



2021년도 한국현미경학회 춘계학술대회

Real-Time a Imaging a Microglial Subcellular Organelle
with a Clickable Small Fluorescent Probe

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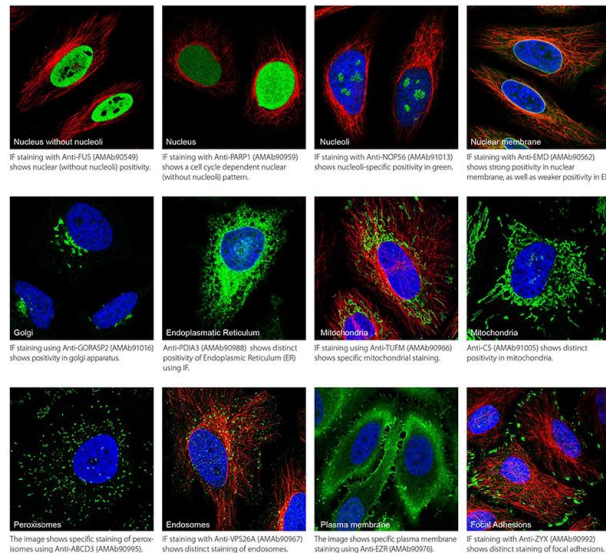


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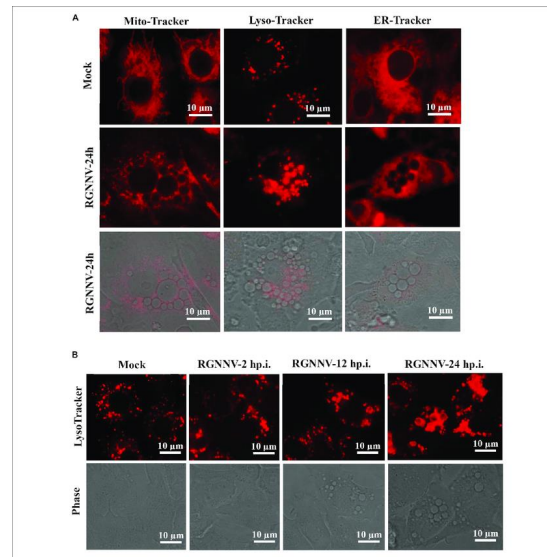
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Lack of simple and fast tracking technology for specific-cell organelle

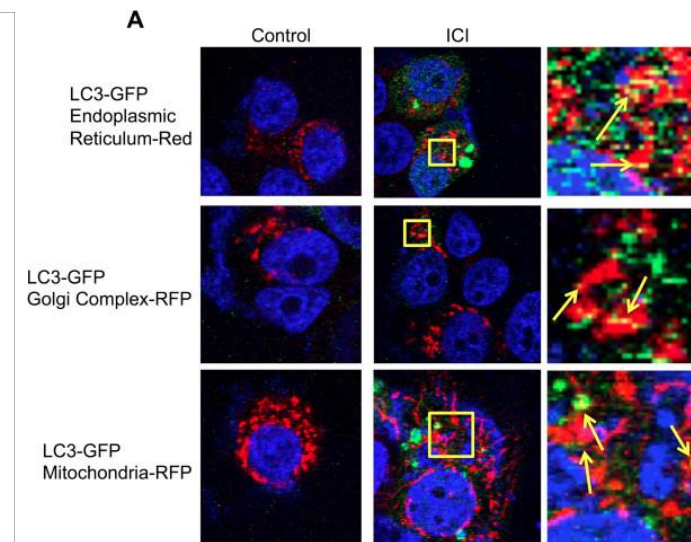
Immunostaining



Virus infection



Transfection



- Only fixed cell (live cell x)
- Need a long time
- Complicated

- Genetic modification of cells/living organisms

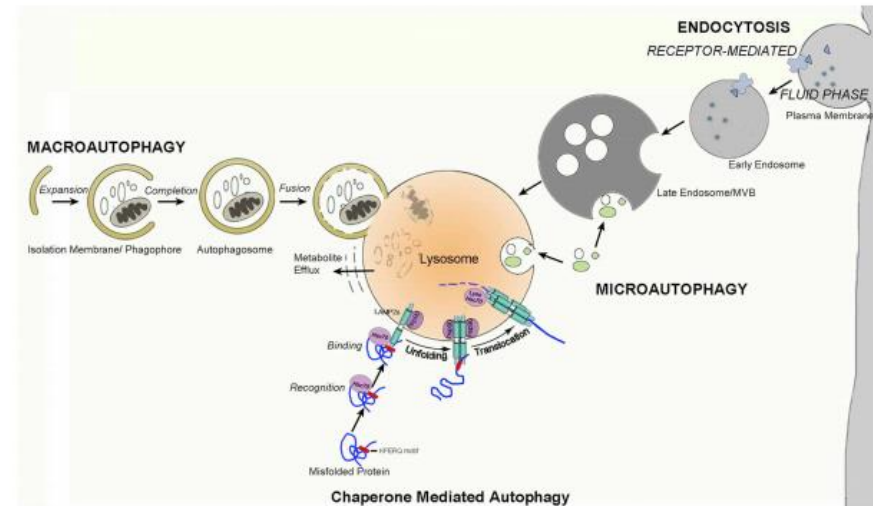
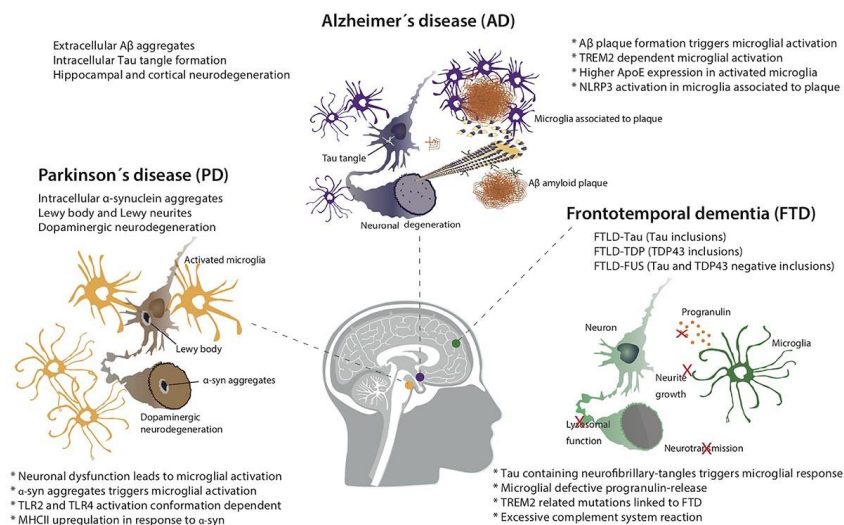
- Cloning complicated
- Lack of cell specificity

sigma

Mitochondria directly donate their membrane to form autophagosomes during a novel mechanism of parkin-associated mitophagy. Cell & Bioscience (2014)

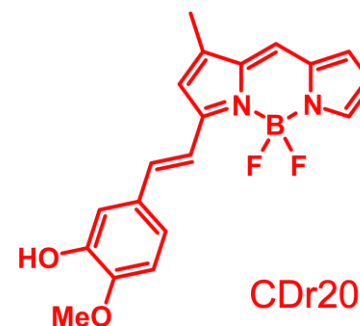
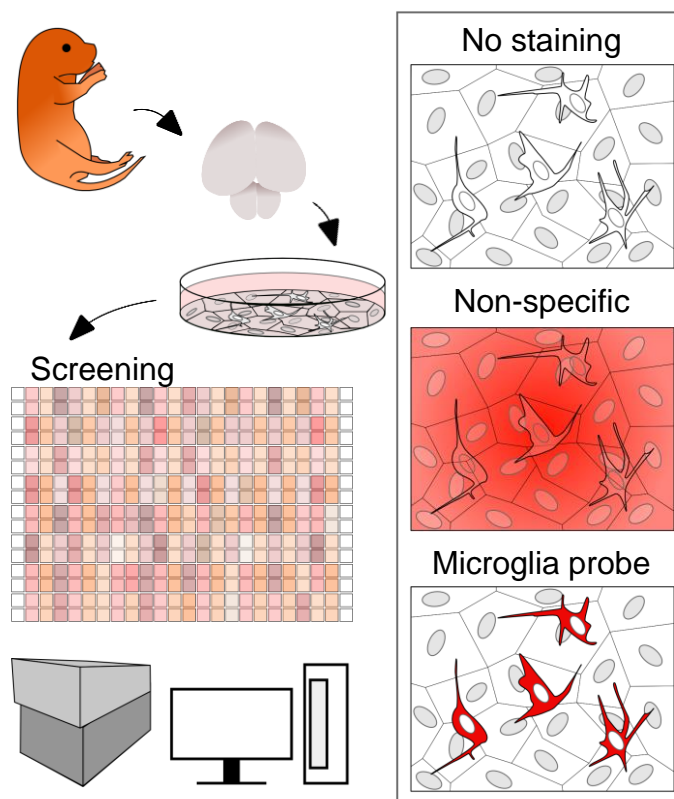
Autophagy Participates in Lysosomal Vacuolation-Mediated Cell Death in RGNV-Infected Cells. Frontiers in microbiology (2020)

Role of microglial lysosome in brain



The need for an advanced method of tracking technology of microglial organelle

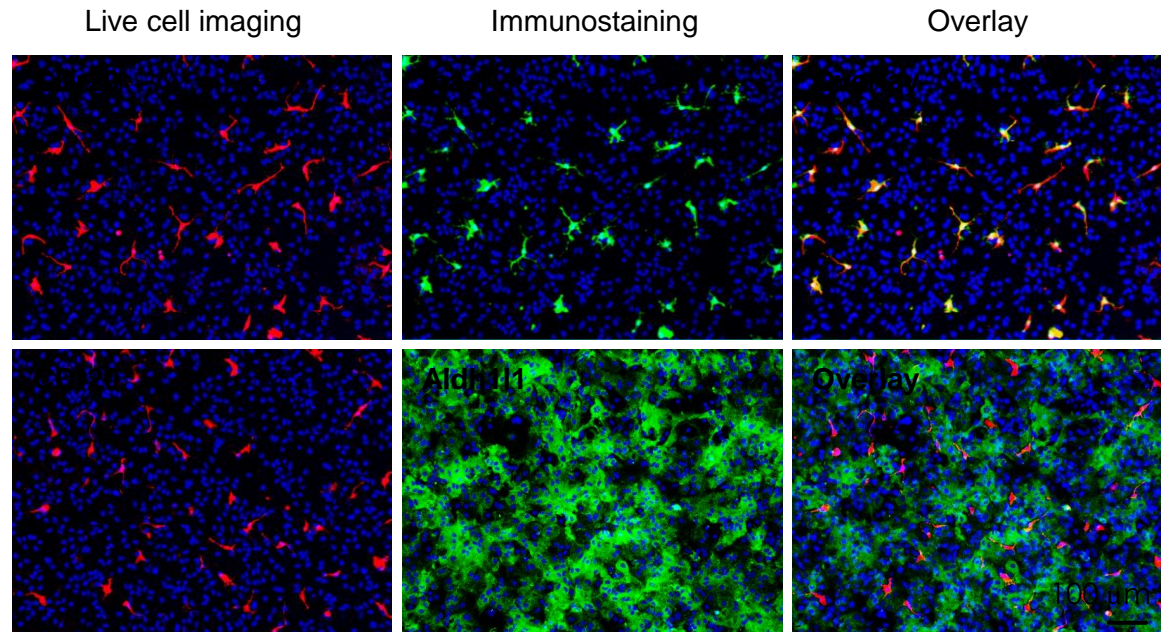
Previous work - Development of CDr20 for labeling live microglia



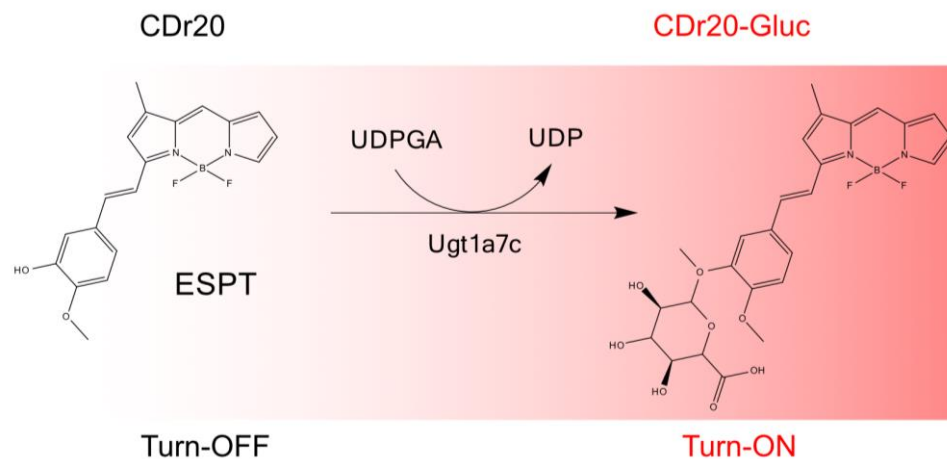
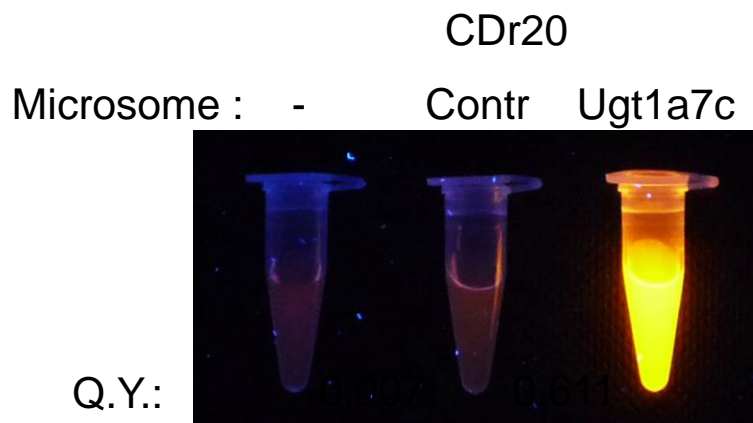
Increase the specificity

Critical for the selectivity

Superimposed images of live cell labeling and immunolabeling in microglia



Scheme on fluorescence turn-on process of CDr20



Washable property of CDr20 in live microglia

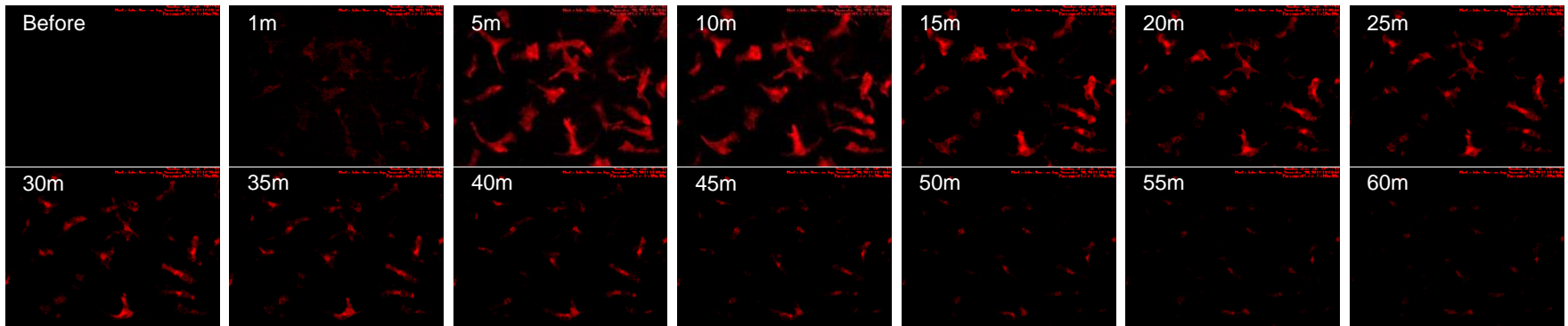
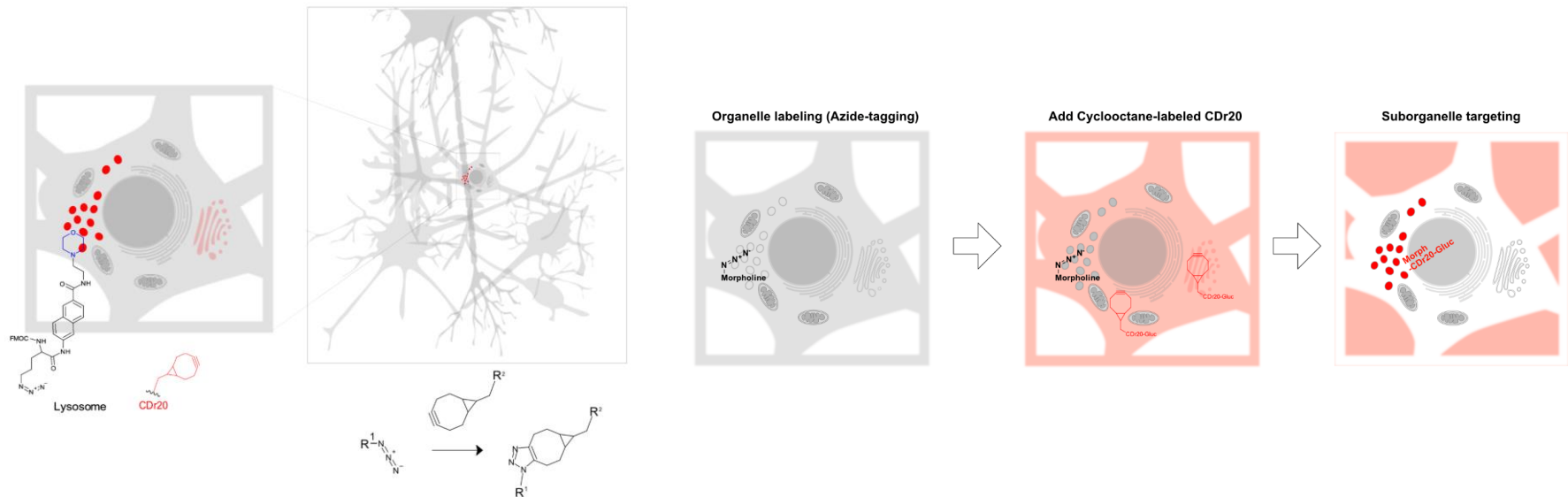


Diagram of the targeting a subcellular organelle of microglia in a heterogenous cell culture condition



Comparison of fluorescence staining patterns between CDr20 and CDr20-derived probe

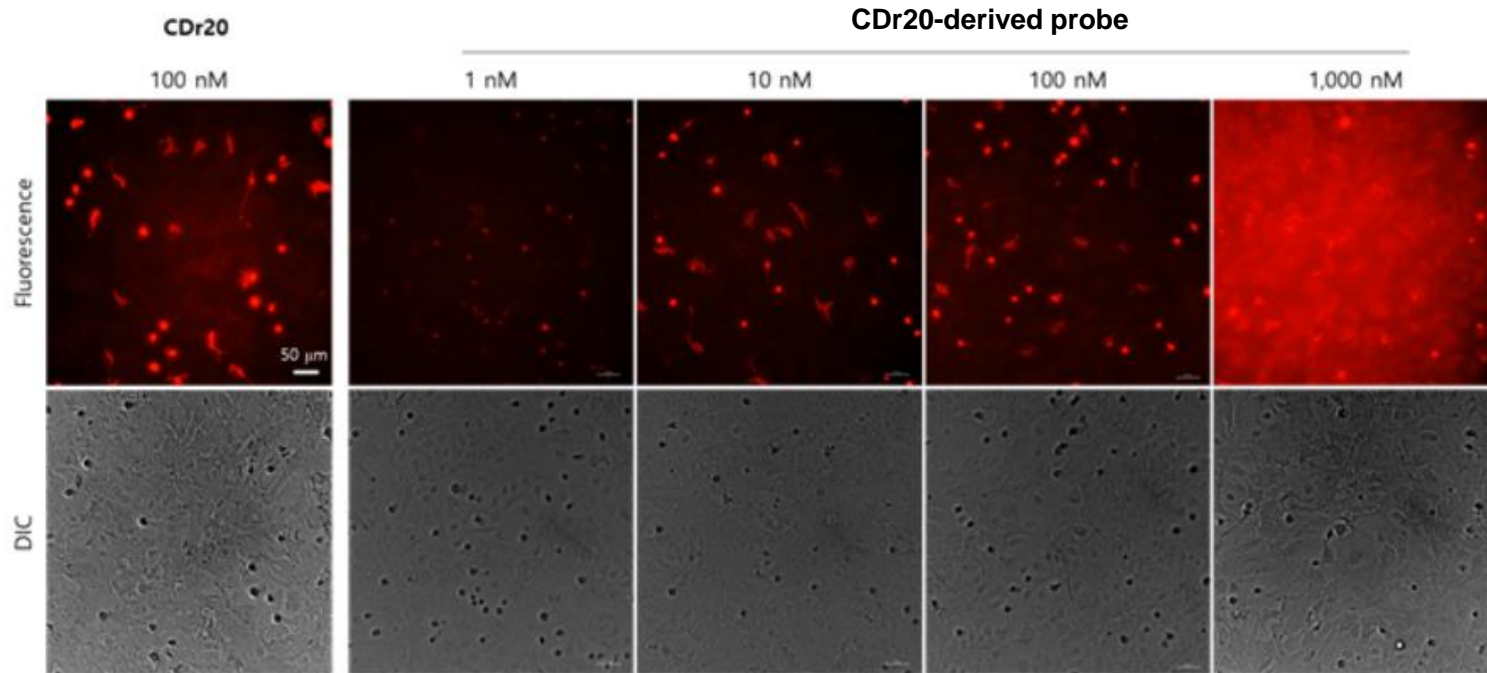
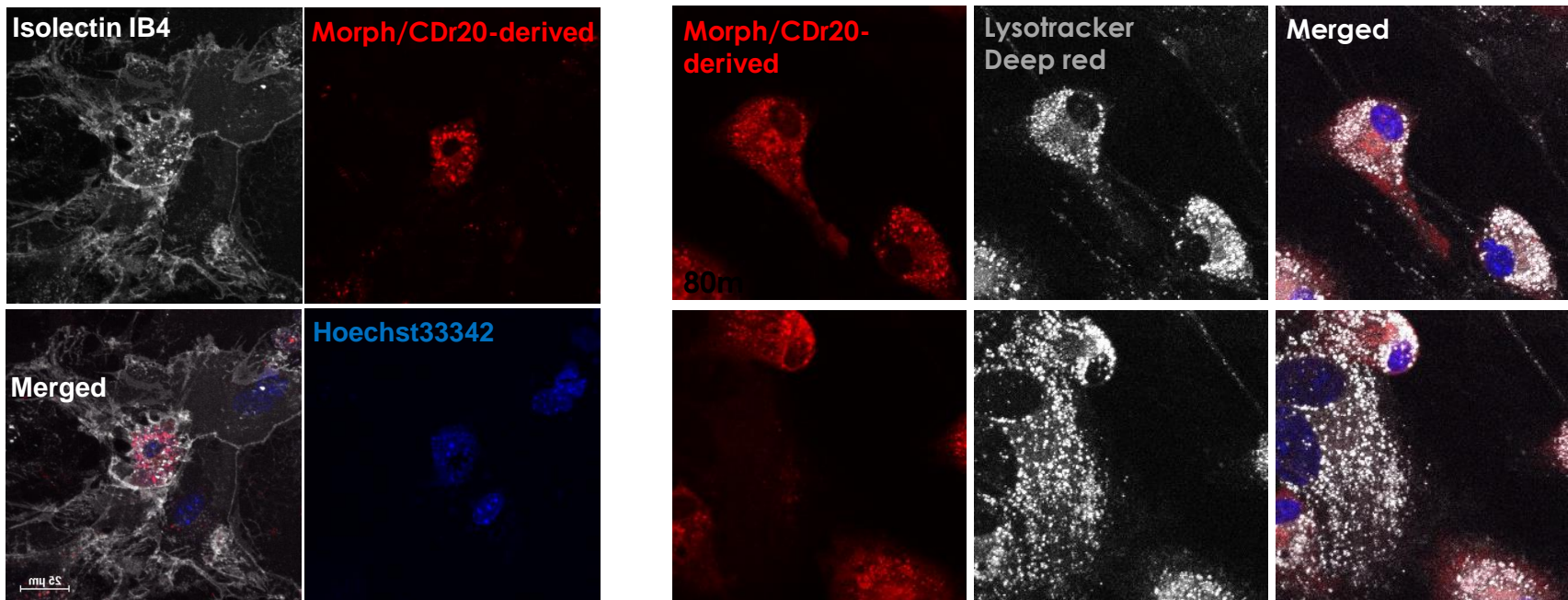
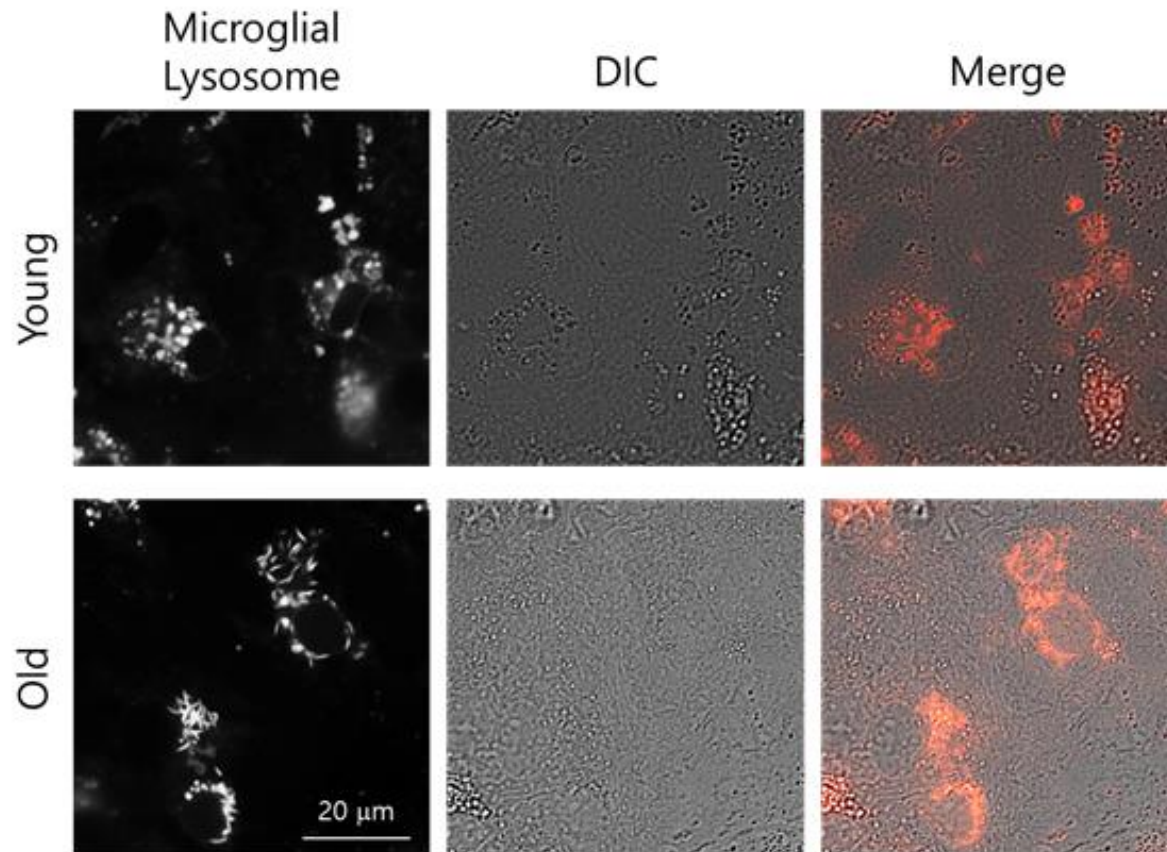


Image of the labeled microglial lysosome in a live mixed glial culture condition



Morphological characteristic of lysosomes using Morph-CDr20 derived probe in aging conditions



Further study

- ✓ Further study of SAR to identify regions that can be structurally transformed as keep maintaining CDr20 function
- ✓ Expanding the range of organelles by applying organic compound that can target various organelles in the system
- ✓ Investigation of the relationship between morphological change of microglia lysosome and mitophagy activity

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