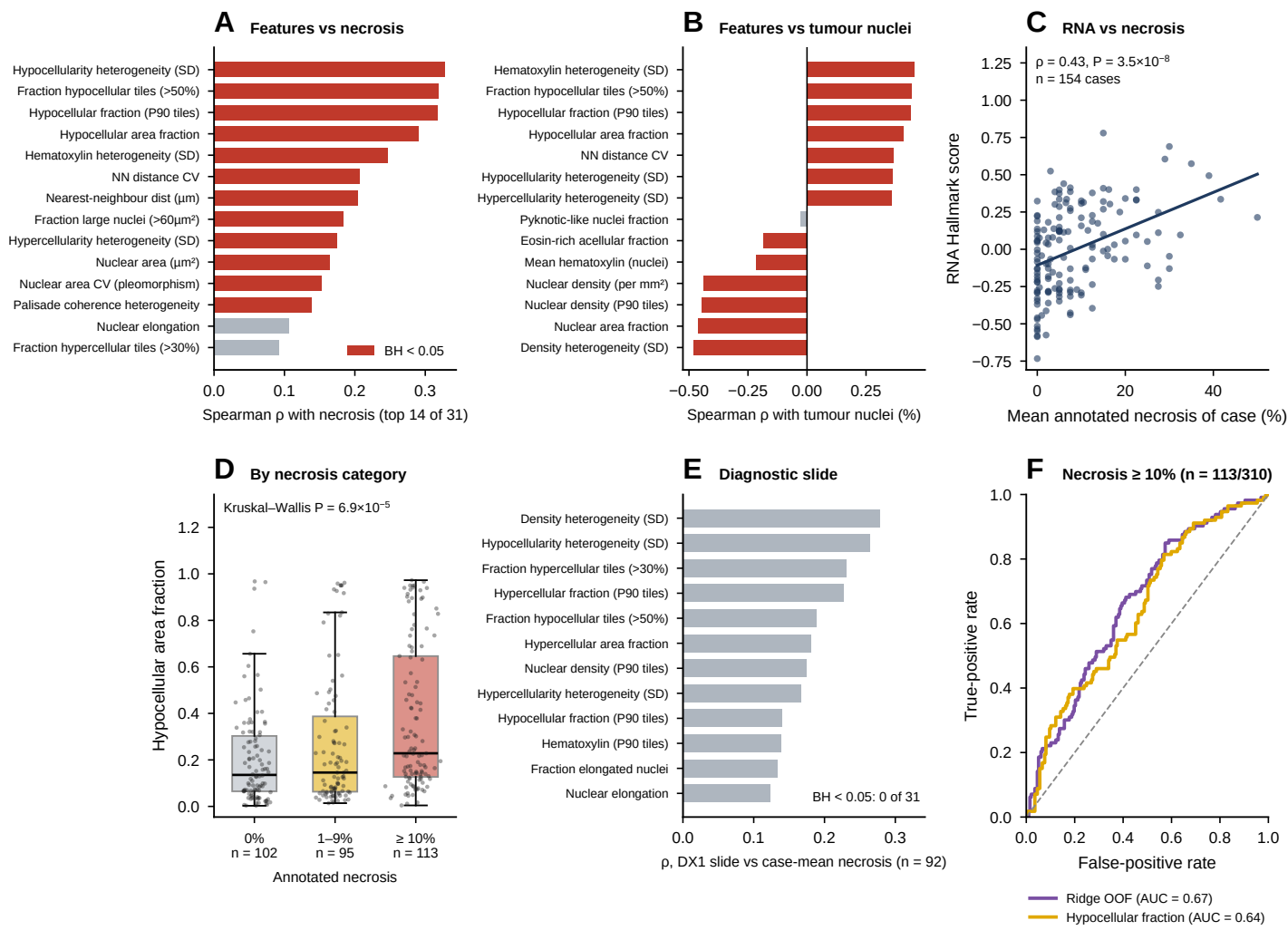

A
Features vs necrosis
Hypocellularity heterogeneity (SD)
Fraction hypocellular tiles (>50%)
Hypocellular fraction (P90 tiles)
Hypocellular area fraction
Hematoxylin heterogeneity (SD)
NN distance CV
Nearest-neighbour dist (µm)
Fraction large nuclei (>60µm²)
Hypercellularity heterogeneity (SD)
Nuclear area (µm²)
Nuclear area CV (pleomorphism)
Palisade coherence heterogeneity
Nuclear elongation
Fraction hypercellular tiles (>30%)
BH < 0.05
0.0
0.1
0.2
0.3
Spearman ρ with necrosis (top 14 of 31)
B
Features vs tumour nuclei
Hematoxylin heterogeneity (SD)
Fraction hypocellular tiles (>50%)
Hypocellular fraction (P90 tiles)
Hypocellular area fraction
NN distance CV
Hypocellularity heterogeneity (SD)
Hypercellularity heterogeneity (SD)
Pyknotic-like nuclei fraction
Eosin-rich acellular fraction
Mean hematoxylin (nuclei)
Nuclear density (per mm²)
Nuclear density (P90 tiles)
Nuclear area fraction
Density heterogeneity (SD)
−0.50
−0.25
0.00
0.25
Spearman ρ with tumour nuclei (%)
C
RNA vs necrosis
ρ = 0.43, P = 3.5×10⁻⁸
n = 154 cases
RNA Hallmark score
1.25
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
0
20
40
Mean annotated necrosis of case (%)
D
By necrosis category
Kruskal–Wallis P = 6.9×10⁻⁵
Hypocellular area fraction
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0%
n = 102
1–9%
n = 95
≥ 10%
n = 113
Annotated necrosis
E
Diagnostic slide
Density heterogeneity (SD)
Hypocellularity heterogeneity (SD)
Fraction hypercellular tiles (>30%)
Hypercellular fraction (P90 tiles)
Fraction hypocellular tiles (>50%)
Hypercellular area fraction
Nuclear density (P90 tiles)
Hypercellularity heterogeneity (SD)
Hypocellular fraction (P90 tiles)
Hematoxylin (P90 tiles)
Fraction elongated nuclei
Nuclear elongation
BH < 0.05: 0 of 31
0.0
0.1
0.2
0.3
ρ, DX1 slide vs case-mean necrosis (n = 92)
F
Necrosis ≥ 10% (n = 113/310)
True-positive rate
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
False-positive rate
Ridge OOF (AUC = 0.67)
Hypocellular fraction (AUC = 0.64)