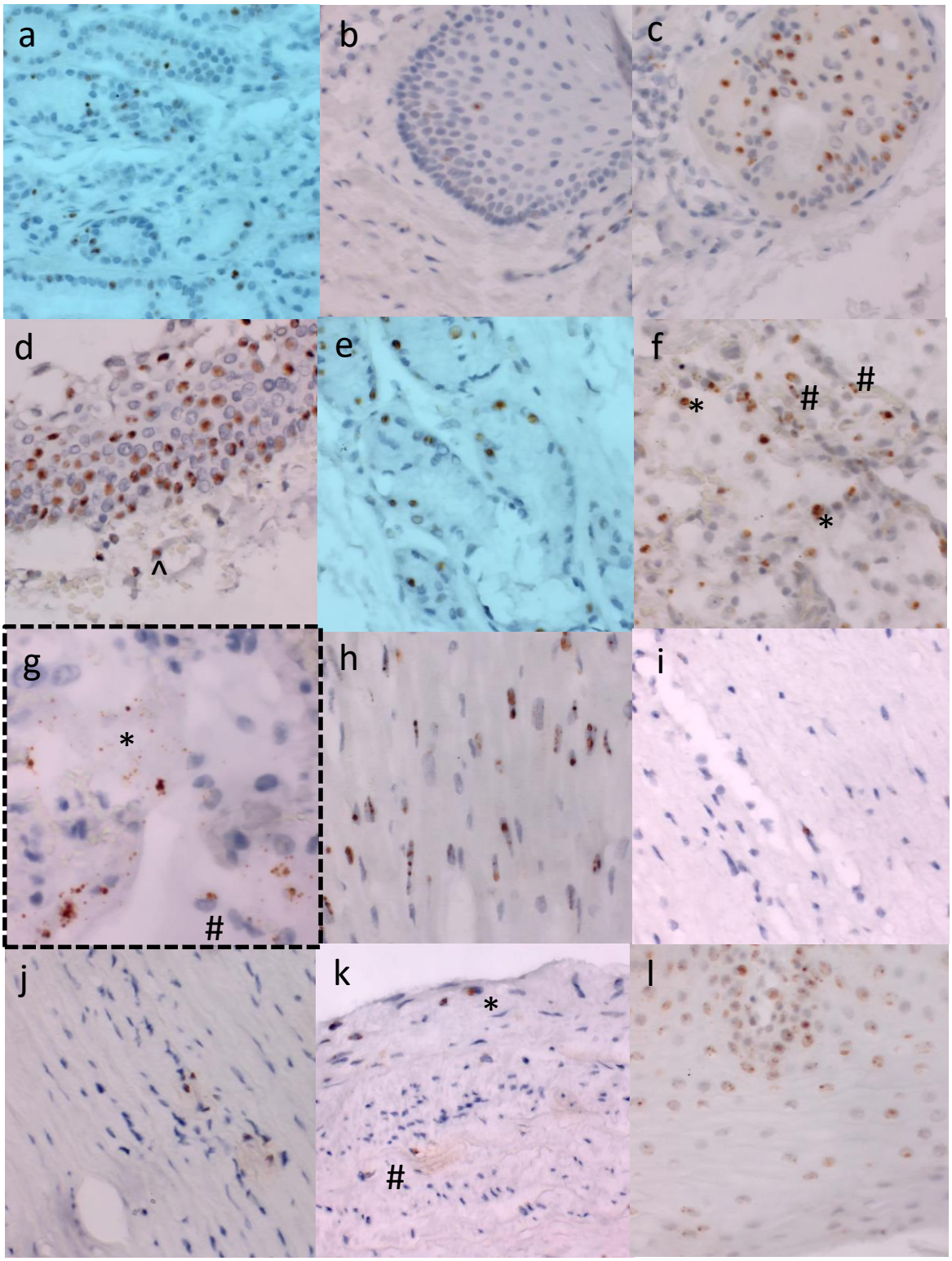
SARS-CoV-2 Cellular Tropism

Panel	Specimen	Case(s)	Cell type(s)
a	Sinus turbinate	P42	Mucus secreting epithelium
b	Lip, oral mucosa	P18	Squamous epithelium
c	Lip, minor salivary gland	P18	Minor salivary gland (lip)
d	Bronchus	P18	Bronchial epithelium, endothelium (^)
e	Bronchus	P20	Mucus secreting epithelium
f	Lung	P42	Pneumocytes, Type I (*) Type II (#)
g	Lung	P24	Hyaline membrane (*) mononuclear leukocyte (#) (60X)
h	Heart	P19	Cardiac myocyte
i	Aorta	P19	Tunica intima
j	Aorta	P19	Tunica media
k	Trachea	P19	Endothelium(*), smooth muscle (#)
l	Esophagus	P18	Stratified squamous epithelium
m	Appendix	P19	Colonic epithelium(*), mononuclear leukocytes (#)
n	Colon	P16	Colonic epithelium(*), mononuclear leukocytes (#)
o	Liver	P19	Hepatocyte (*), bile duct epithelium (#)
p	Liver	P19	Hepatocyte (*), Kupffer cell (#)
q	Pancreas	P18	Exocrine pancreatic cells
r	Adrenal gland	P19	Adrenal cortical epithelium
s	Thyroid	P19	Follicular cells
t	Kidney	P18	Glomerular epithelium
u	Kidney	P18	Tubular epithelium
v	Uterus	P35	Endometrial stroma (*), endometrial glandular epithelium (#)
w	Uterus	P35	Myometrium
x	Ovary	P20	Ovarian stromal cells
y	Testis	P20	Sertoli cells (*), spermatid (#)
z	Testis	P20	Sertoli cells (*), Leydig cells (#)
aa	Testis, seminiferous tubules	P19	Seminiferous tubule epithelium
bb	Lymph node	P19	Mononuclear leukocytes
cc	Lymph node	P19	Mononuclear leukocytes
dd	Spleen	P19	Mononuclear leukocytes
ee	Pancreas	P18	Arterial smooth muscle
ff	Ileum	P19	Intestinal epithelium (*), smooth muscle (#)
gg	Trachea	P27	Chondrocyte (60X)
hh	Skin	P43	Epithelium, outer root sheath of a hair follicle
ii	Pericardium	P18	Fibroblast
jj	Bronchus	P43	Endothelium (*), smooth muscle (#)
kk	Psoas muscle	P18	Skeletal muscle
ll	Sciatic nerve	P20	Schwann cells
mm	Brain, frontal lobe	P40	NOS
nn	Brain, parietal lobe	P38	NOS
oo	Brain, occipital lobe	P38	Endothelium (#), NOS (*)
pp	Brain, corpus callosum	P38	NOS
qq	Brain, thalamus	P33	NOS
rr	Brain, hypothalamus	P40	NOS
ss	Brain, basal ganglia	P40	NOS
tt	Brain, midbrain	P43	NOS
uu	Brain, cerebellum	P42	Granular layer neurons
vv	Cervical spinal cord	P38	Ependymal cells
ww	Brain, temporal lobe	P43	NOS
xx	Cervical spinal cord	P40	NOS within white matter
yy	Lung and basal ganglia	Pre-pandemic, P40	Table of chromogenic IHC and ISH validation images
zz	Basal ganglia, cervical spinal cord, lung, hypothalamus	Pre-pandemic, P42, P38	IF validation images
aaa	Hypothalamus, cervical spinal cord, and cerebellum	P38, P42	Table of additional chromogenic IHC and ISH control images for Fig. 3
bbb	Cortex, brain NOS, cervical spinal cord, and cerebellum	Pre-pandemic	Table of additional CNS chromogenic and ISH validation images
ccc			Table of ddPCR vs. ISH quantification on heart, interventricular septum
ddd	Heart, interventricular septum	P18, P29	Examples of image analysis with and without markup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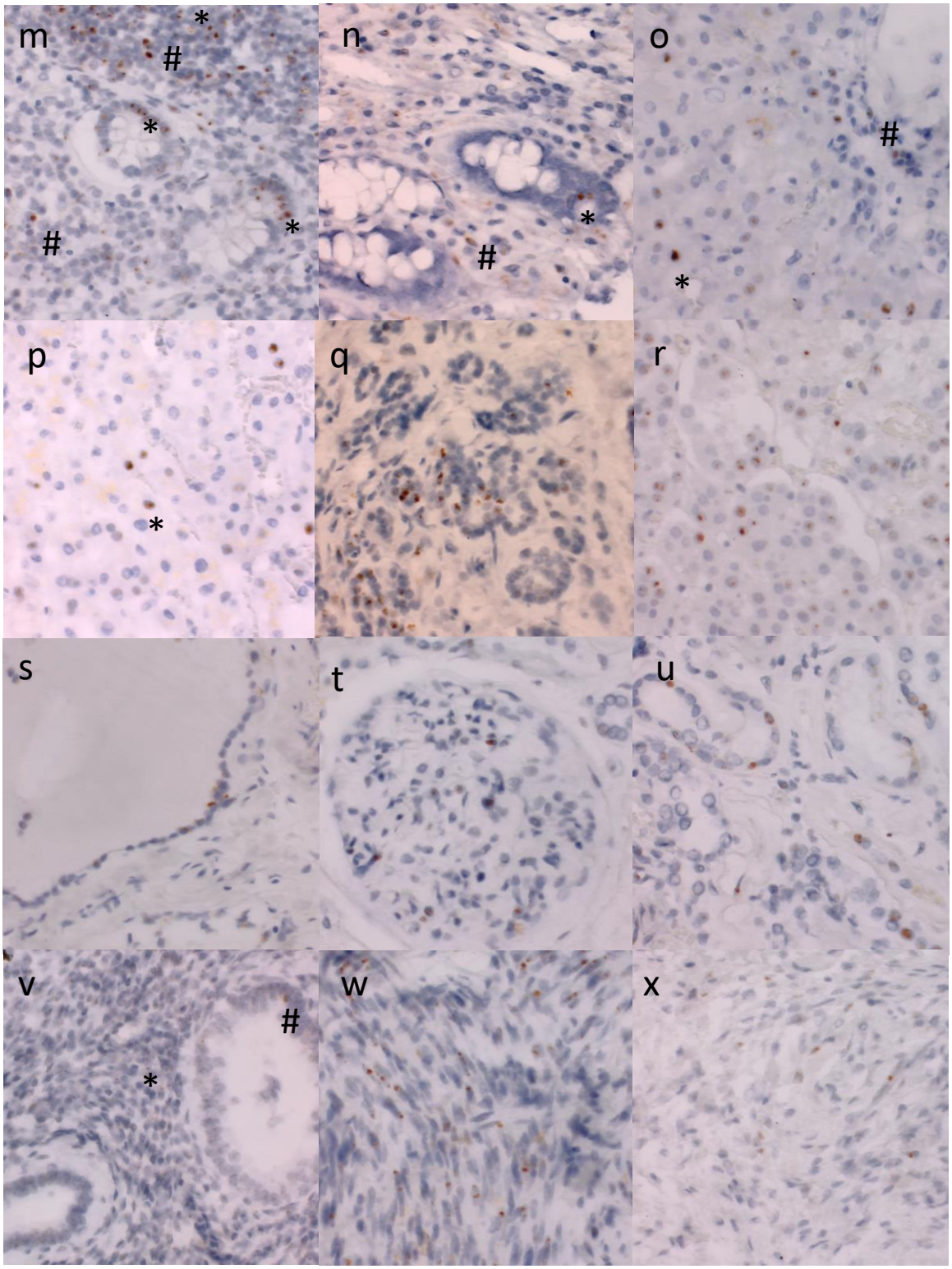
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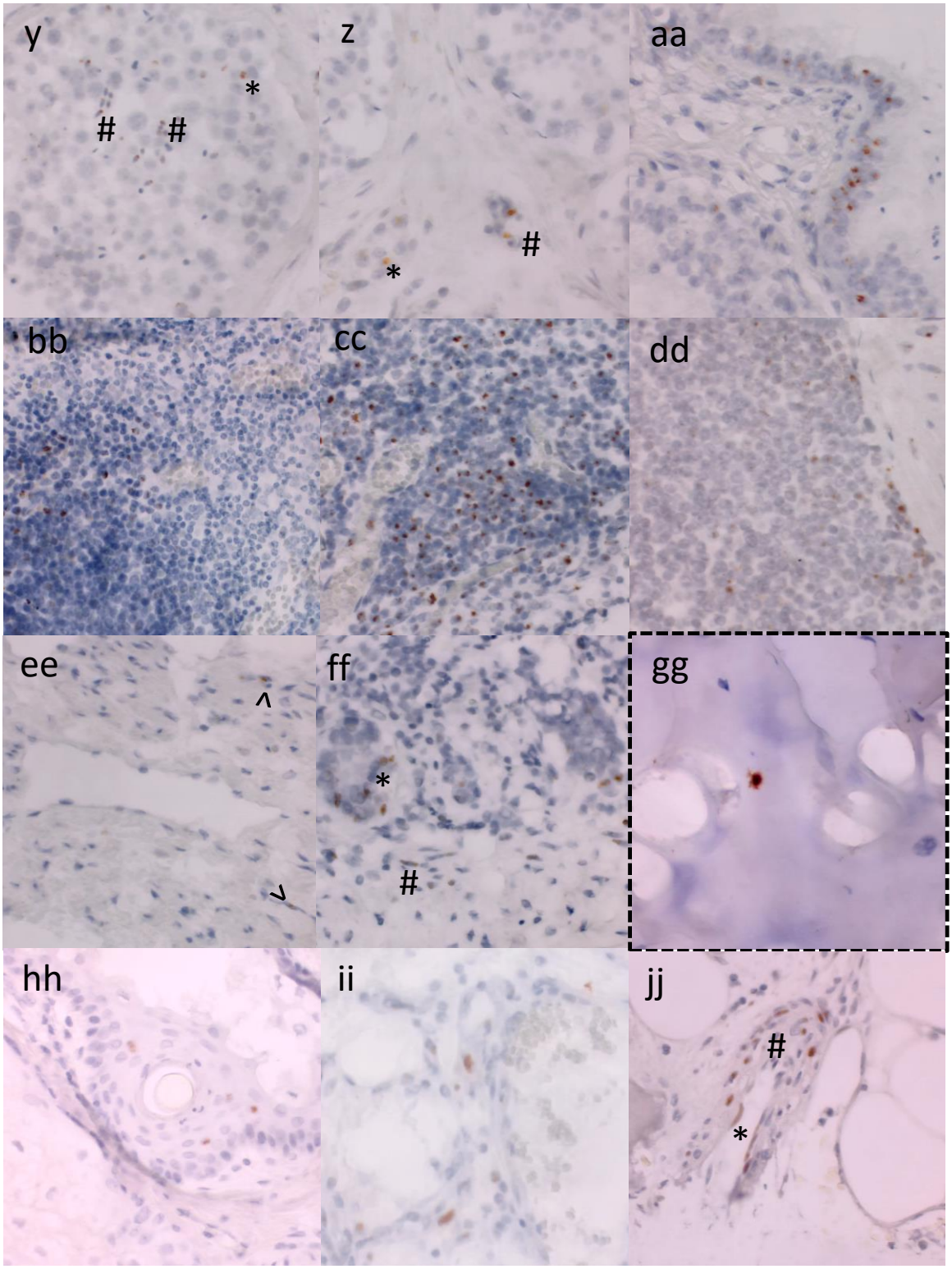
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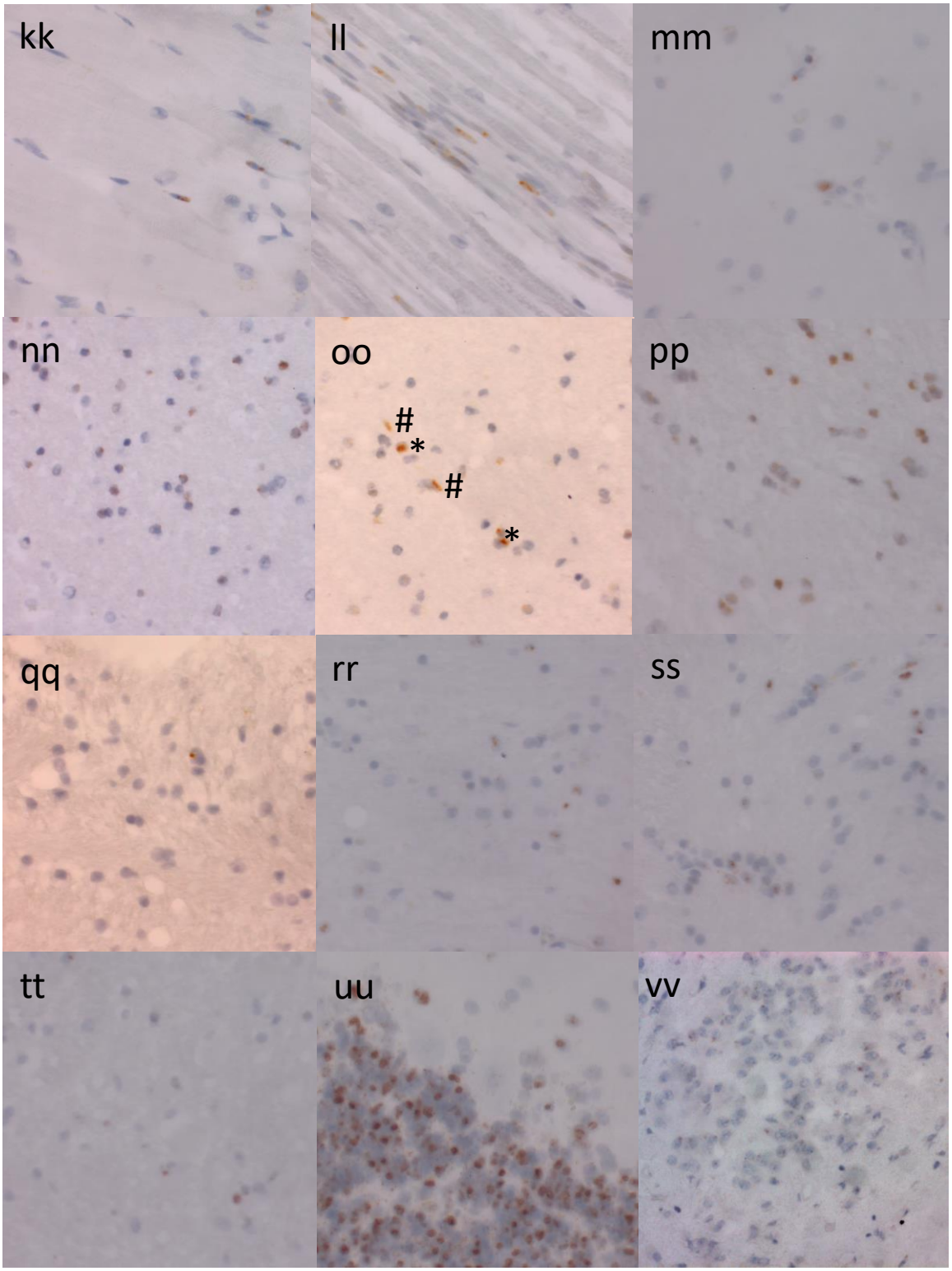
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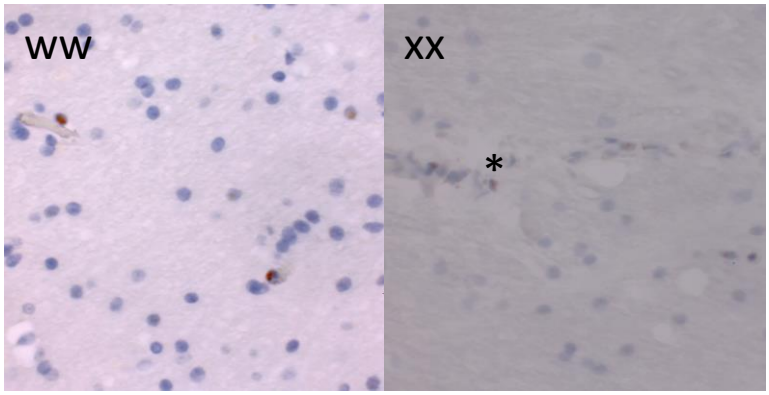
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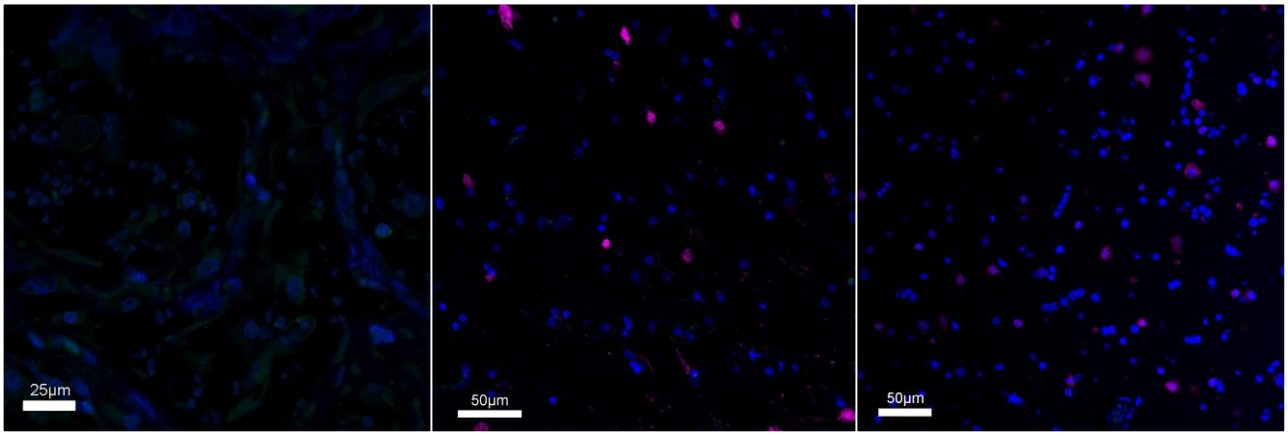
yy		Lung		Brain, basal ganglia	
		P18	Pre-pandemic	P40	Pre-pandemic
Chromogenic immunohistochemistry	Anti-nucleocapsid Ab				
	Rabbit IgG isotype control				
In situ hybridization	Spike				
	Nucleocapsid				
	Positive control human housekeeping gene				
	Negative Control *E. coli* gene				

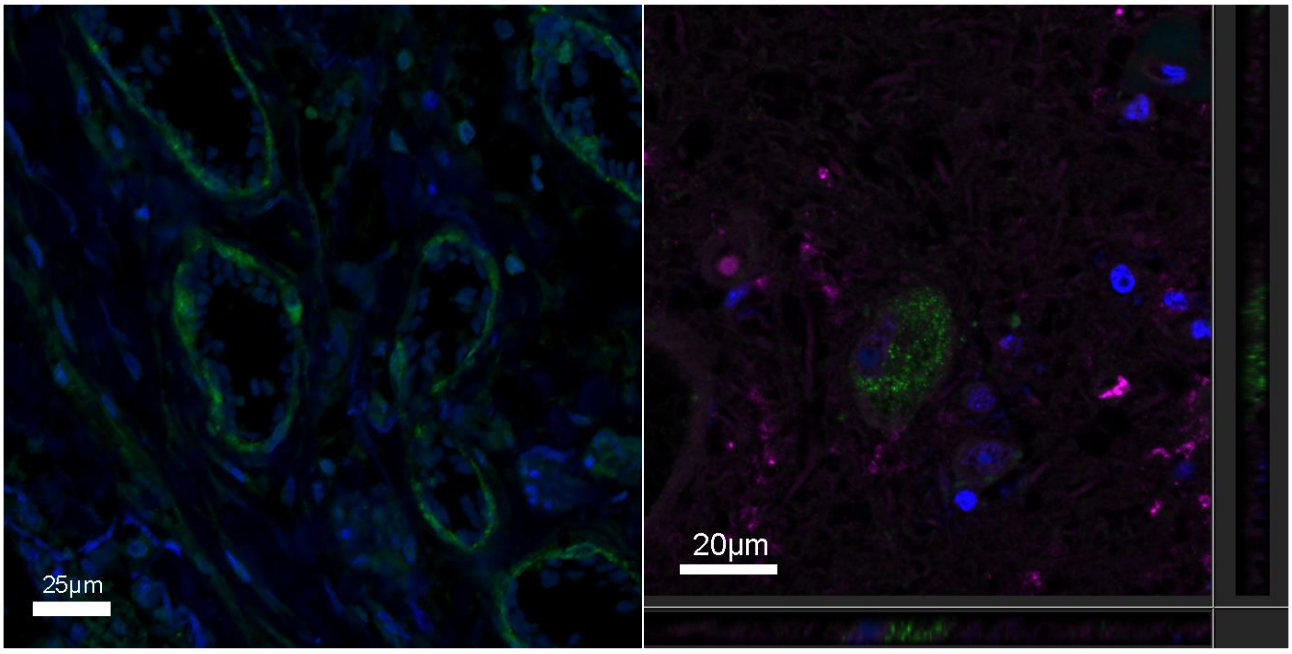
zz



Pre-pandemic lung
Immunofluorescence, 20x

Pre-pandemic basal ganglia
Immunofluorescence, 20x

Pre-pandemic spinal cord
Immunofluorescence, 20x

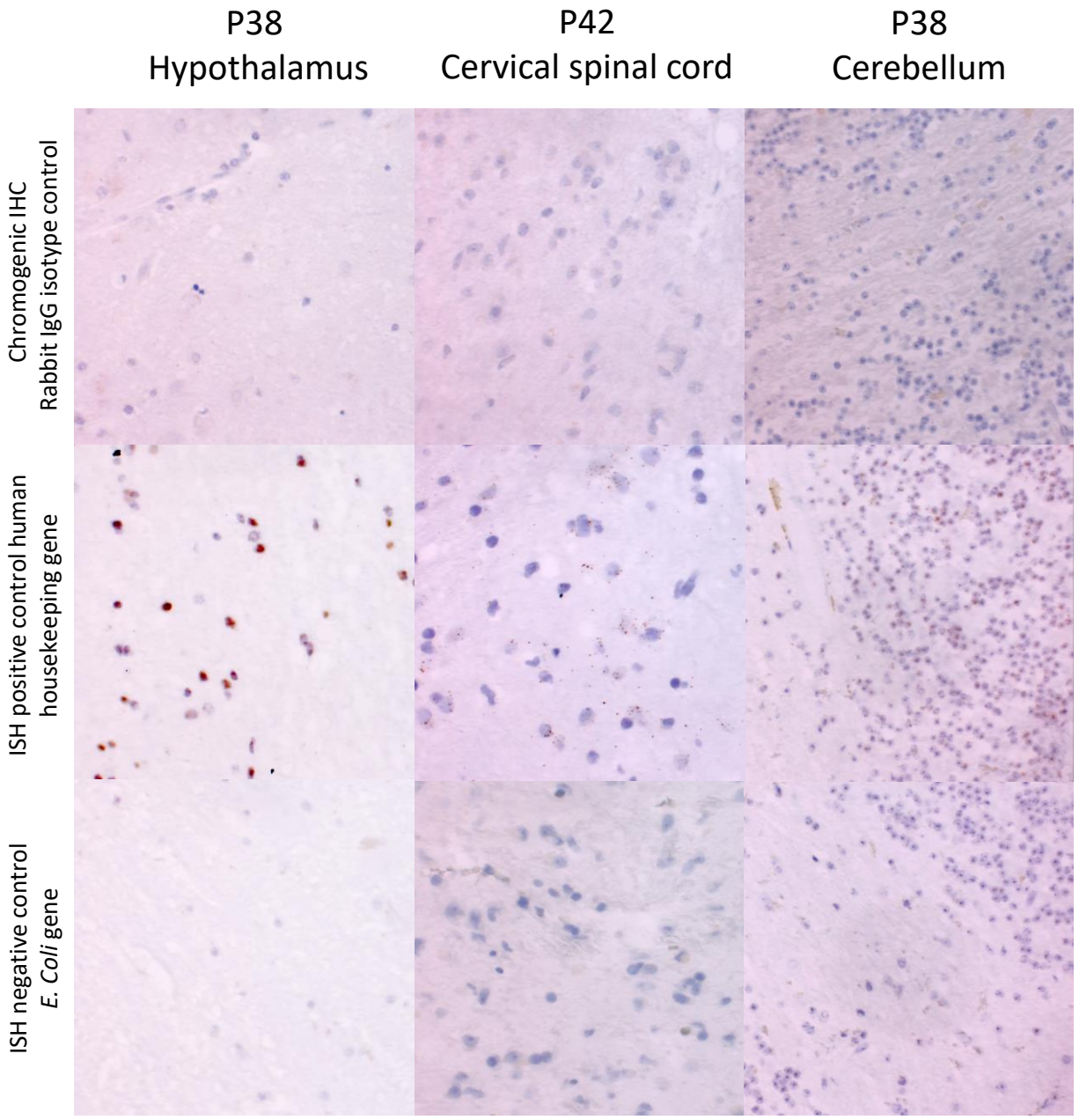


Lung, P42
Immunofluorescence, 20x

Hypothalamus, P38
Immunofluorescence, 63x

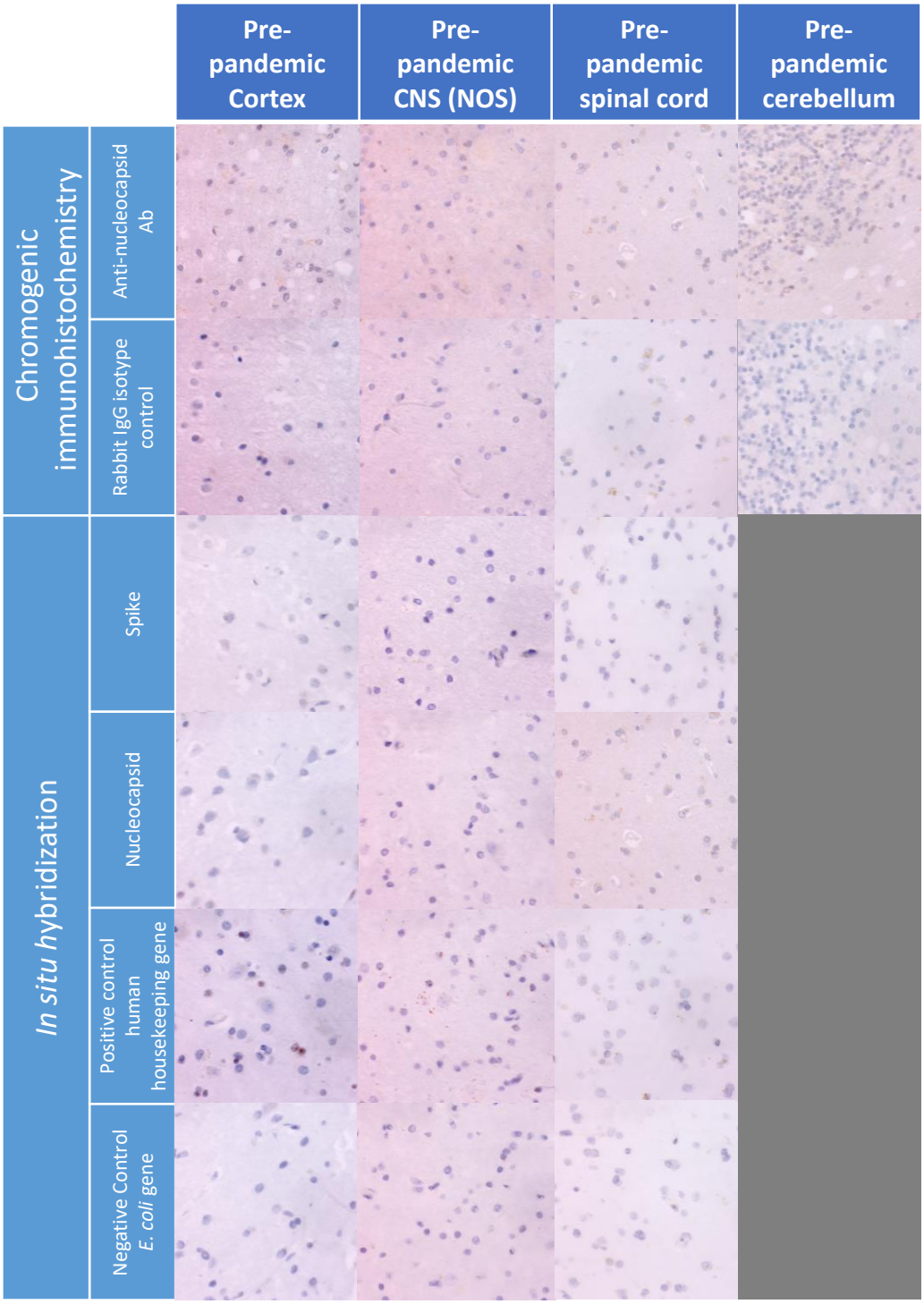
zz) To confirm SARS-CoV-2 antibody specificity within CNS and lung tissues, sections of pre-pandemic lung (top left), basal ganglia (top middle), and spinal cord (top right) were labeled with primary antibodies against NP1 (lung and CNS, green) and NeuN (CNS only, magenta). As a positive control, lung from P42 was labeled for SARS-CoV-2 NP1 (bottom left, green). Within the CNS, microglial cells were identified via TMEM119 labeling (bottom right, magenta) and were consistently found to be negative for SARS-CoV-2 protein (green). Hoechst 33342 was used to identifying nuclei and is shown in blue.

aaa



RNA ISH and chromogenic IHC controls from P40 are contained in panel yy (page 7)

bbb



Adequate pre-pandemic ISH controls were not available for cerebellum

ccc

in situ hybridization quantification of interventricular septum (n=16)		
Patient ID	ddPCR N copies per ng RNA (mean)	Positive cells (median)
P18	60.2478	110.0
P37	47.3838	80.5
P27	24.1469	50.5
P32	14.7105	46.0
P24	4.2594	74.5
P16	1.0061	28.0
P21	0.5922	23.0
P7	0.3116	89.5
P39	0.1489	26.5
P38	0.0632	52.0
P15	0.0519	52.5
P29	0.0081	21.5
P42	0.0027	28.0
P12	0.0000	21.0
P17	0.0000	18.0
P31	0.0000	26.0

ddd