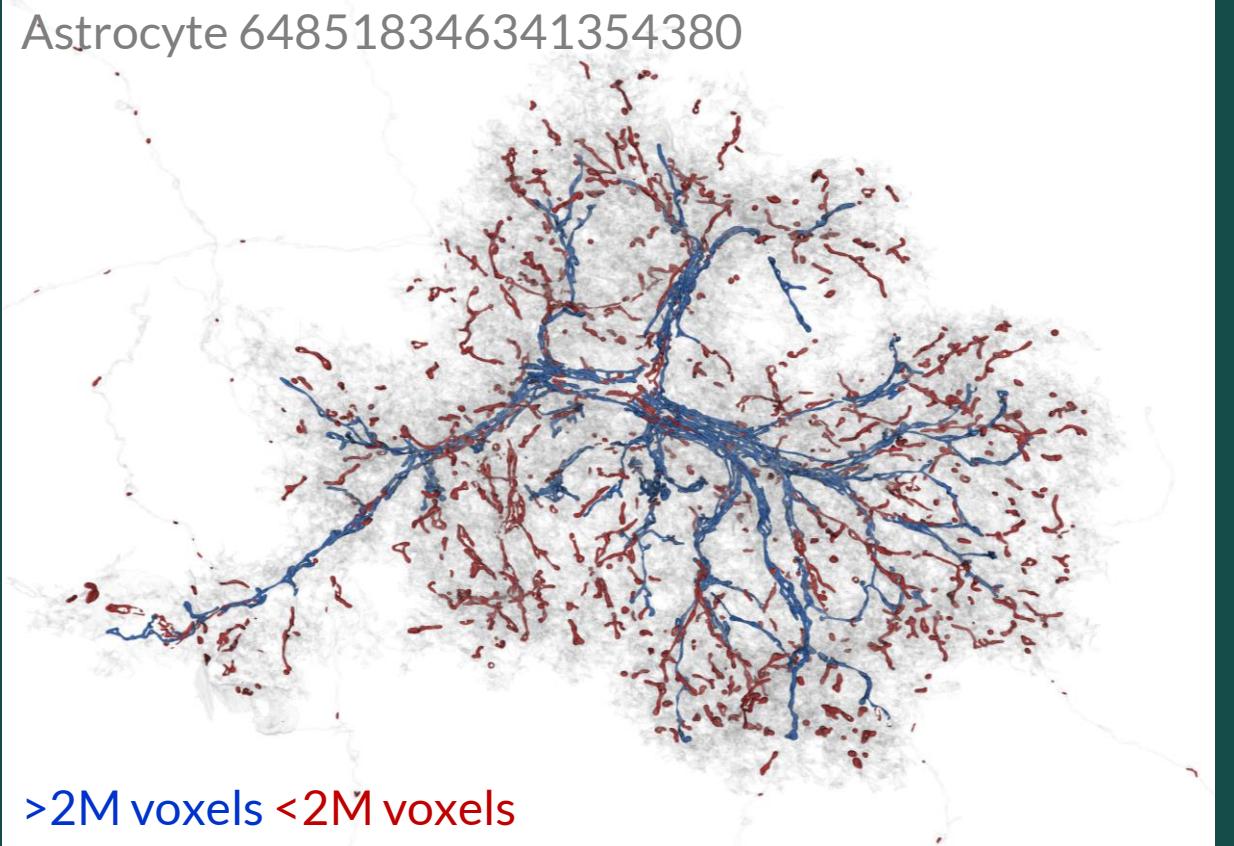


# MITOCHONDRIA INCLUSIONS IN ASTROCYTES OF THE LAYER 2/3 VOLUME



# Mitochondria in astrocytes are dense and extensively branched



View 3D mitochondria  
visualizations of all 44 astrocytes  
in the Layer 2/3 volume

[https://github.com/shandran/layer23-  
volume/tree/main/astrocyte\\_mitochondria](https://github.com/shandran/layer23-volume/tree/main/astrocyte_mitochondria)

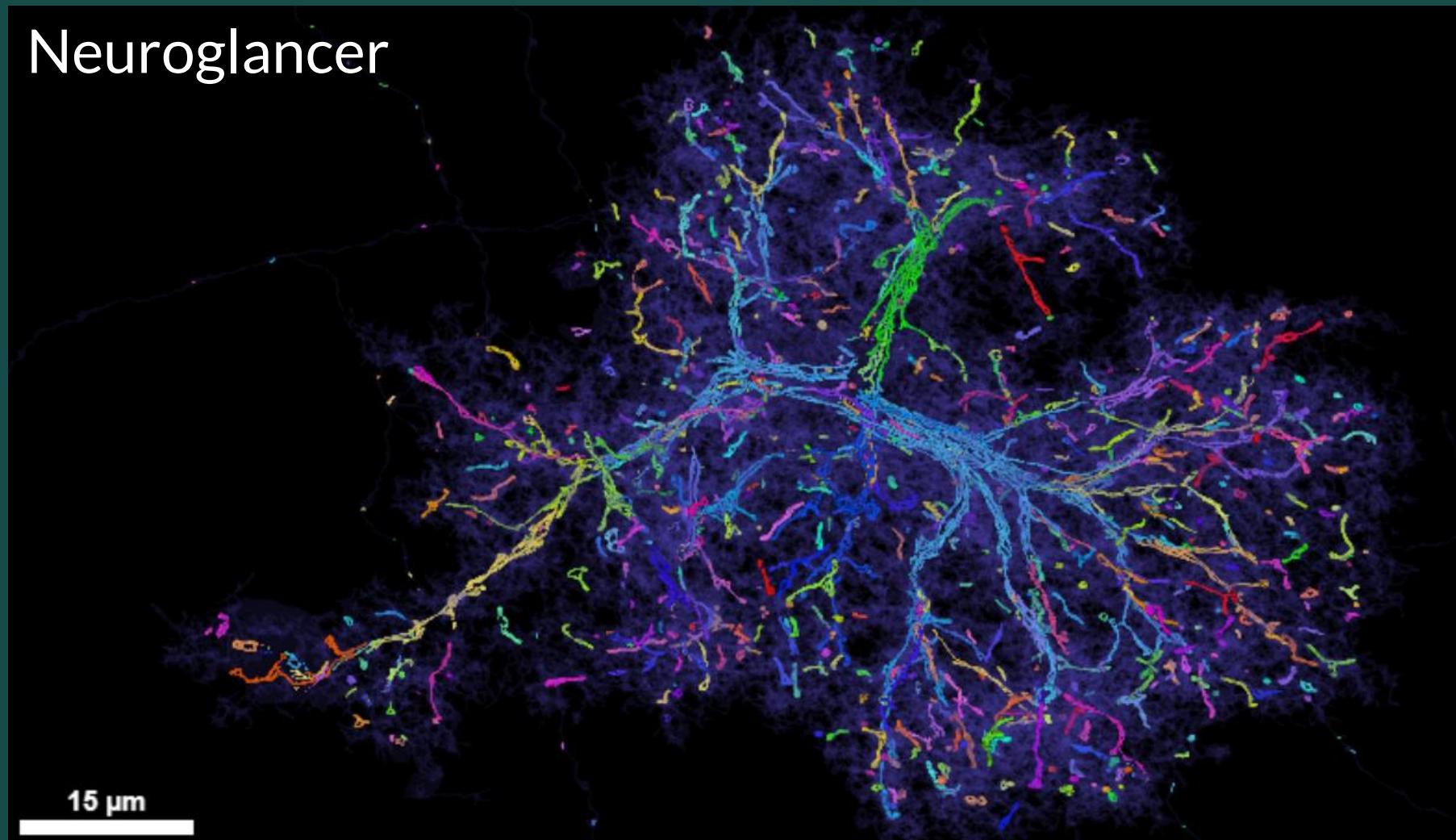
# Mitochondrial inclusions are relatively easy to find in Neuroglancer

Reveal all the mitochondria for an astrocyte in Neuroglancer using the [neuroglancer\\_link\\_generator\\_all\\_mitochondria.ipynb](#) notebook and then search manually for broken or fragmented mitochondria

# Inclusion examples

Generate EM image stacks and montages using the  
[EM\\_image\\_generator\\_master\\_astrocyte\\_inclusions.ipynb](#) notebook  
and create 3D visualizations using the  
[vtk\\_astrocyte\\_mitochondria\\_visualizer\\_using\\_threshold\\_with\\_neuroglancer\\_all\\_mitos.ipynb](#) notebook

# Astrocyte 648518346341354380

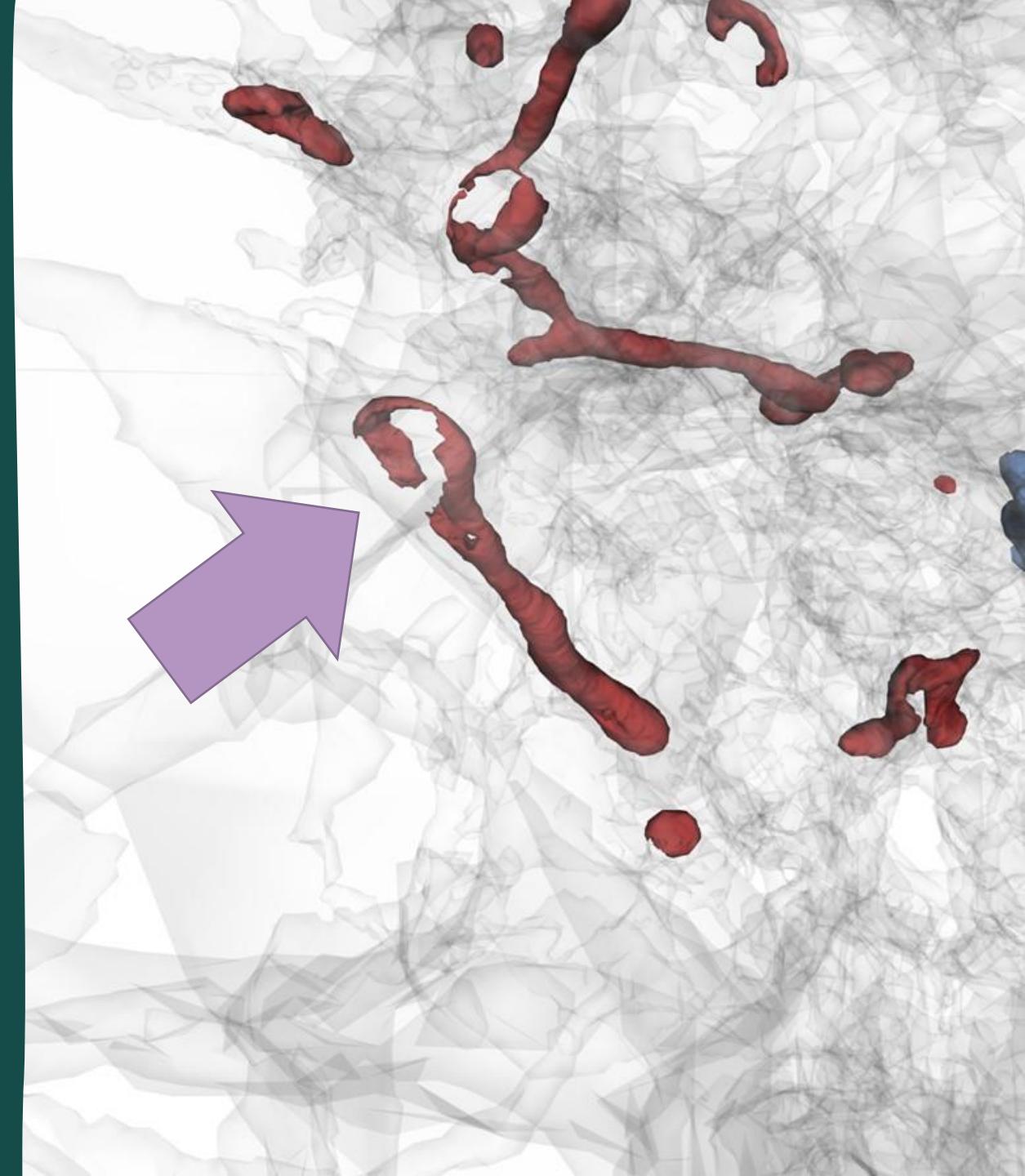


# Inclusion example 1

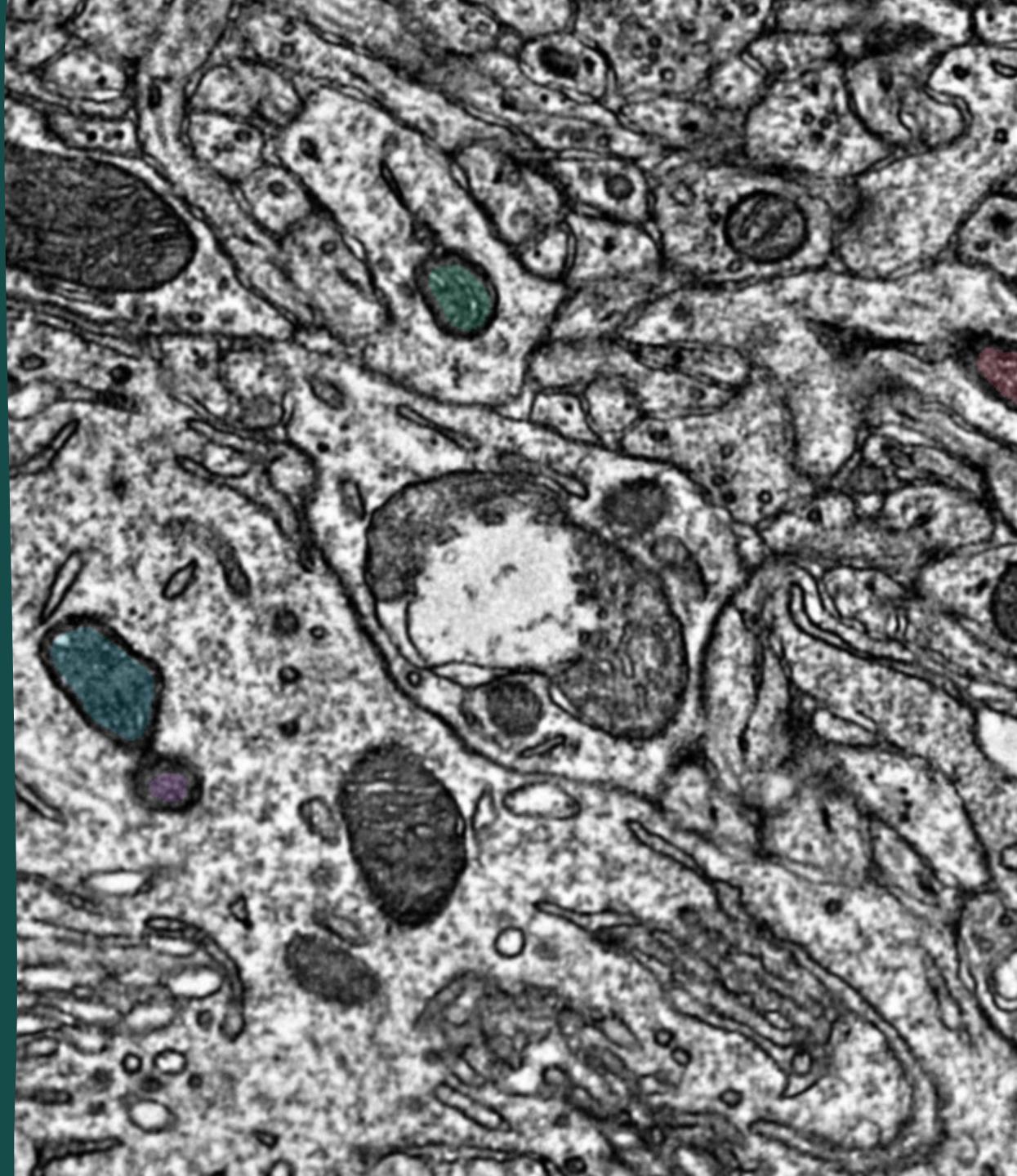
Cellid 648518346341354380

Mitoid 2643657

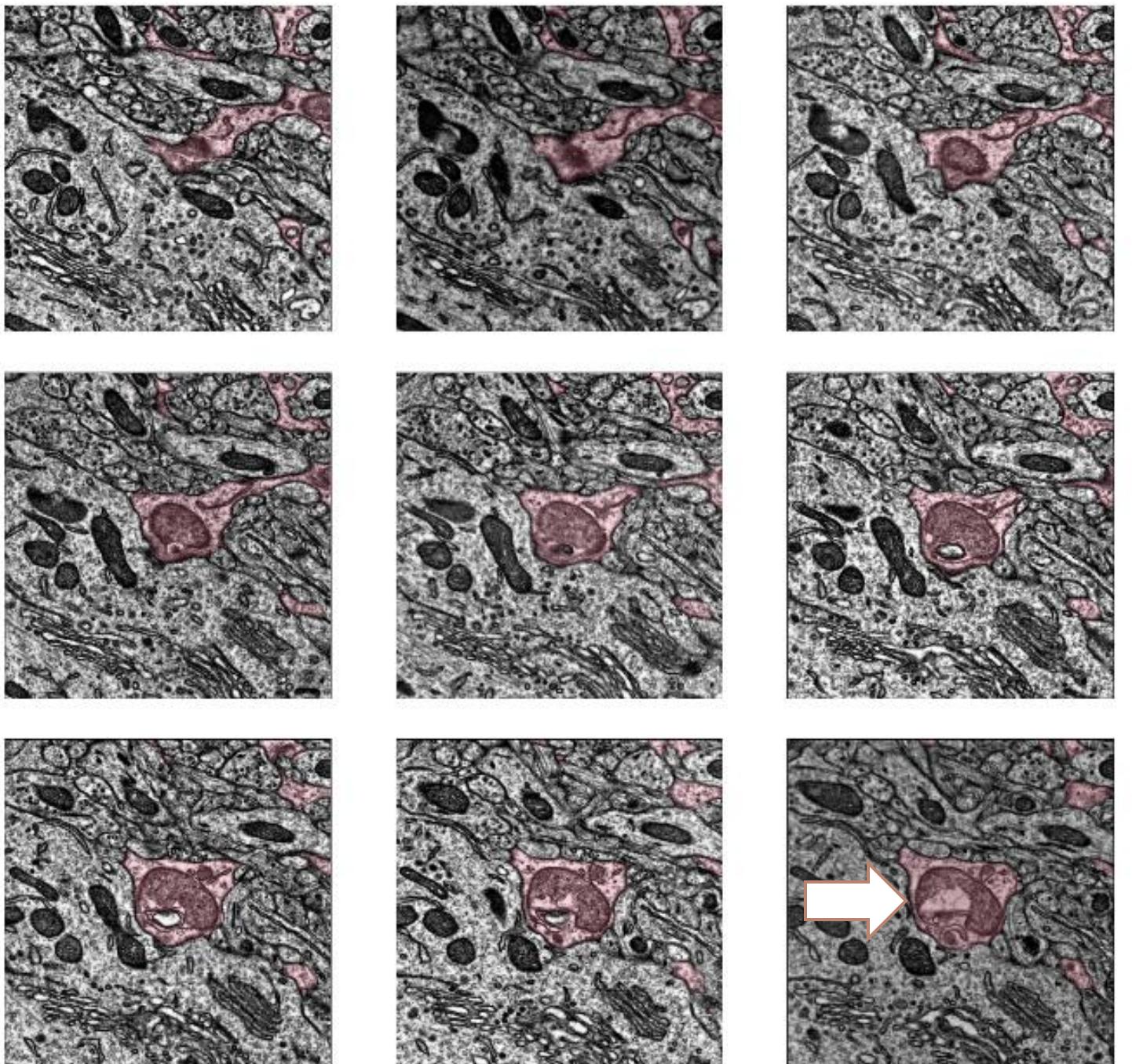
# Mito 2643657



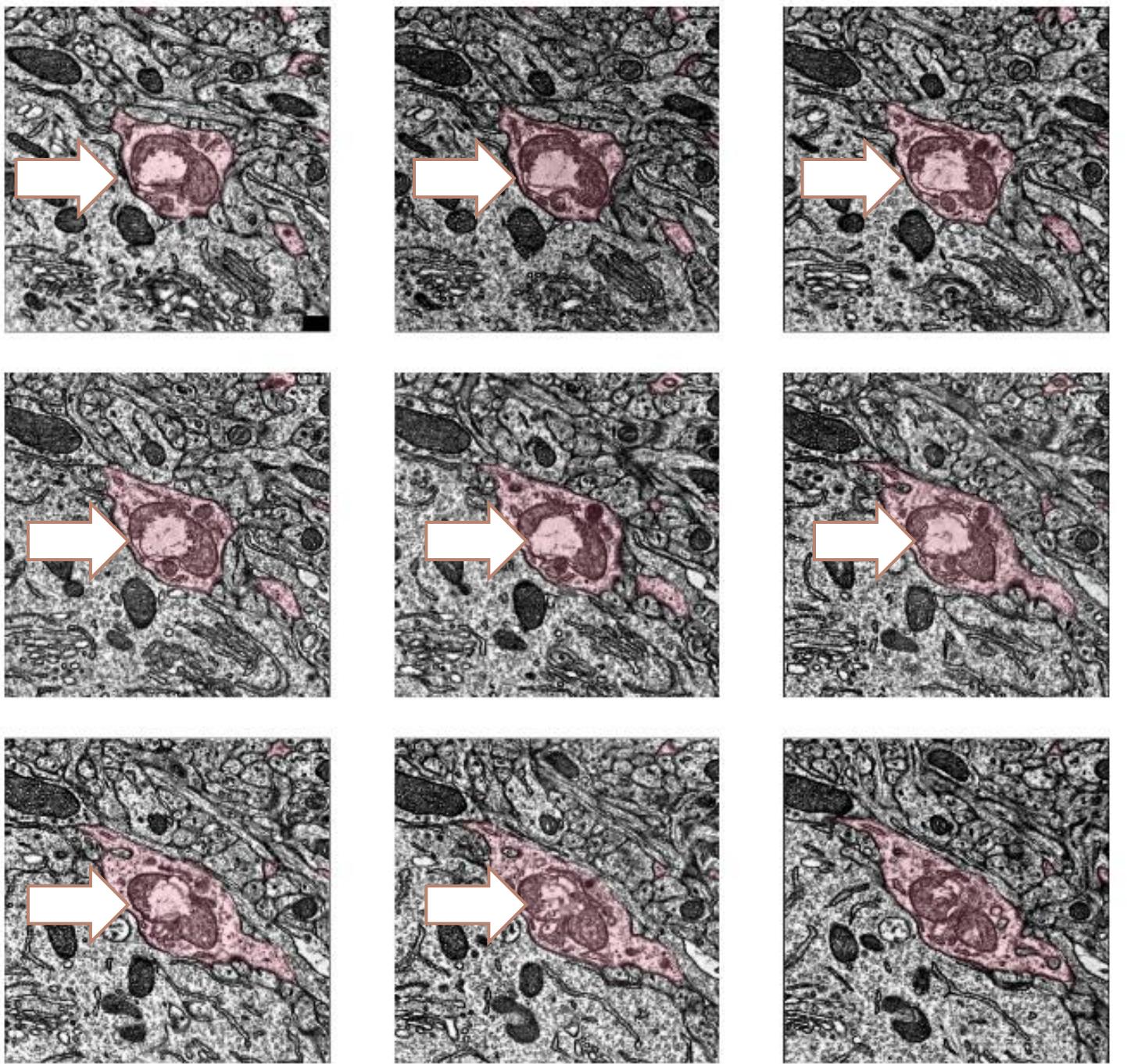
Mito 2643657



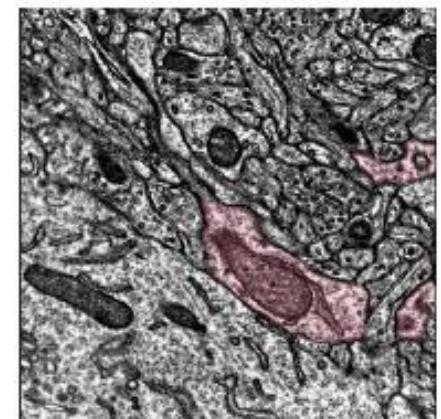
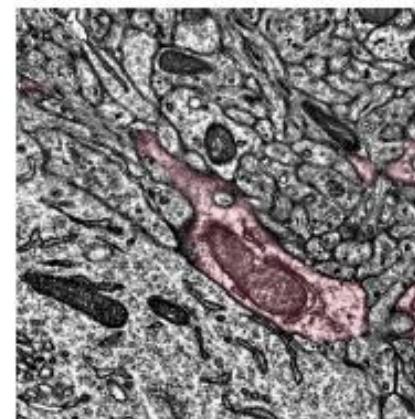
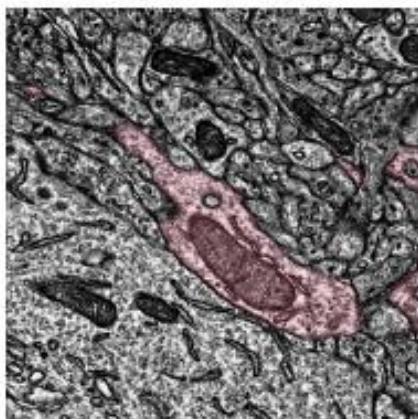
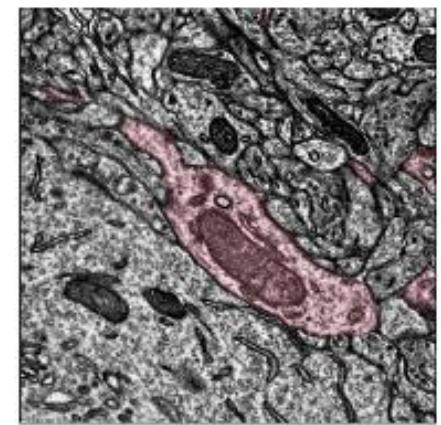
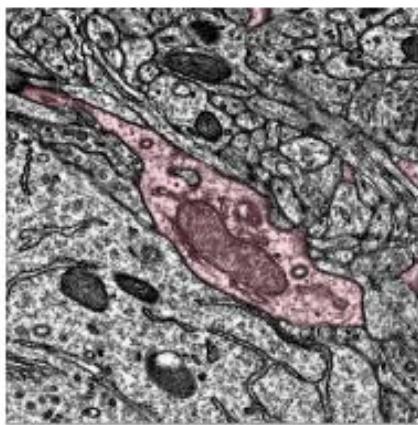
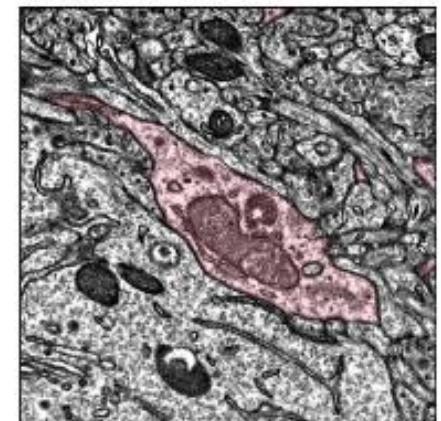
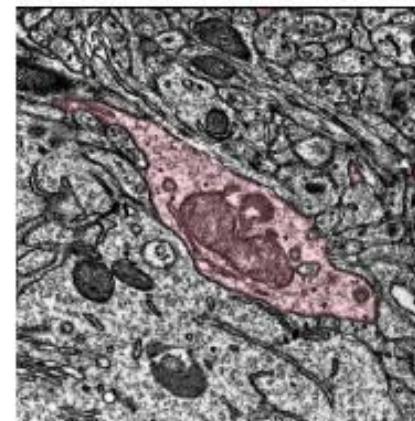
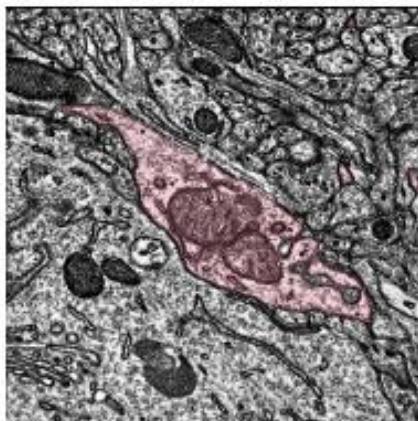
# Mito 2643657



# Mito 2643657



# Mito 2643657



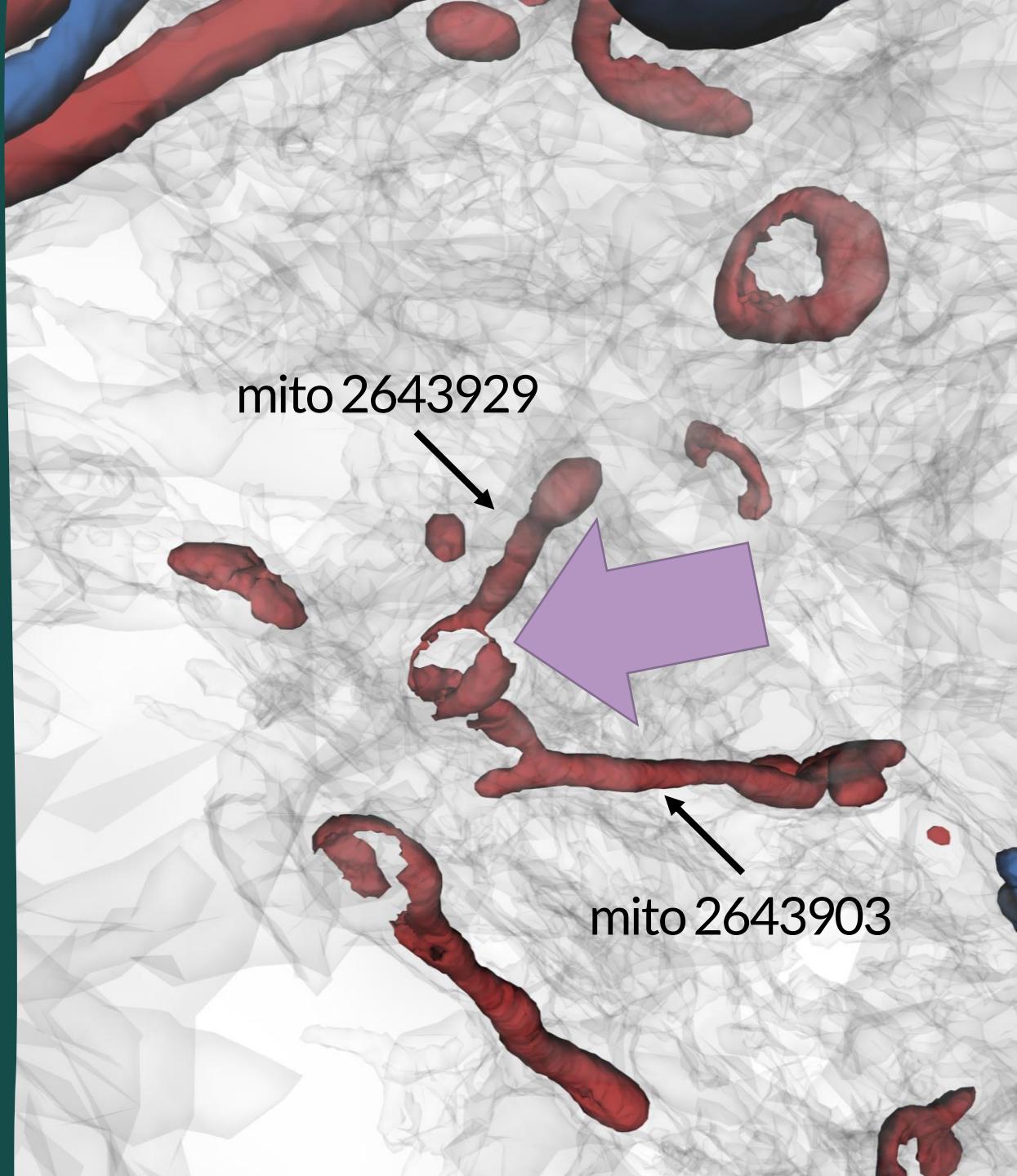
# Inclusion example 2

Cellid 648518346341354380

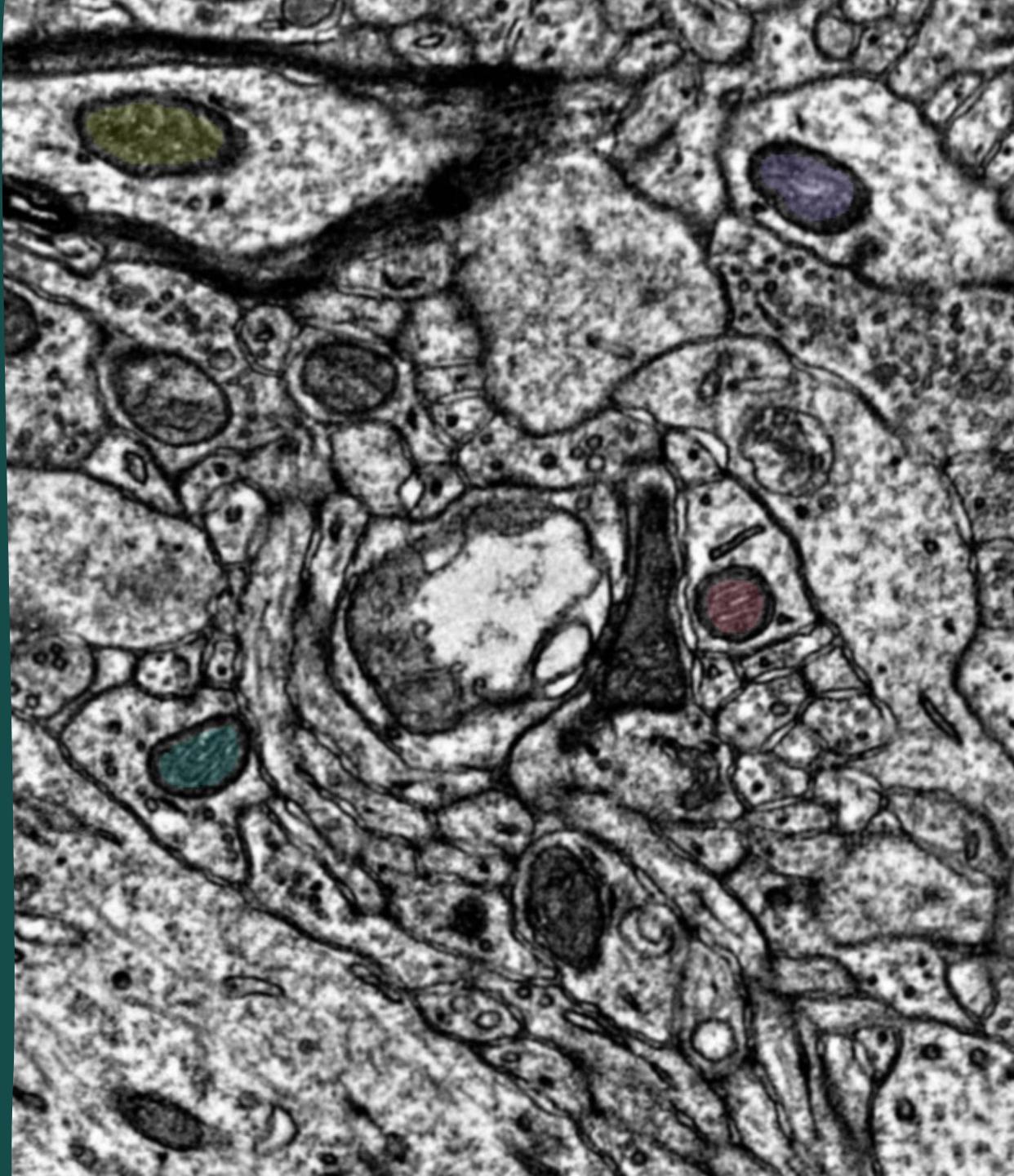
Mitoid 2643929 and 2643903

# Mito 2643929

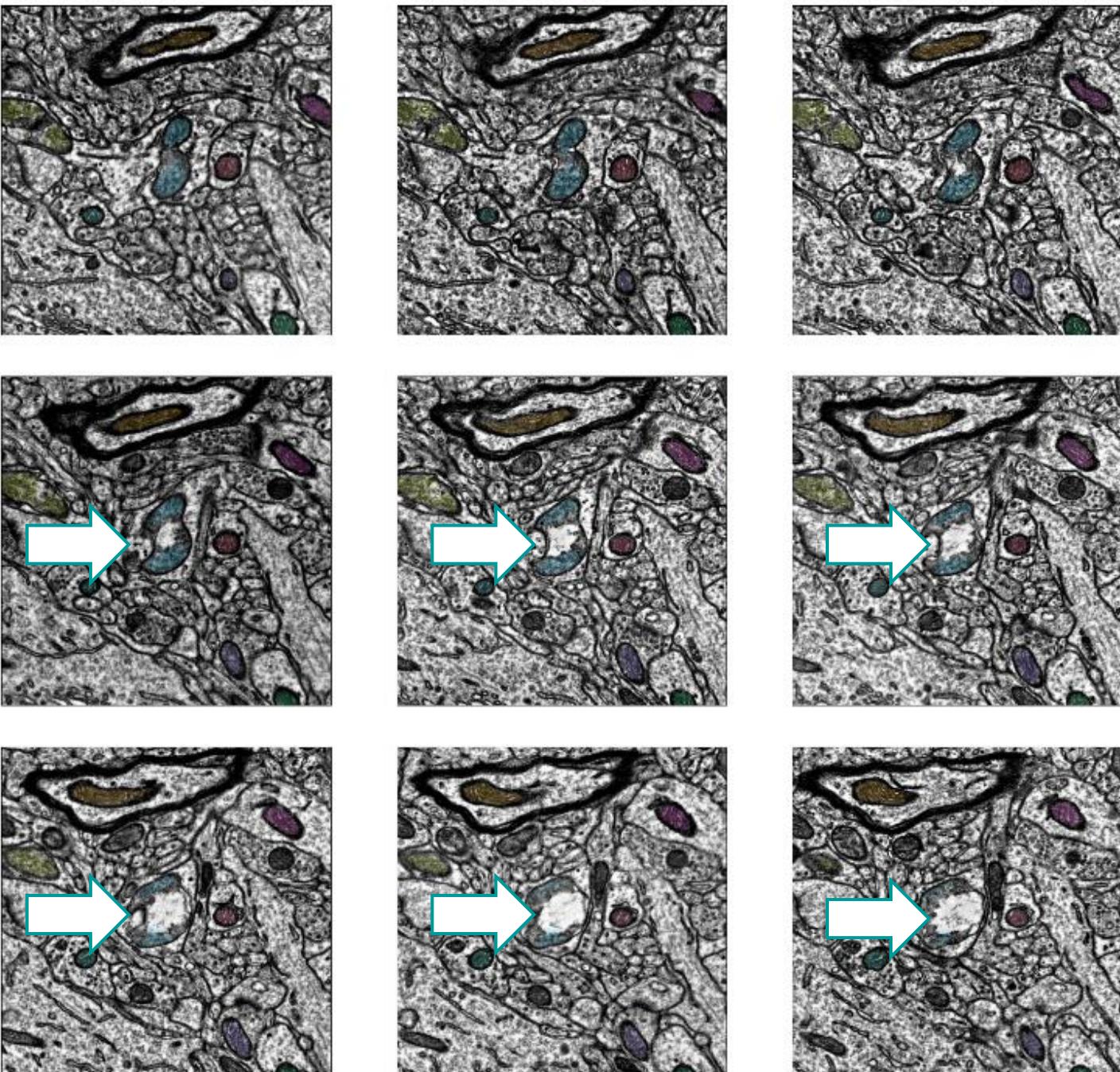
continuous with mito 2643903



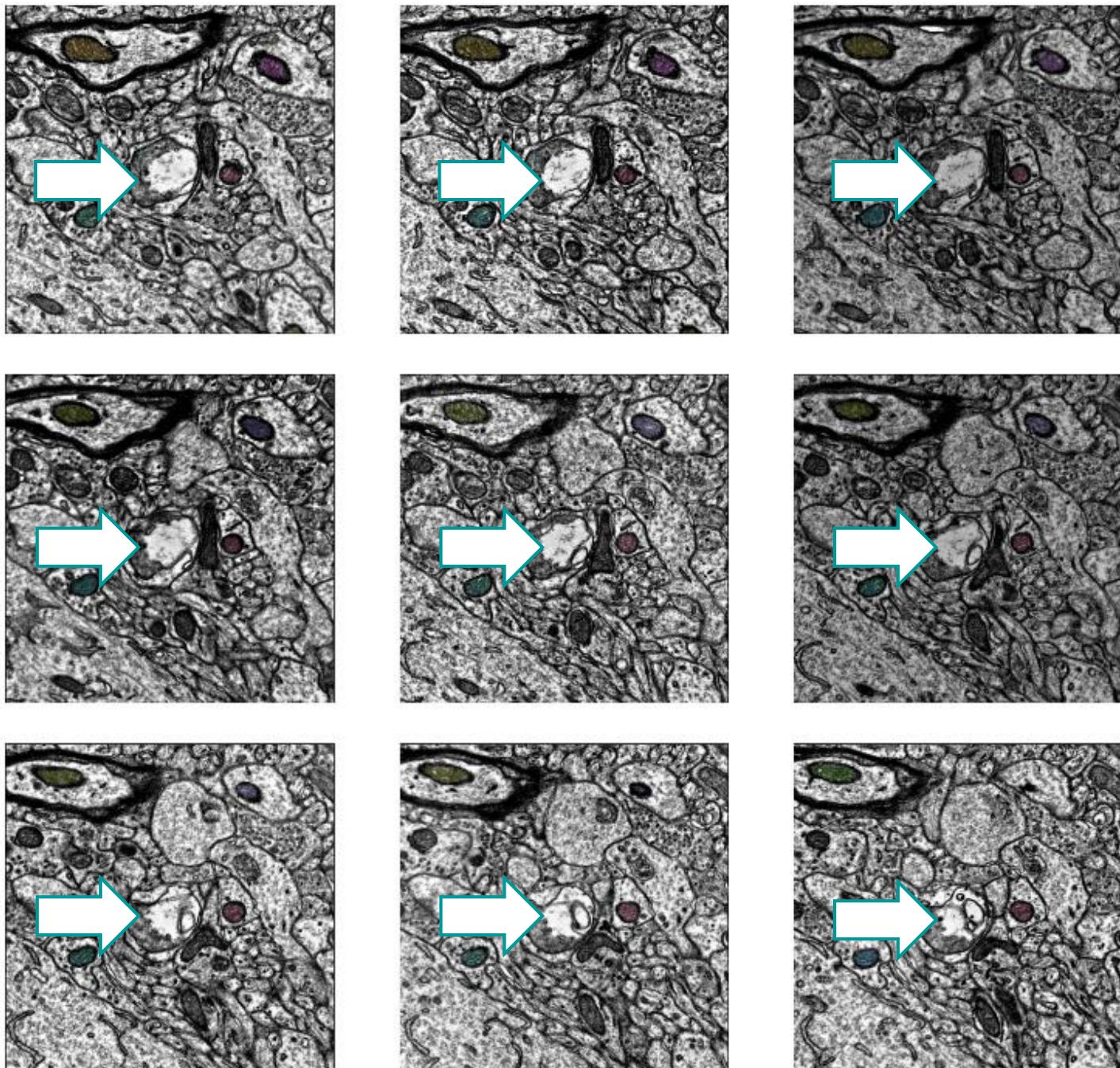
Mito 2643929

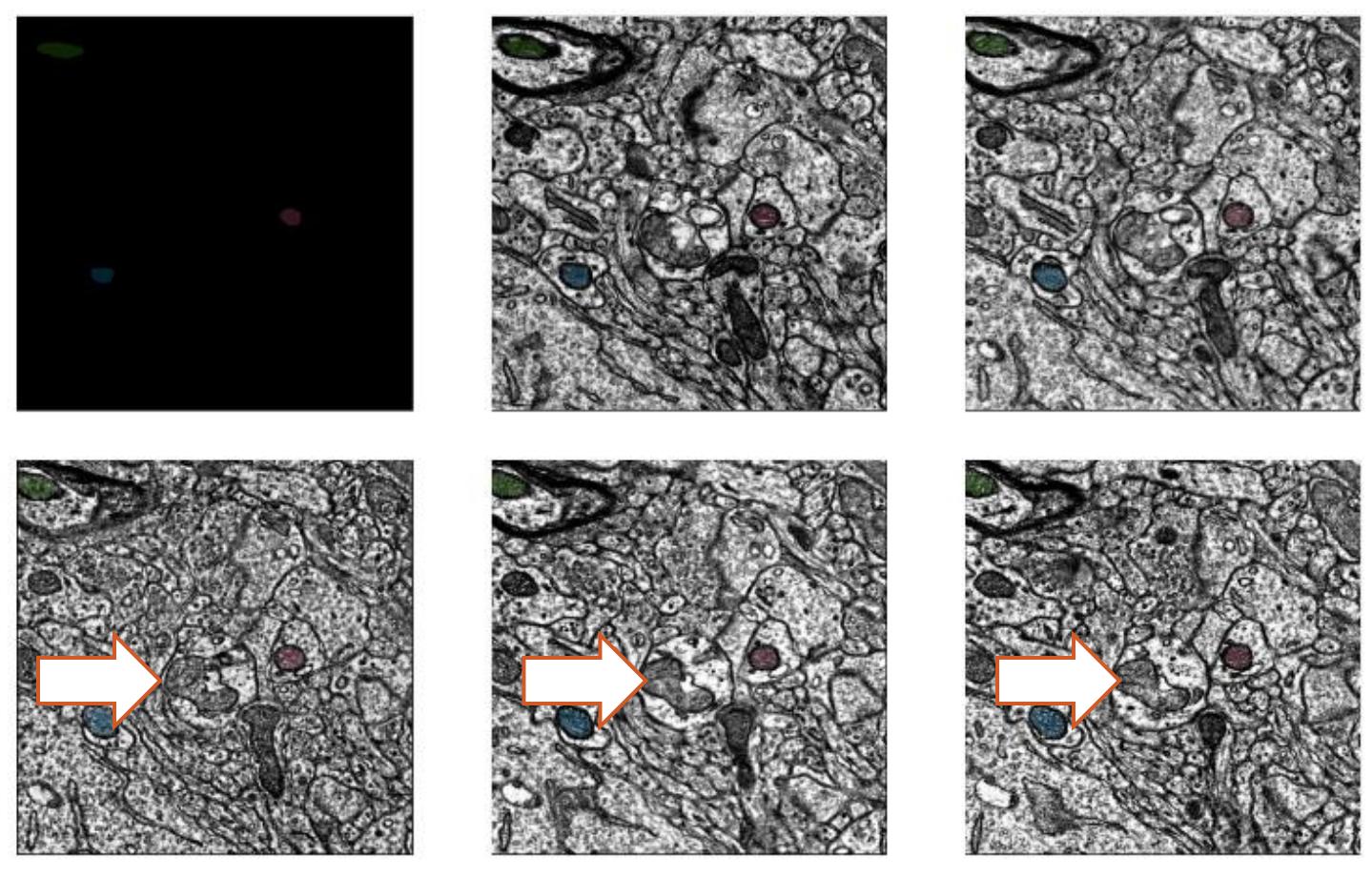


# Mito 2643929



# Mito 2643929





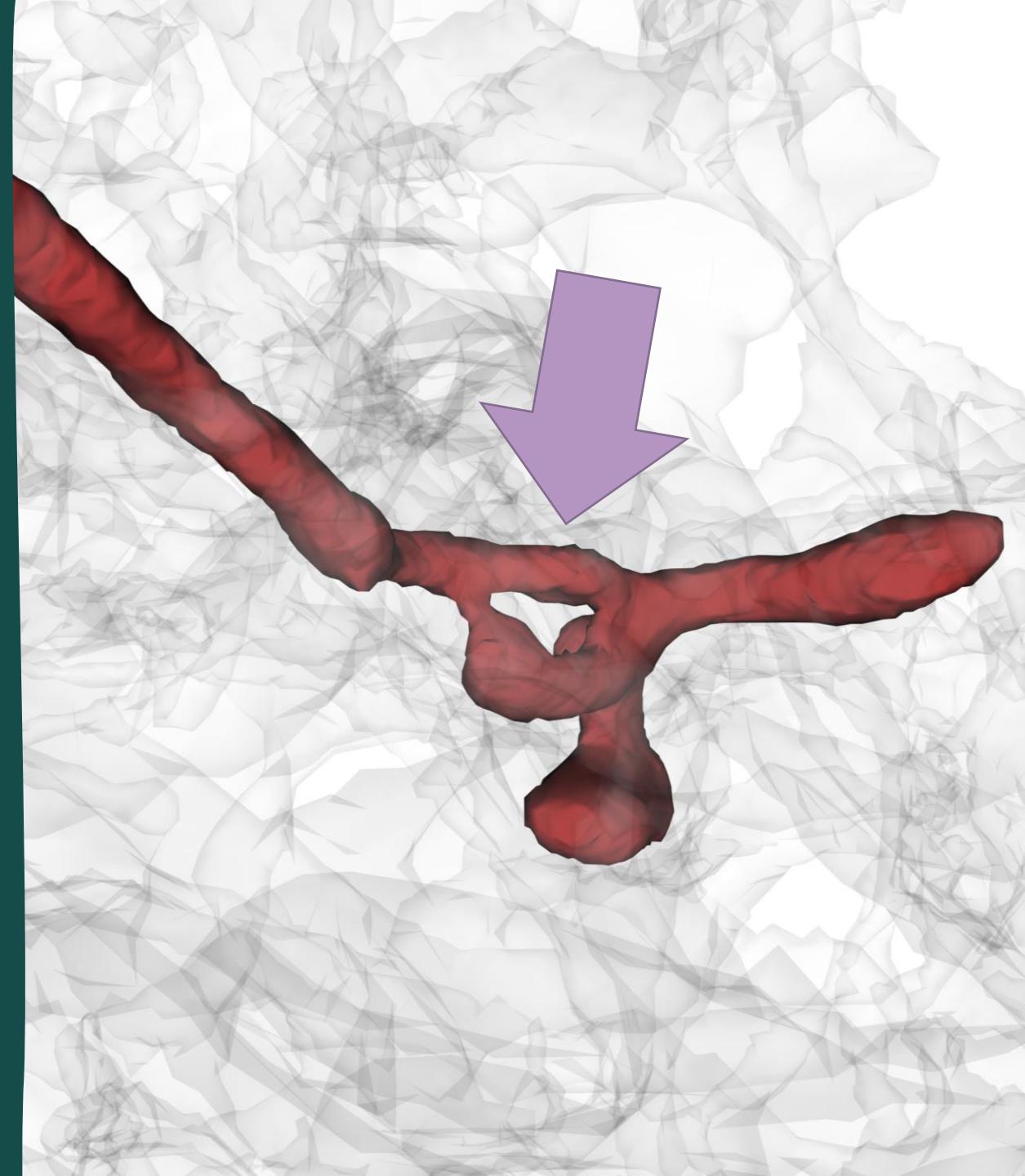
Mito 2643929 is continuous with Mito 2643903  
(the inclusion interrupted the segmentation)

# Inclusion example 3

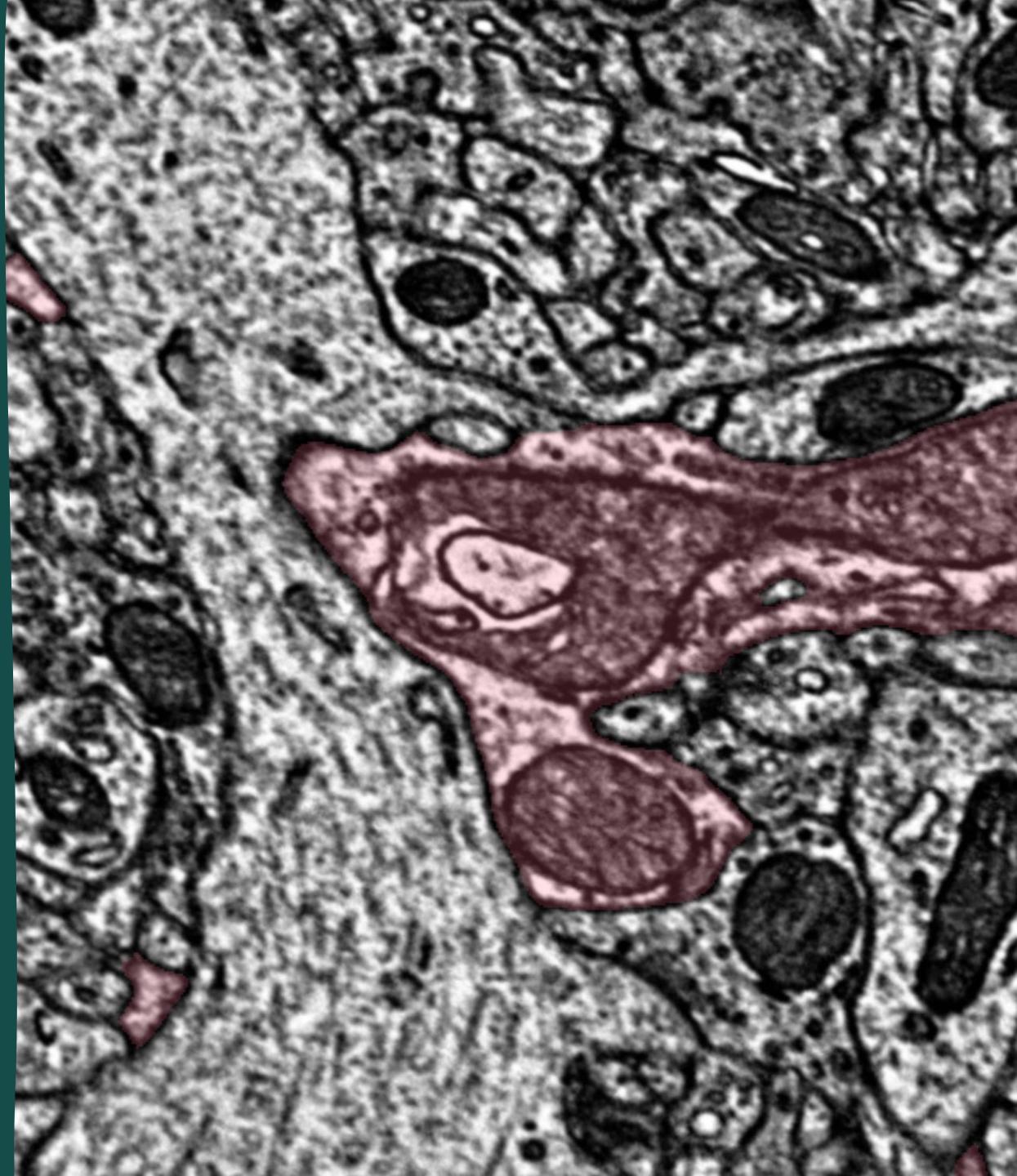
Cellid 648518346341354380

Mitoid 3425723

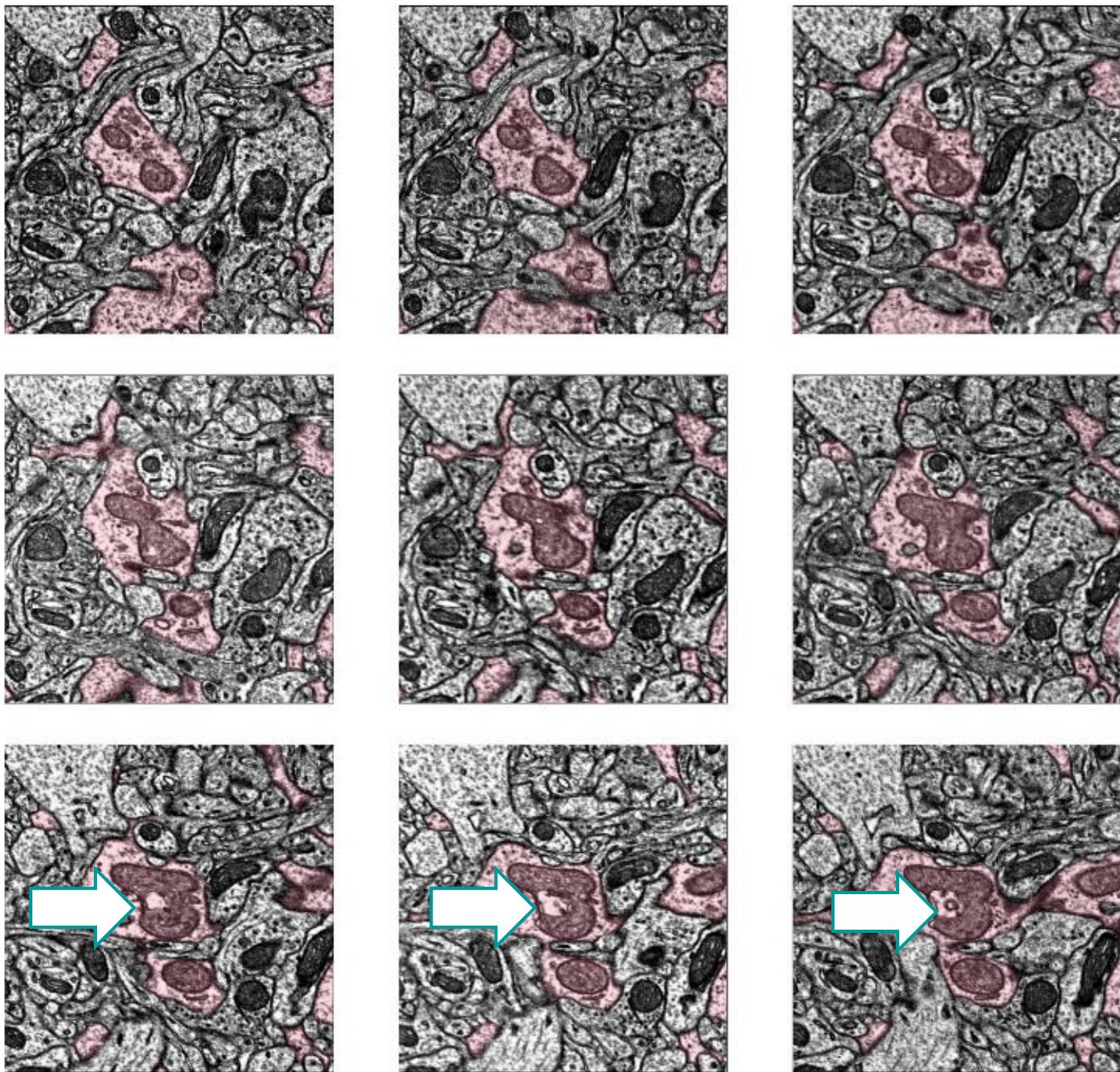
Mito 3425723



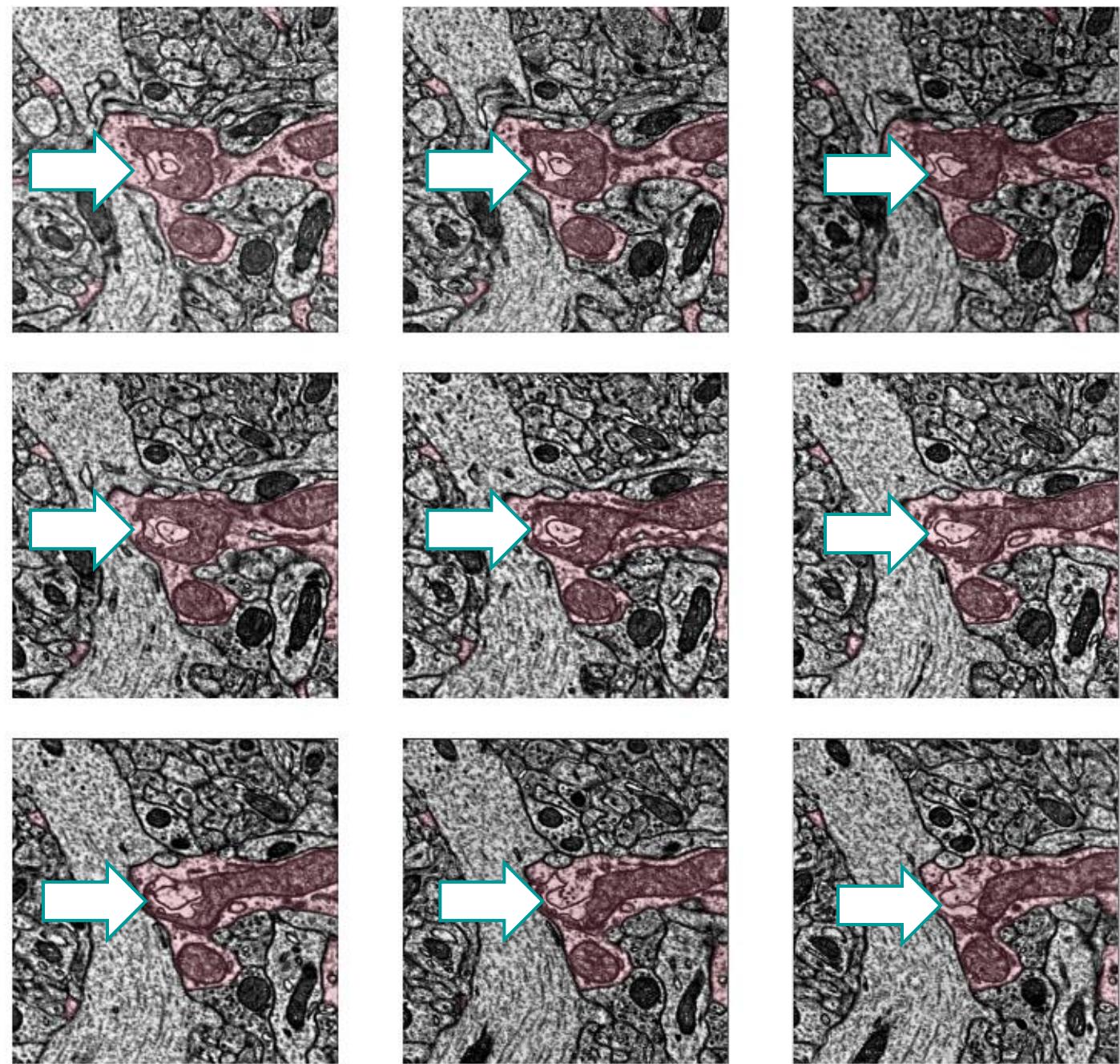
Mito 3425723



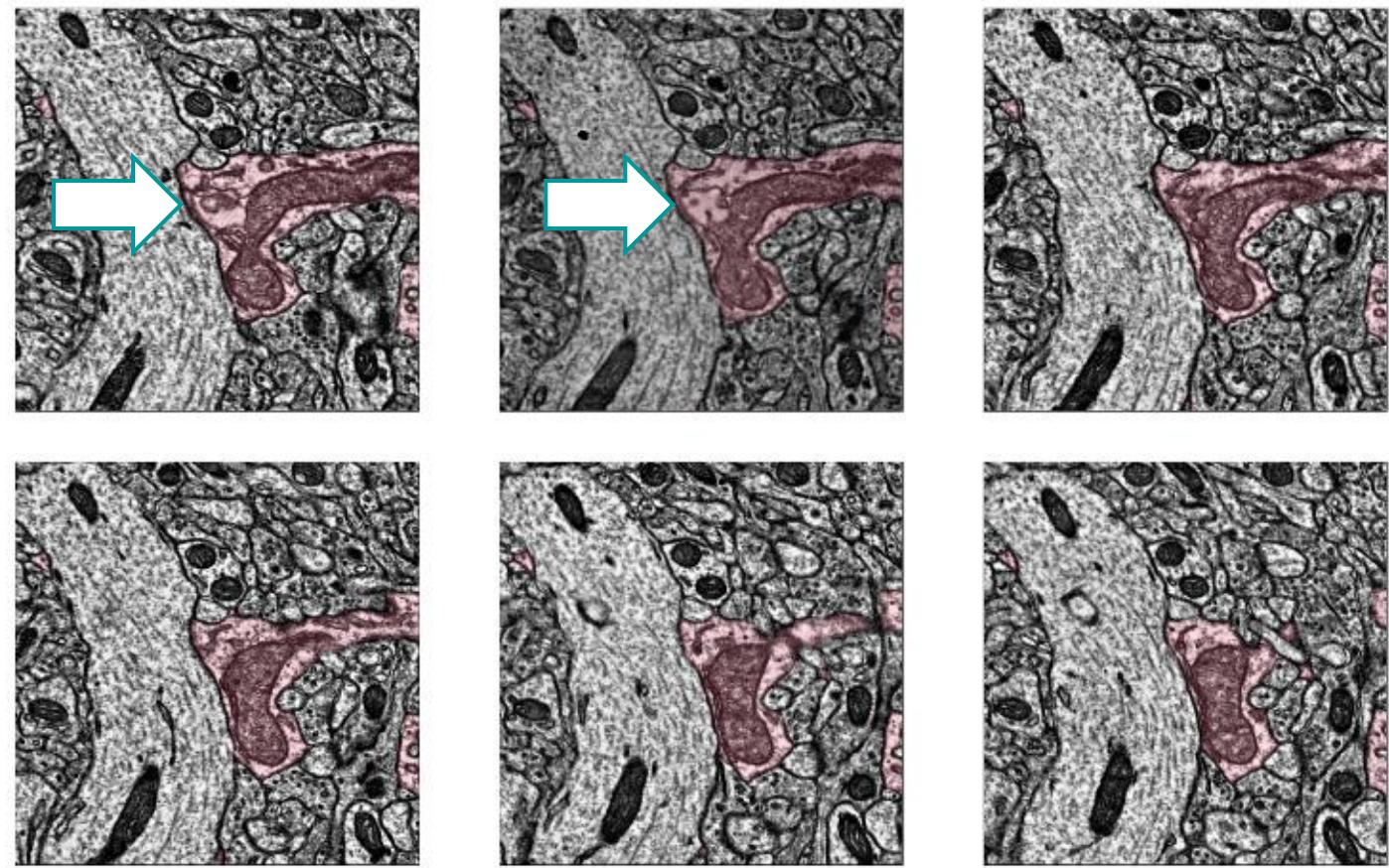
# Mito 3425723



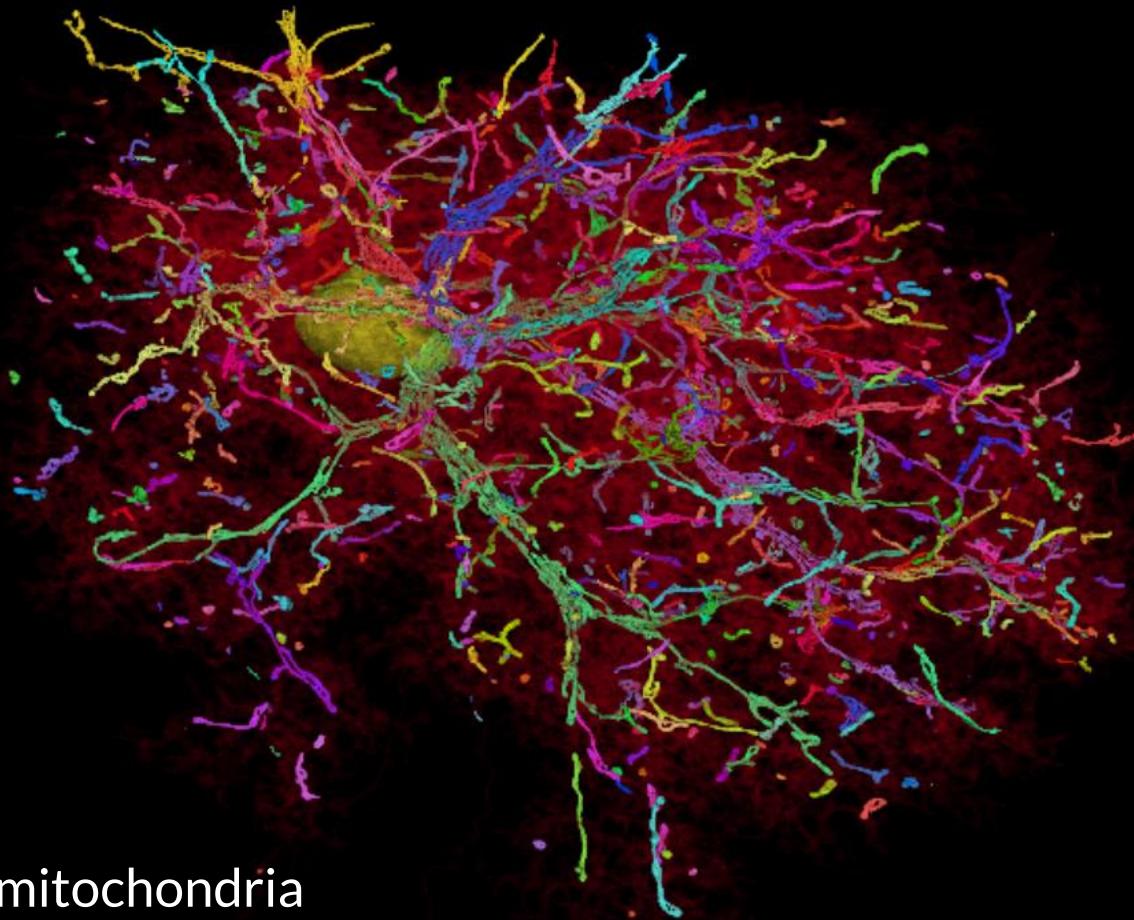
# Mito 3425723



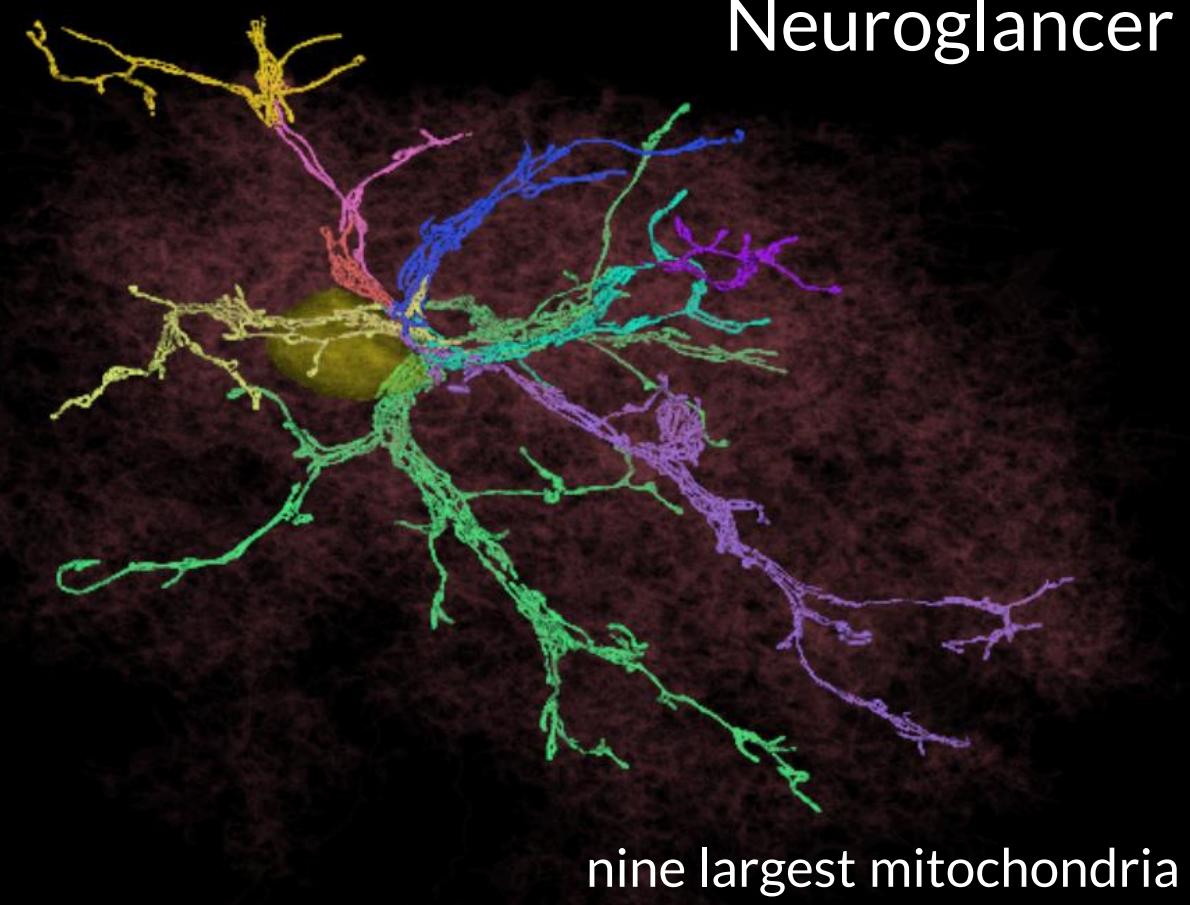
# Mito 3425723



# Astrocyte 648518346349527319



all mitochondria



Neuroglancer

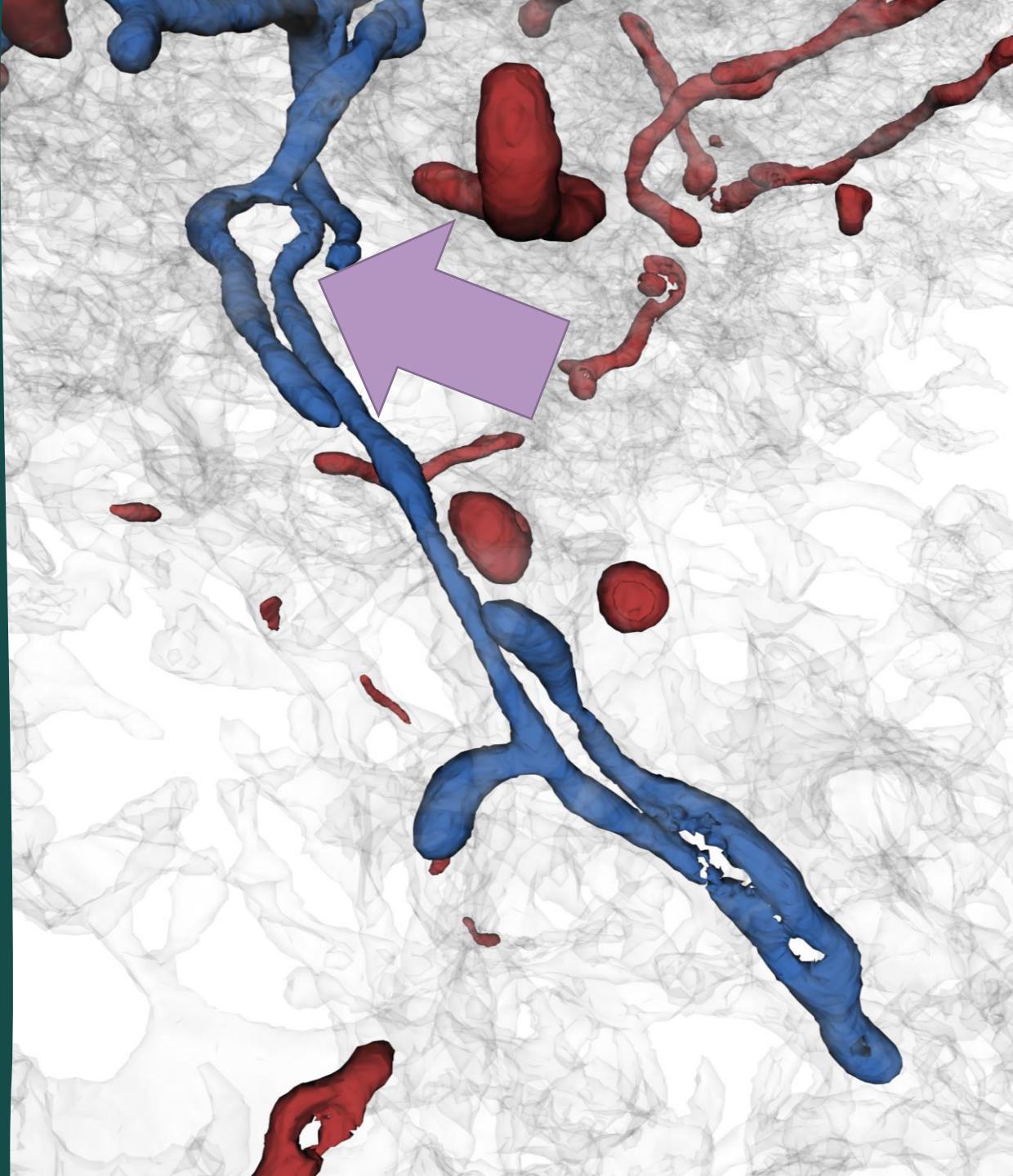
nine largest mitochondria

# Inclusion example 4

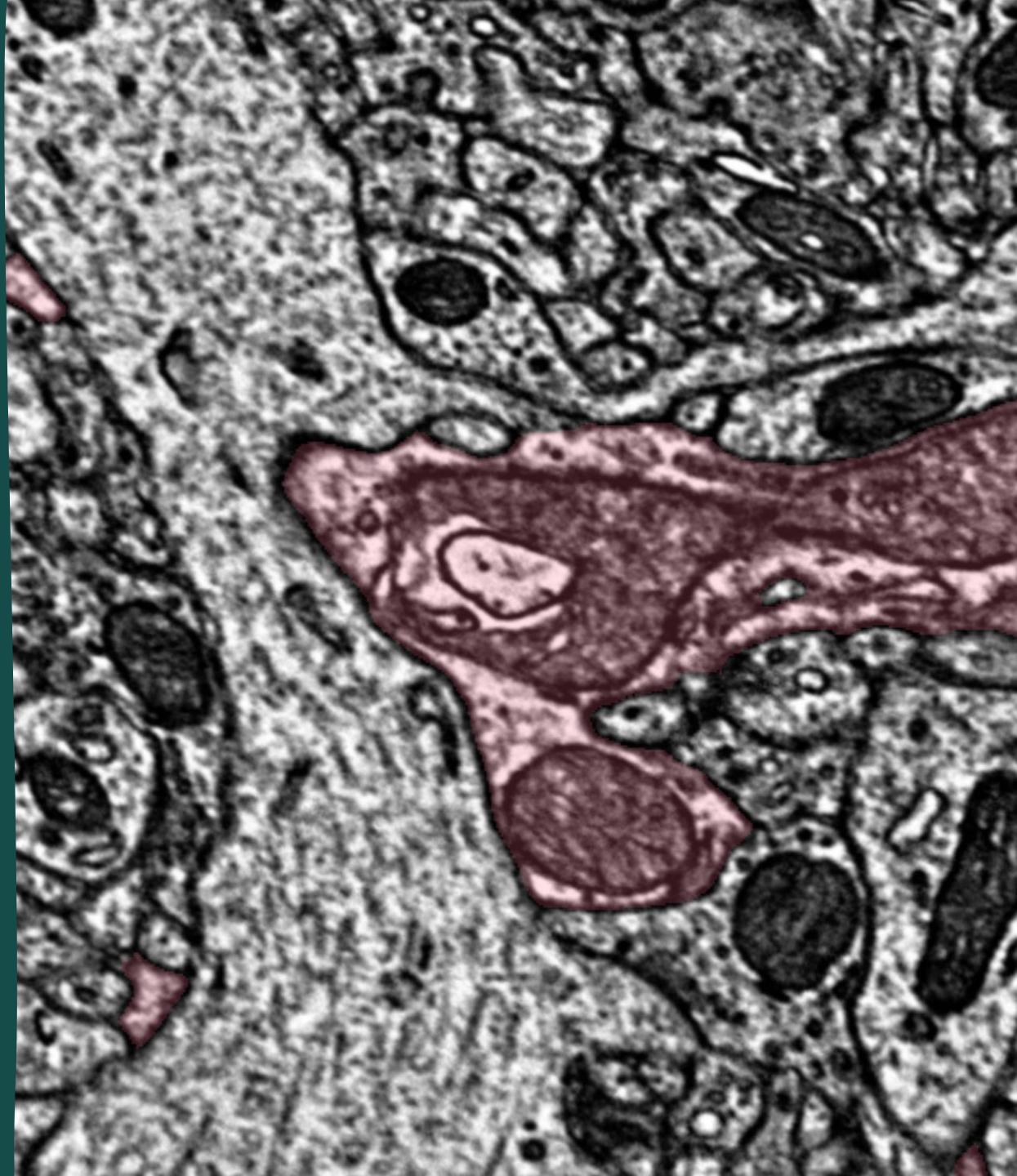
Cellid 648518346349527319

Mitoid 980814

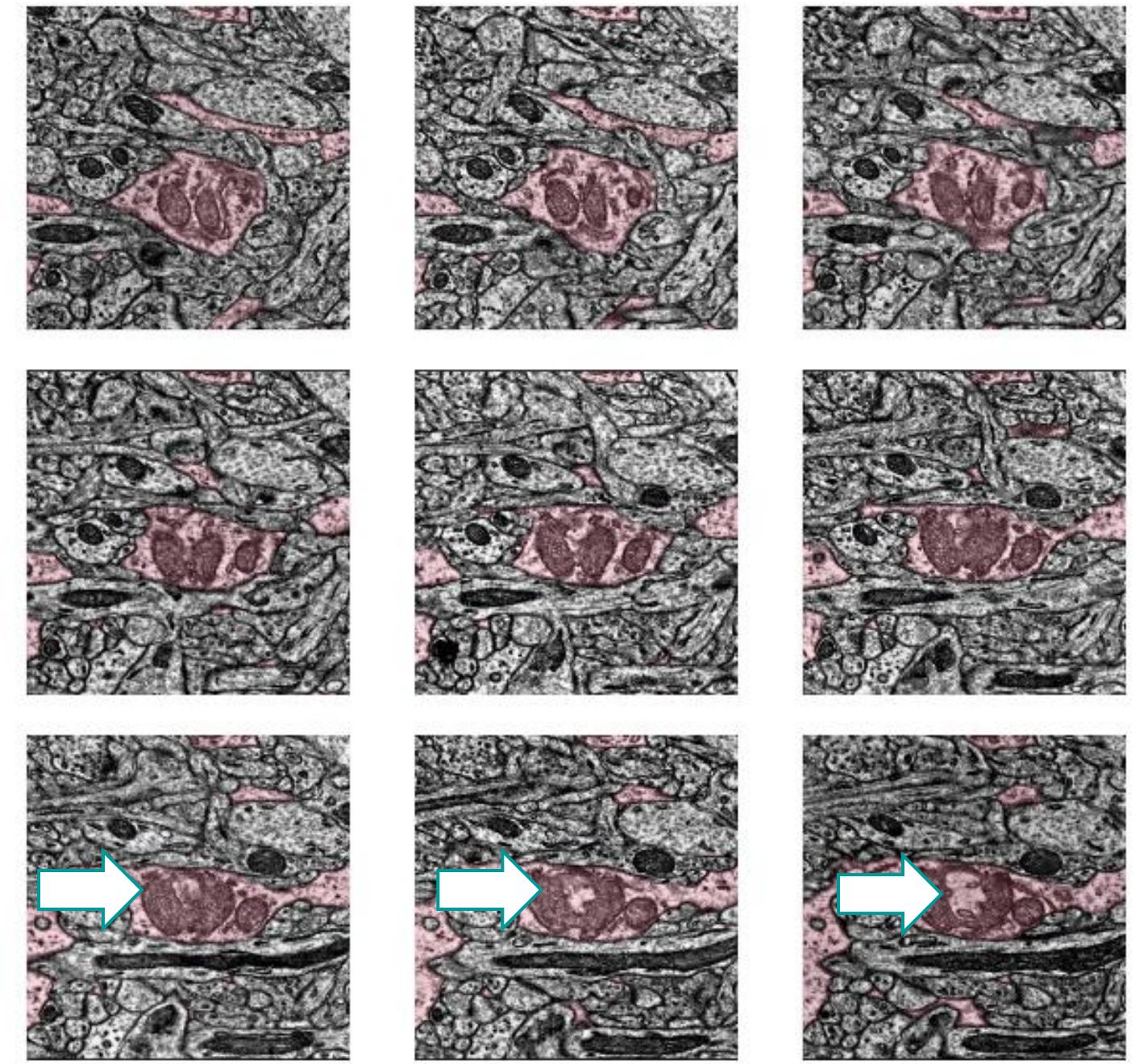
# Mito 980814



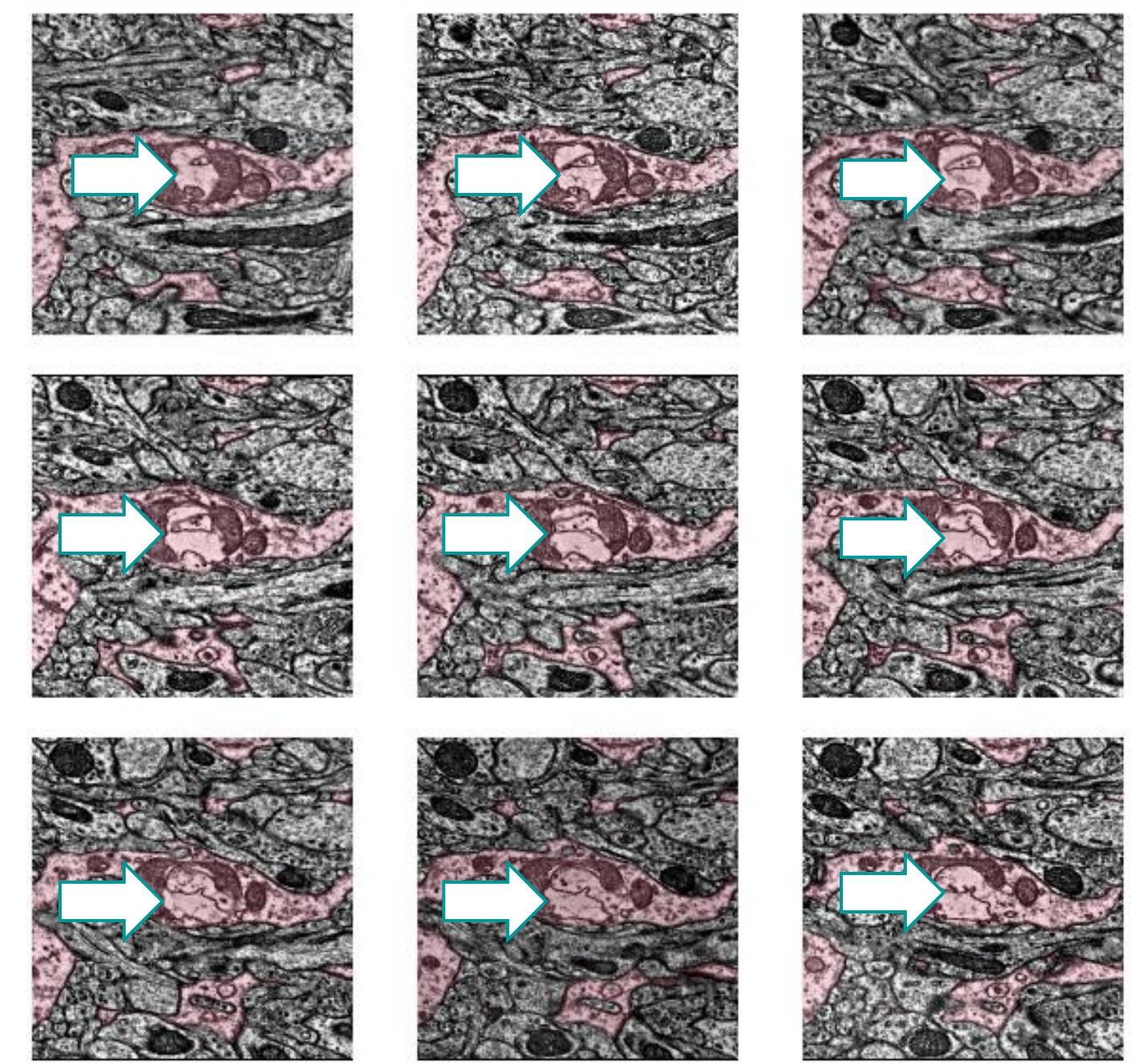
Mito 980814



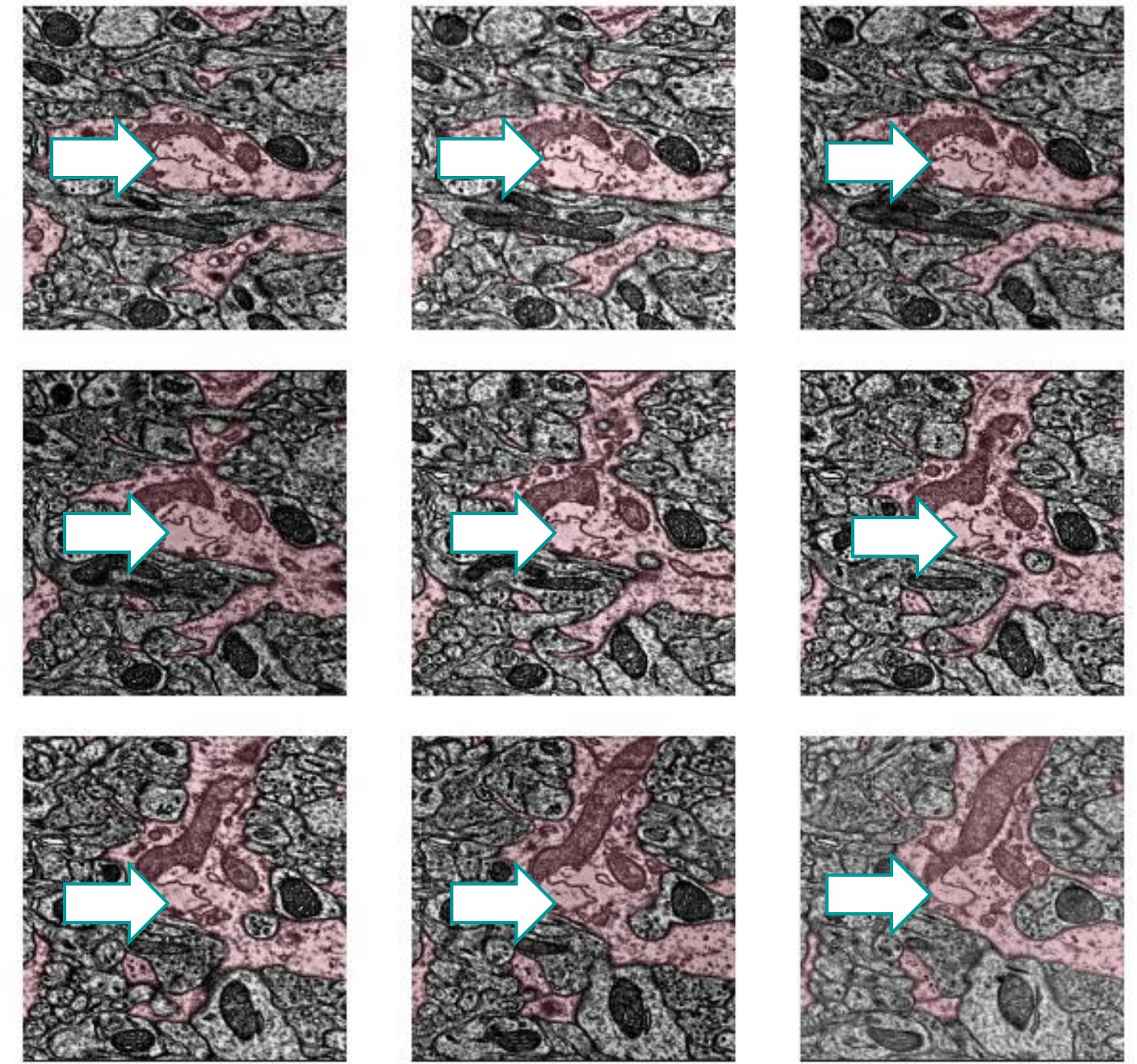
# Mito 980814



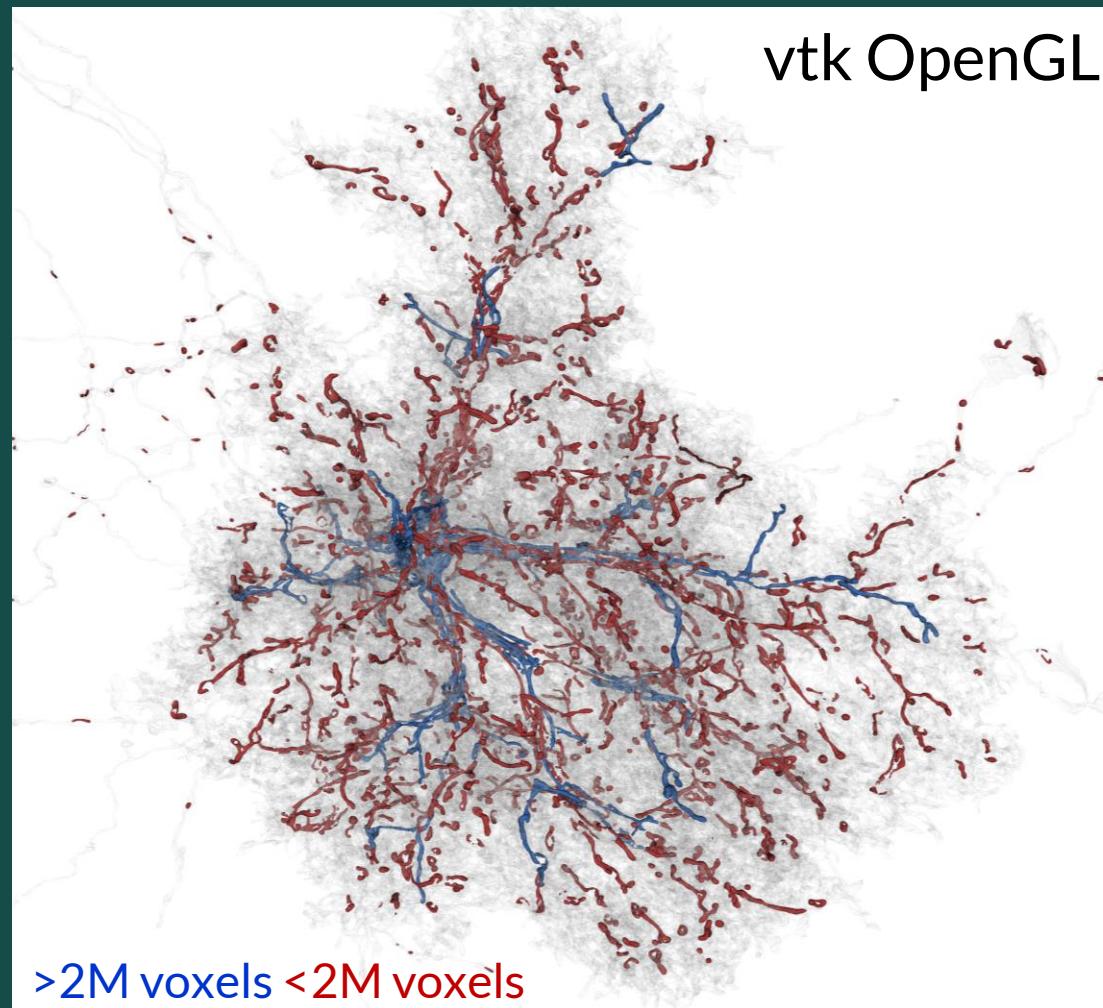
# Mito 980814



# Mito 980814



# Astrocyte 648518346349538089

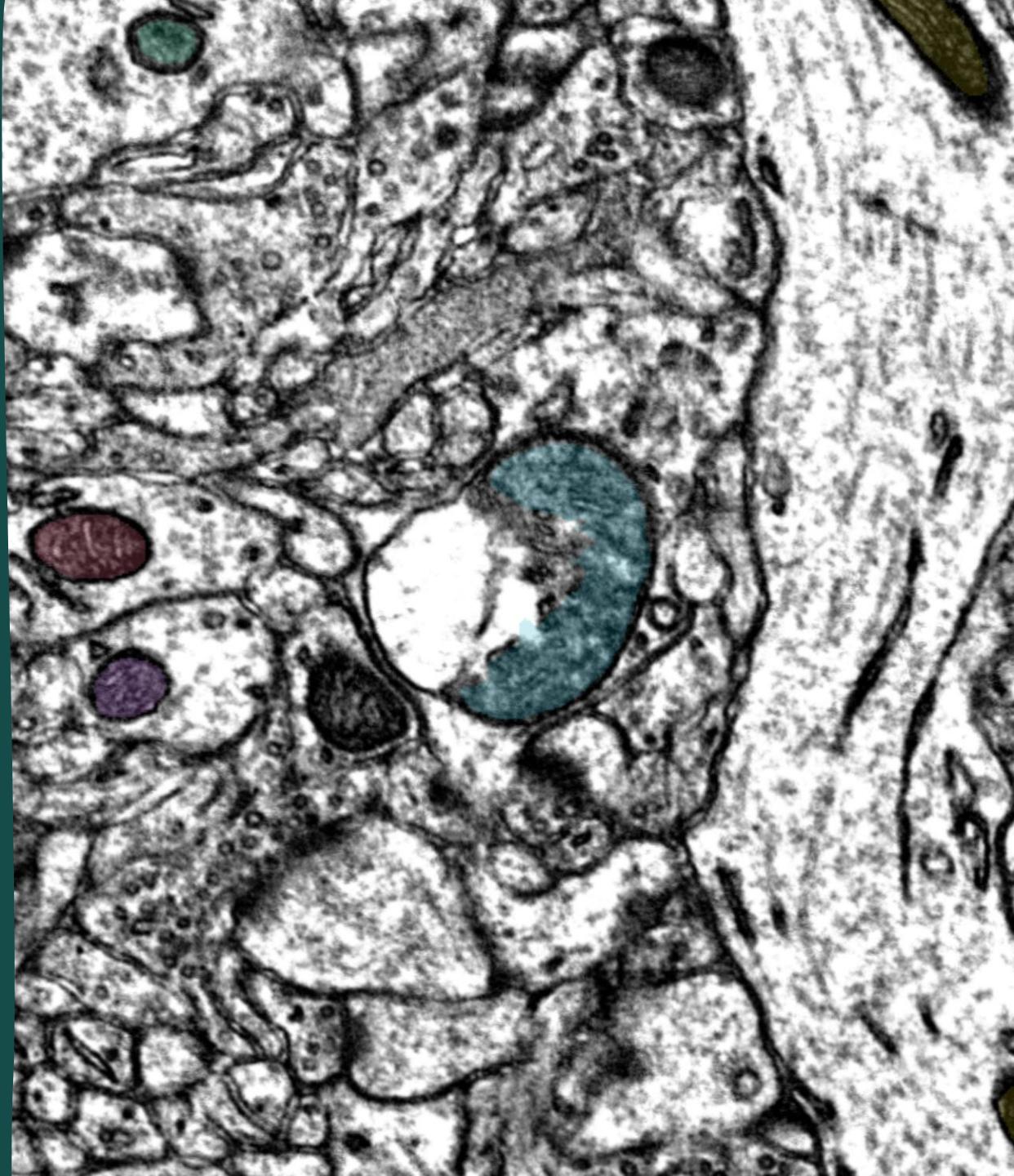


# Inclusion example 5

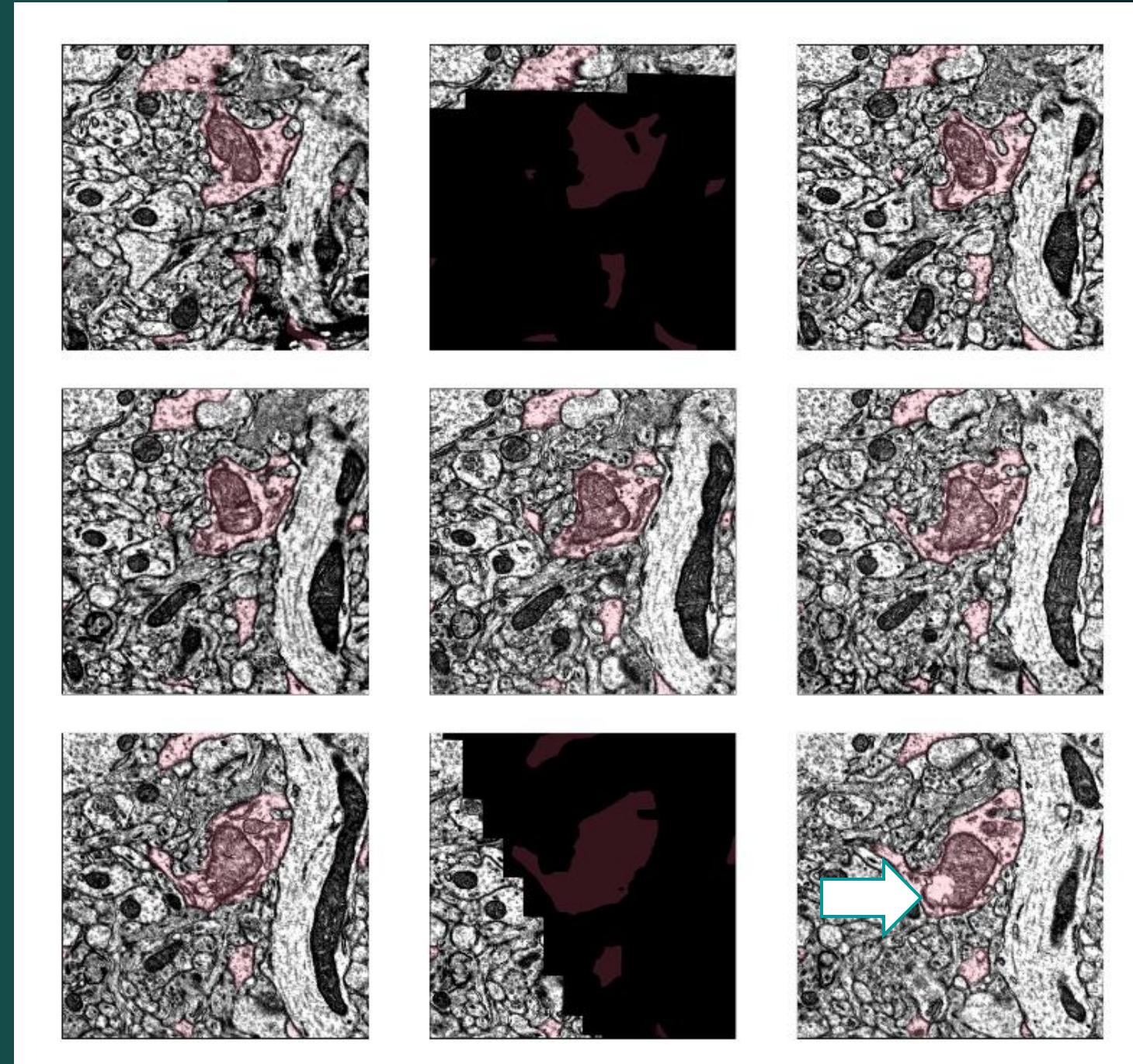
Cellid 648518346349538089

Mitoid 2528399

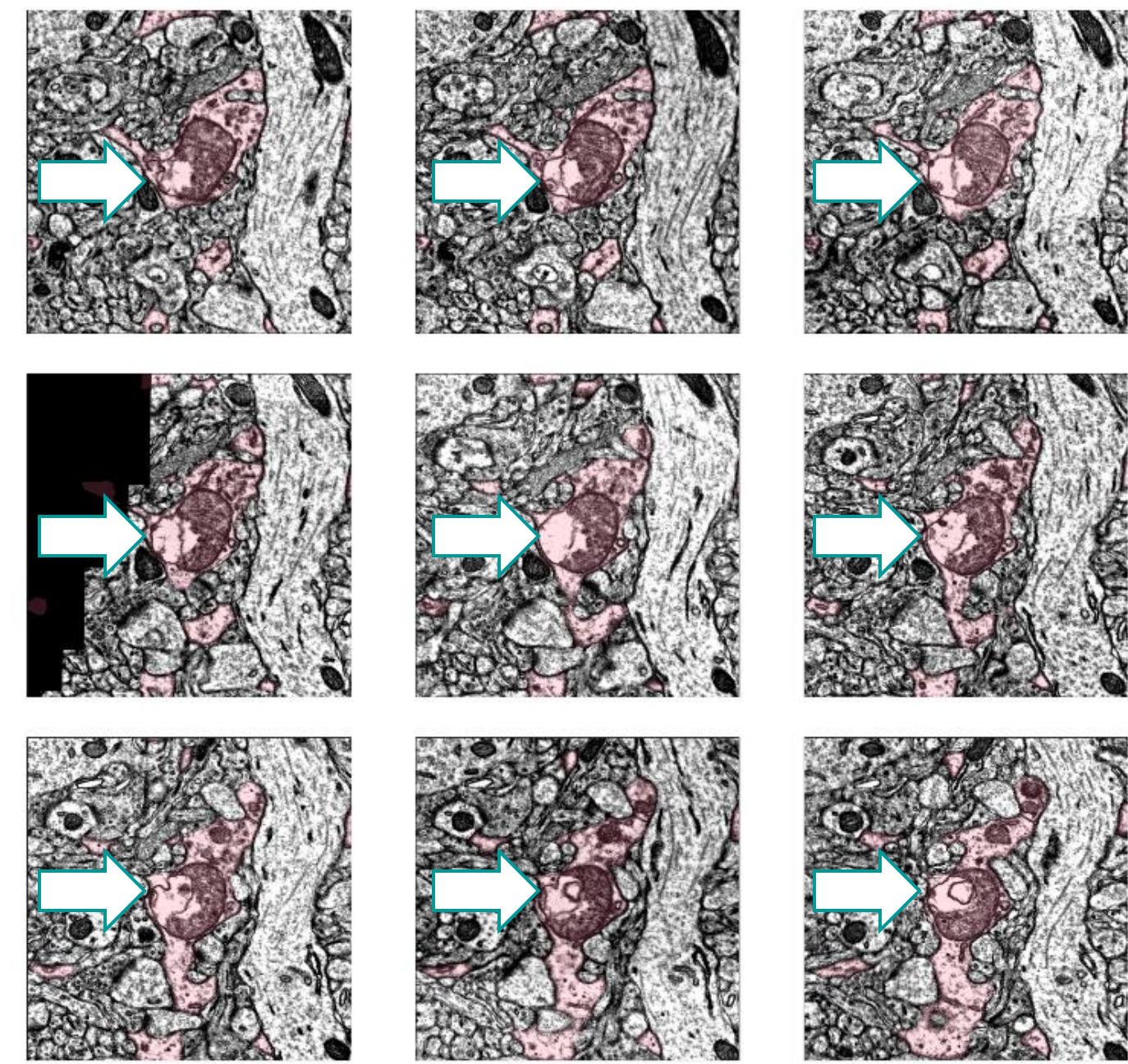
Mito 2528399



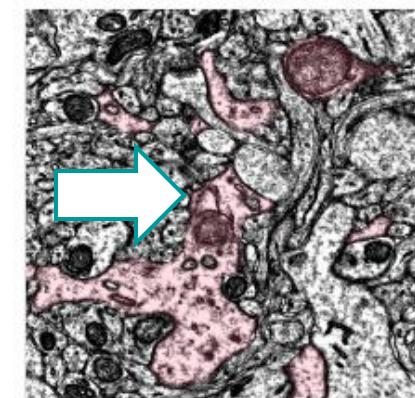
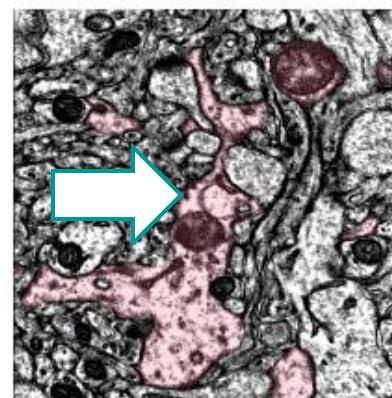
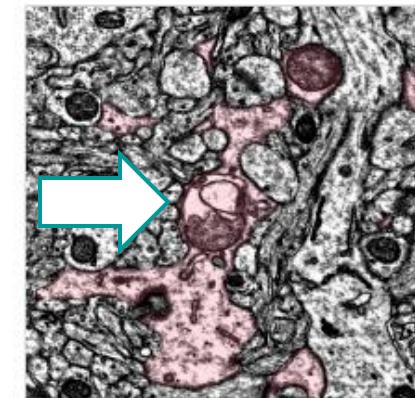
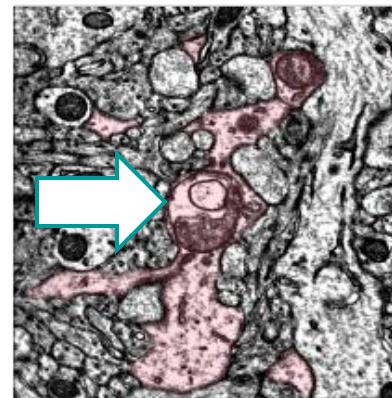
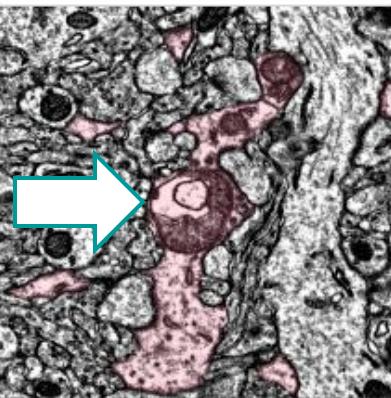
# Mito 2528399



# Mito 2528399



# Mito 2528399

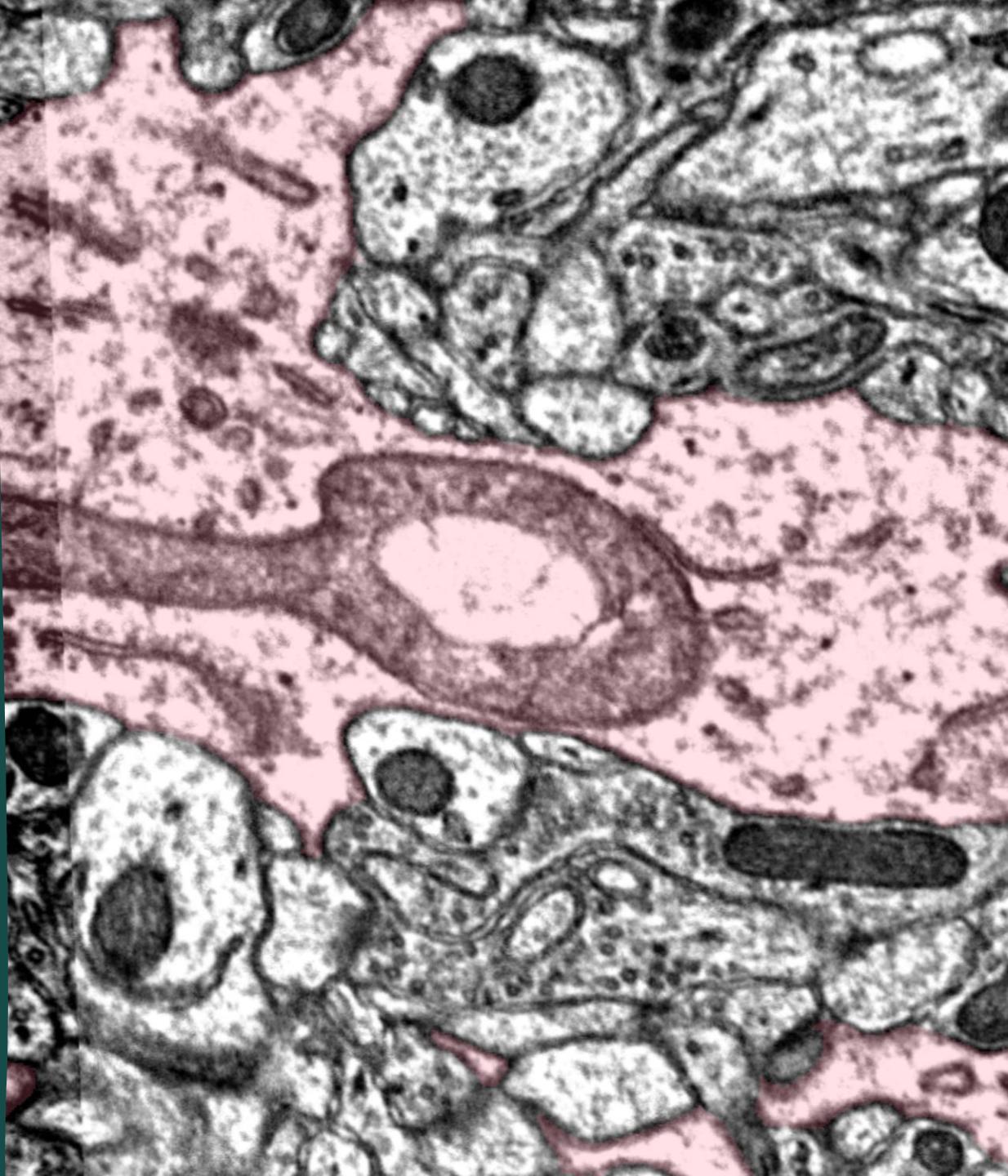


# Inclusion example 6

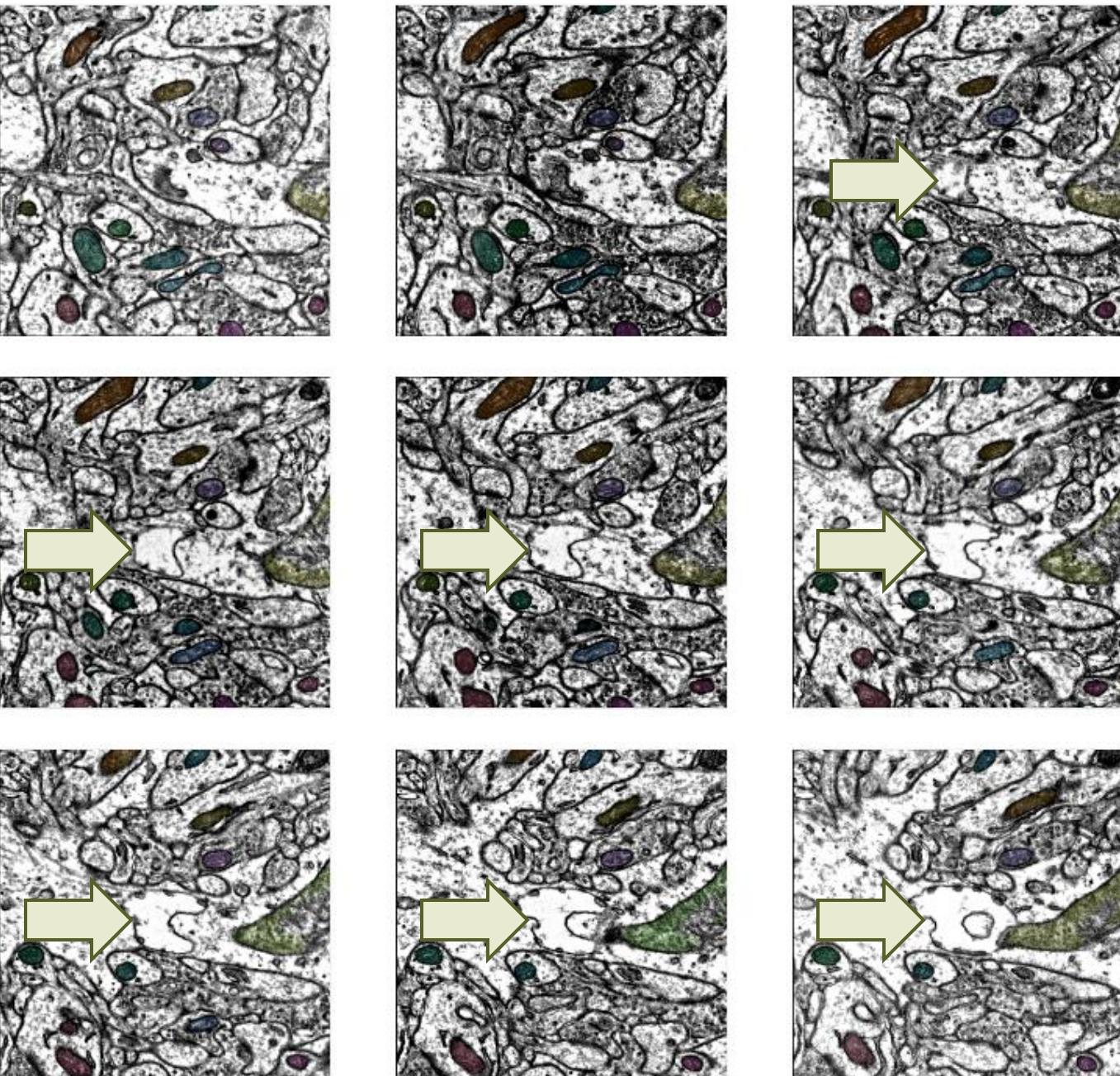
Cellid 648518346349538089

Mitoid 2646319

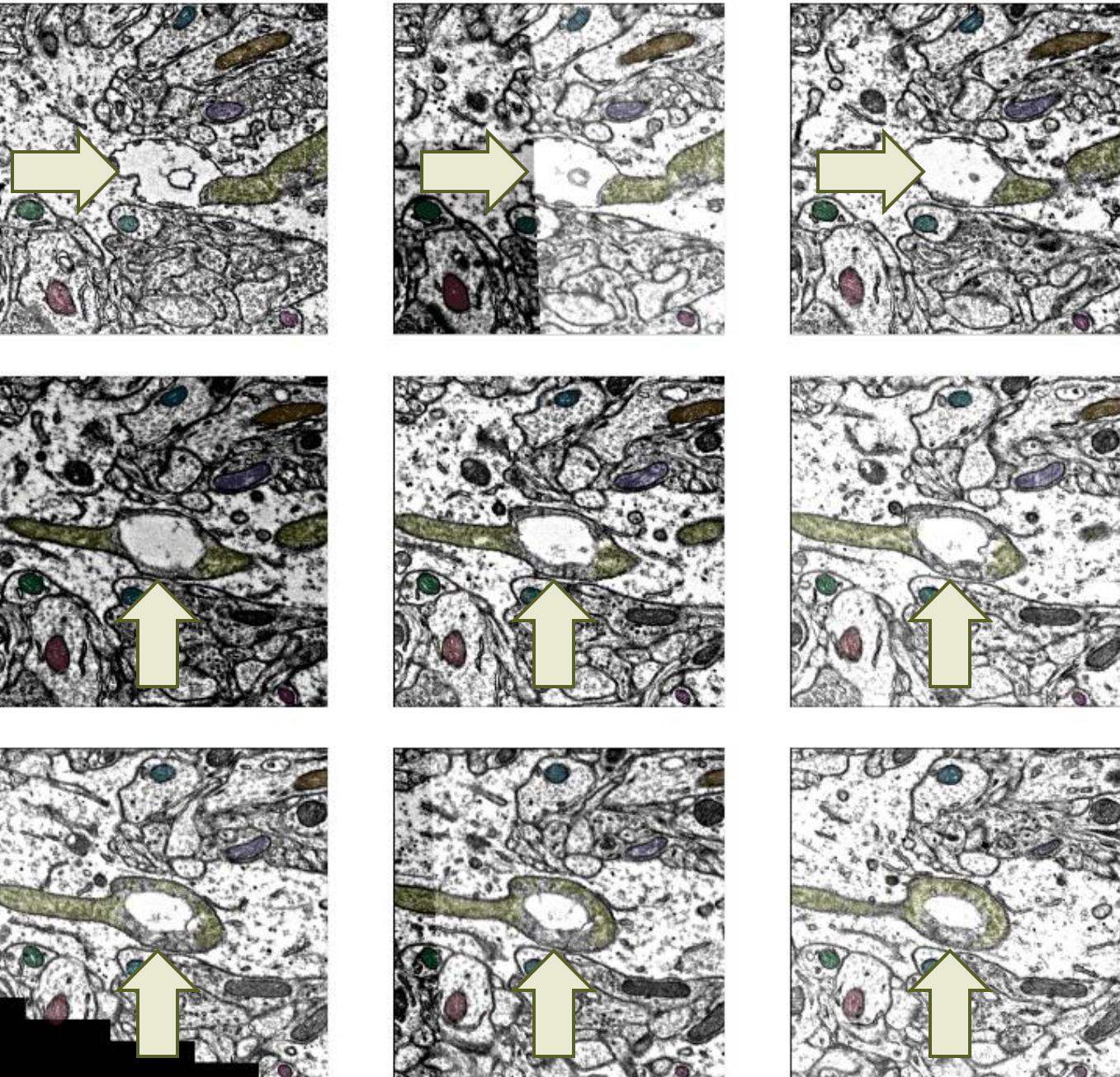
Mito 2646319



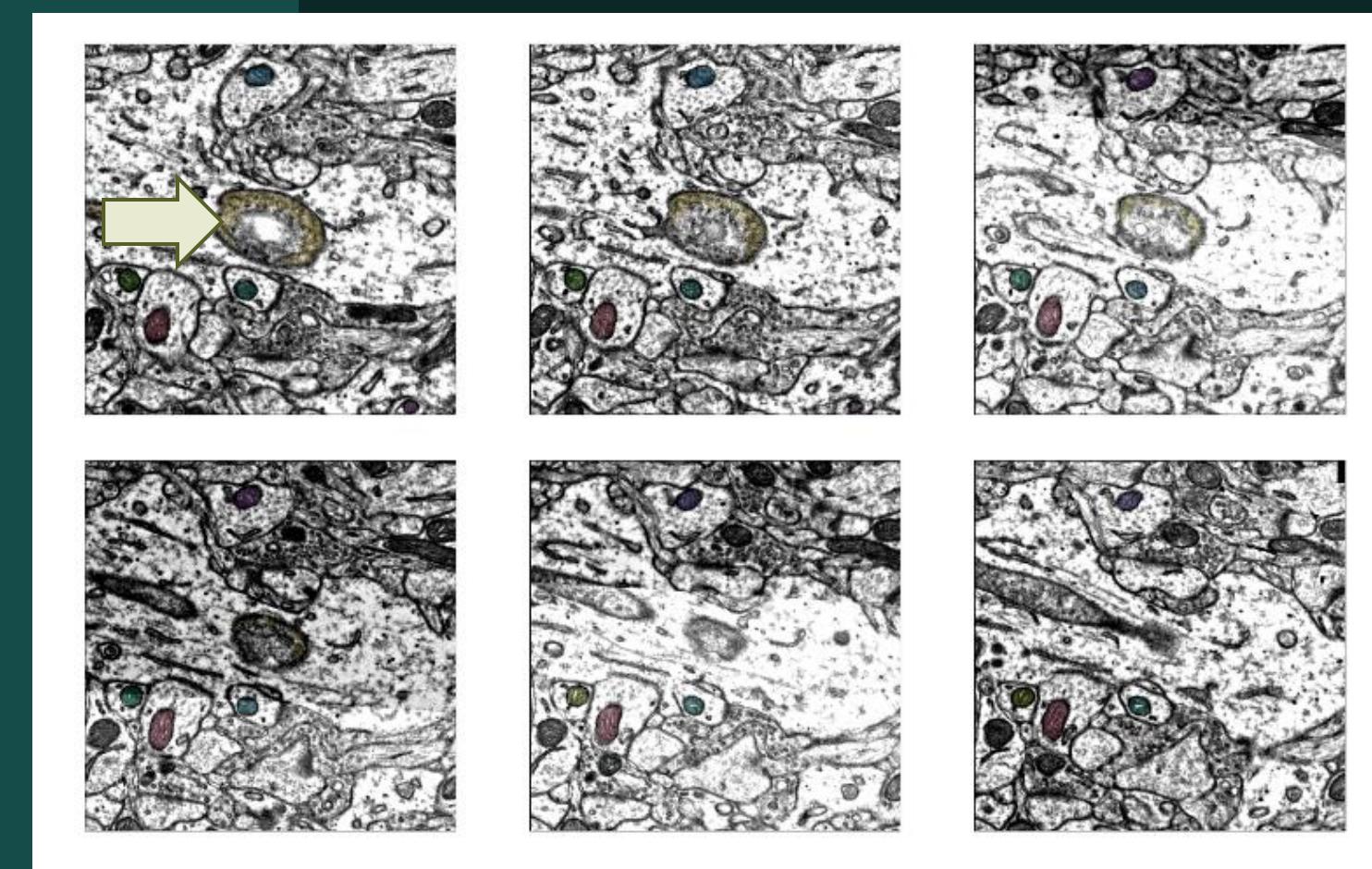
# Mito 2646319



# Mito 2646319



# Mito 2646319



# Summary

- Electron bright mitochondria inclusions are commonly seen in astrocytes
- Inclusions can be found relatively easily by manual inspection in Neuroglancer by looking for fragmented mitochondria in the 3D view
- Once manually selected, EM images can be generated using imageryclient module

# Acknowledgements



Read the original research papers on  
the [Citation](#) page at Allen Institute



Read the [Terms and Conditions](#) page



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# Code Availability

Visit my [GitHub repository](#) to view how the images and data in this presentation were generated

```
    for object to mirror
    mirror_mod.mirror_object = object

    if operation == "MIRROR_X":
        mirror_mod.use_x = True
        mirror_mod.use_y = False
        mirror_mod.use_z = False
    elif operation == "MIRROR_Y":
        mirror_mod.use_x = False
        mirror_mod.use_y = True
        mirror_mod.use_z = False
    elif operation == "MIRROR_Z":
        mirror_mod.use_x = False
        mirror_mod.use_y = False
        mirror_mod.use_z = True

    #selection at the end - add
    mirror_ob.select= 1
    mirror_ob.select=1
    context.scene.objects.active = mirror_ob
    ("Selected" + str(modifier))
    mirror_ob.select = 0
    bpy.context.selected_objects = []
    data.objects[one.name].select = 1
    print("please select exactly one object")

- OPERATOR CLASSES -
types.Operator:
    X mirror to the selected object.mirror_mirror_x"
    "mirror X"
```