# Würtemberger et al.: Mesoscopic assessment of microstructure in glioblastomas and metastases by merging advanced diffusion imaging with immunohistopathology
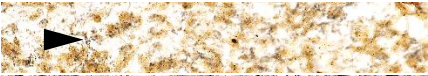
Supplementary Figure 1. Exemplary histopathological sections in 9 patients with metastases (**left panel**) and 9 patients with GBM IDH wt (**right panel**). In each case, the presence of axonal structures was visually assessed and scored according to a semiquantitative scale, exemplified in the lower panel. With the exception of one case, no axonal structures can be detected in metastases, whereas axonal structures are clearly detectable in all GBM cases, ranging from axonal fragments to intact axonal structures. Compared to metastases, GBM show a significant shift towards increased Bielschowsky score. **** $p \leq$ 0.001. Scale = 200µm.

Supplementary Figure 2. Exemplary histopathological sections in 9 patients with metastases (**left panel**) and 9 patients with GBM IDH wt (**right panel**). In each case, the presence and extent of GFAP expression was visually assessed and scored according to a semiquantitative scale, exemplified in the lower panel. GBM cases exhibit significantly more frequent and higher GFAP expression than metastases. Compared to metastases, GBM show a significant shift towards increased GFAP score. **** $p \leq$ 0.001. Scale = 200µm.

Supplementary Figure 3. Neurite orientation dispersion and density imaging (NODDI ICVF and VISO)- and diffusion microstructure imaging (DMI V-intra and V-CSF)- metrics in comparison to FA and OD in contrast enhancing tumor areas in patients with GBM (n = 22) and metastases (n = 21). There was no significant between-group difference detectable regarding the intra-axonal volume fractions (ICVF and V-intra), but a significant increase in NODDI V-ISO in metastases (p = 0.0025) and a tendency towards increased DMI V-CSF, without reaching significance (p = 0.077).

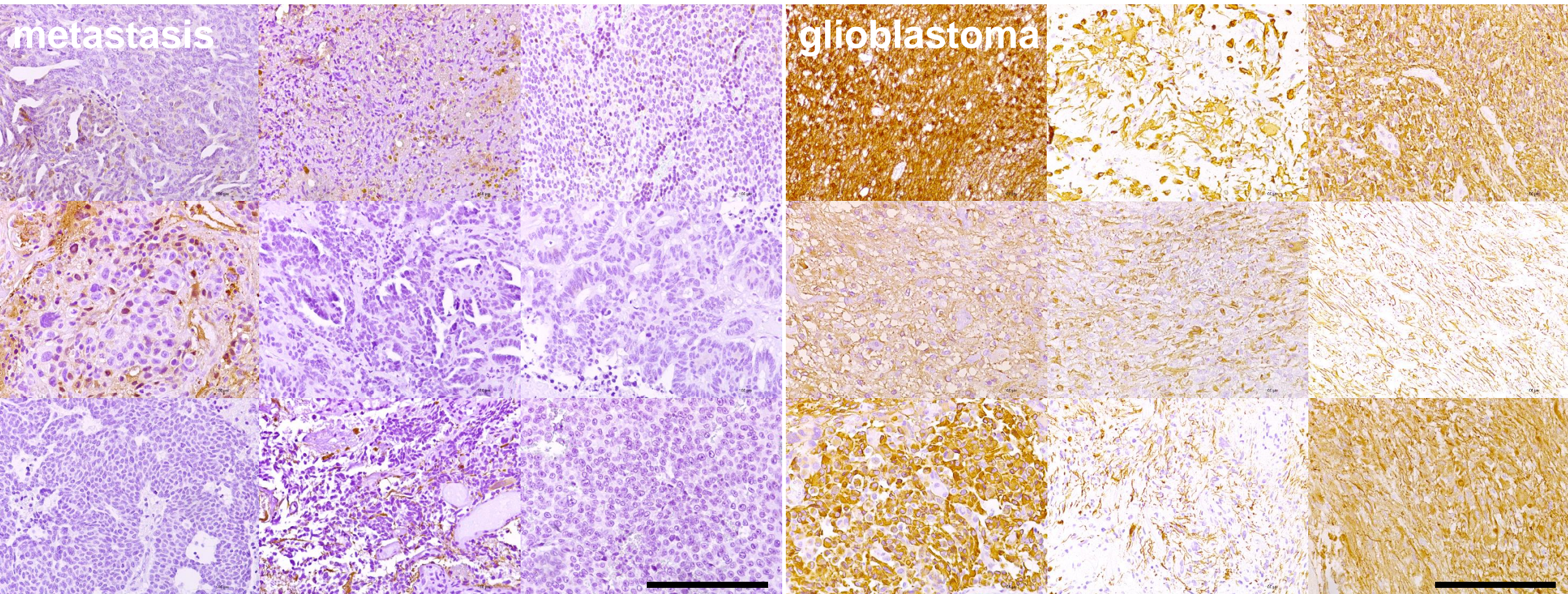# Bielschowsky stain
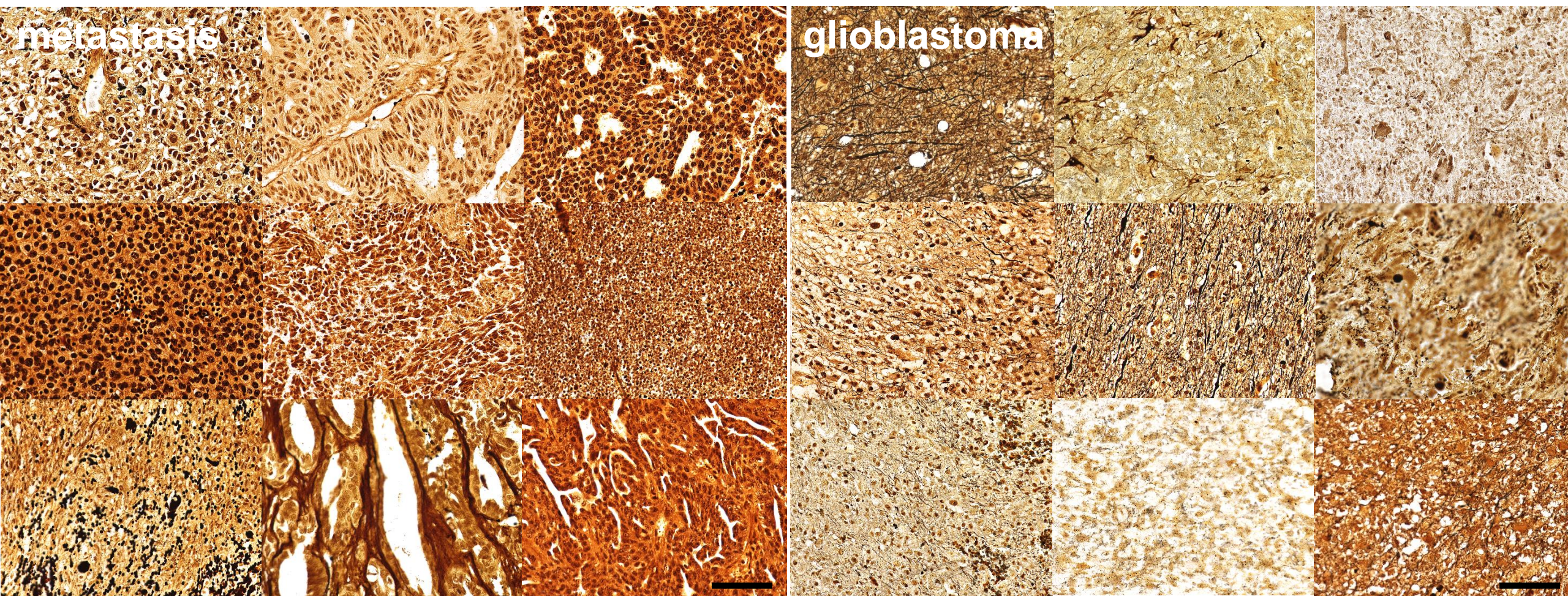
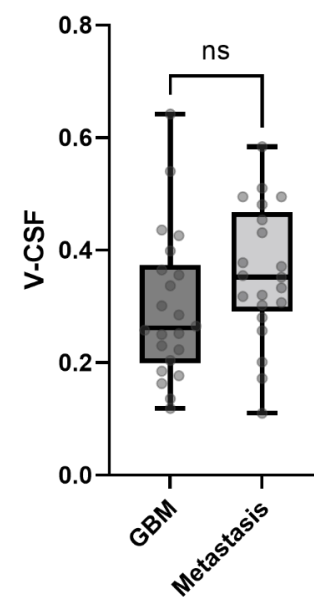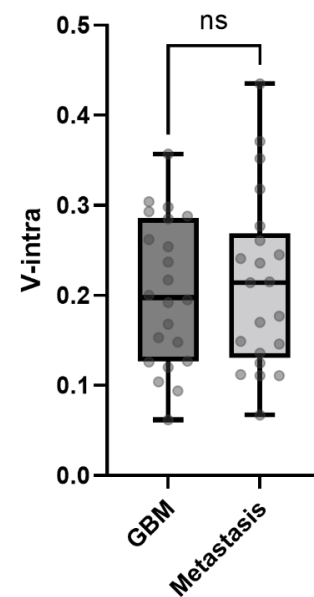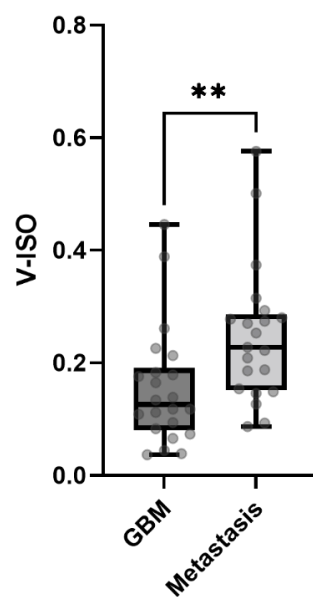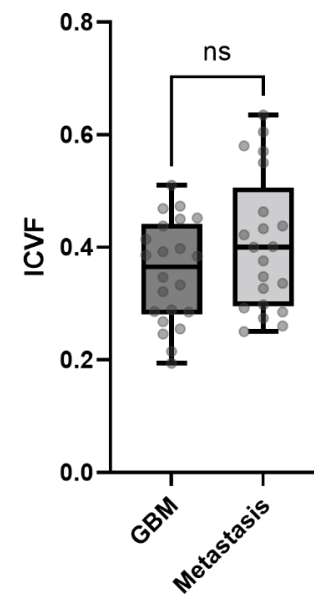|	
0	No axonal structures in tumor
1	Minimal axonal fragments maintained in tumor
2	Decreased axonal density in tumor
3	No axonal loss in tumor

Supplementary Figure 1

GFAP immunohistochemistry

0	No GFAP positivity in tumor	
1	restricted expression in tumor	
2	equivalent to surrounding parenchyma	
3	increased expression in tumor	

Supplementary Figure 2

Supplementary Figure 3