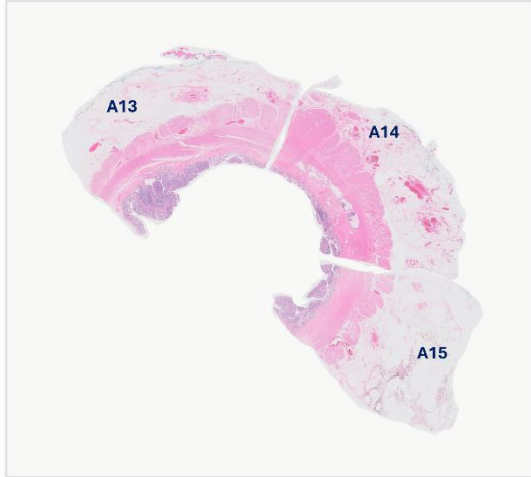


Supplementary material

(a) **Haematoxylin & Eosin (H&E)**
Structural architecture



(b) **Dual staining: trichromic + sma IHC:**
Protein and antigen localization

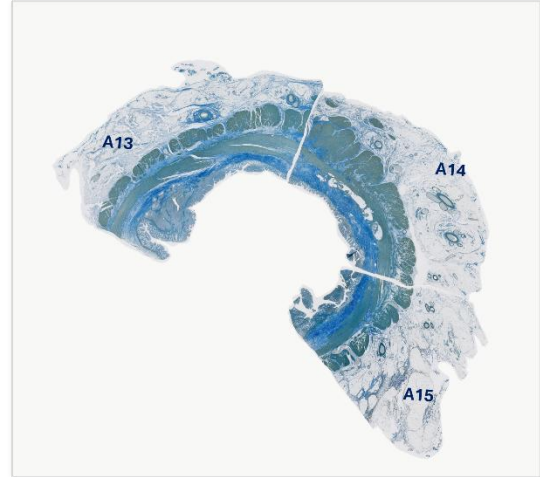


Figure S1 - **Illustrative examples of the histological staining analysis:** (a) standard haematoxylin and eosin (H&E); and (b) dual staining combining smooth muscle actin (SMA) immunohistochemistry (IHC) and modified Masson's trichrome (right), used to differentiate fibrosis (blue) from residual smooth muscle bundles (brownish).

Table S1 – Summary of the number of regions-of-interest (ROIs) defined as the number of unique mask files.

Specimen	Mucosa	Submucosa	Circular Layer	Longitudinal Layer	Tumour	Fibrous Tissue
Specimen001	4	3	9	9	9	7
Specimen003	4	2	5	4	4	3
Specimen004	4	4	6	5	5	2
Specimen005	4	4	5	5	4	5
Specimen006	6	6	6	6	6	6

Table S2 – Summary of the total ROI area in mm² defined as sum of the areas of the single-slice ROI masks.

Specimen	Mucosa	Submucosa	Circular Layer	Longitudinal Layer	Tumour	Fibrous Tissue
Specimen001	53.75	197.50	647.50	1065.00	311.75	136.50
Specimen003	48.75	35.75	210.50	136.00	32.00	50.25
Specimen004	81.00	115.50	161.75	152.75	267.00	6.75
Specimen005	133.50	249.25	240.50	402.75	44.25	169.50
Specimen006	199.25	736.50	505.50	1134.75	219.25	78.00

Table S3 – Summary of the total pixel count defined as sum of all nonzero pixels across those ROI masks.

Specimen	Mucosa	Submucosa	Circular Layer	Longitudinal Layer	Tumour	Fibrous Tissue
Specimen001	215	790	2590	4262	1247	546
Specimen003	195	143	842	544	128	201
Specimen004	324	462	647	611	1068	27
Specimen005	534	997	962	1611	177	678
Specimen006	797	2946	2022	4539	877	312

Table S4 – Summary of ROI sampling characteristics by tissue category, including the range of ROI counts per case, total ROI area, and total pixel count.

Tissue category	Min ROIs per case	Max ROIs per case	Min area (mm²)	Max area (mm²)	Min pixel count	Max pixel count
Mucosa	4	6	48.75	199.25	195	797
Submucosa	2	6	35.75	736.50	143	2946
Circular Layer	5	9	161.75	647.50	647	2590
Longitudinal Layer	4	9	136.00	1134.75	544	4539
Tumour	4	9	32.00	311.75	128	1247
Fibrous Tissue	2	7	6.75	169.50	27	678

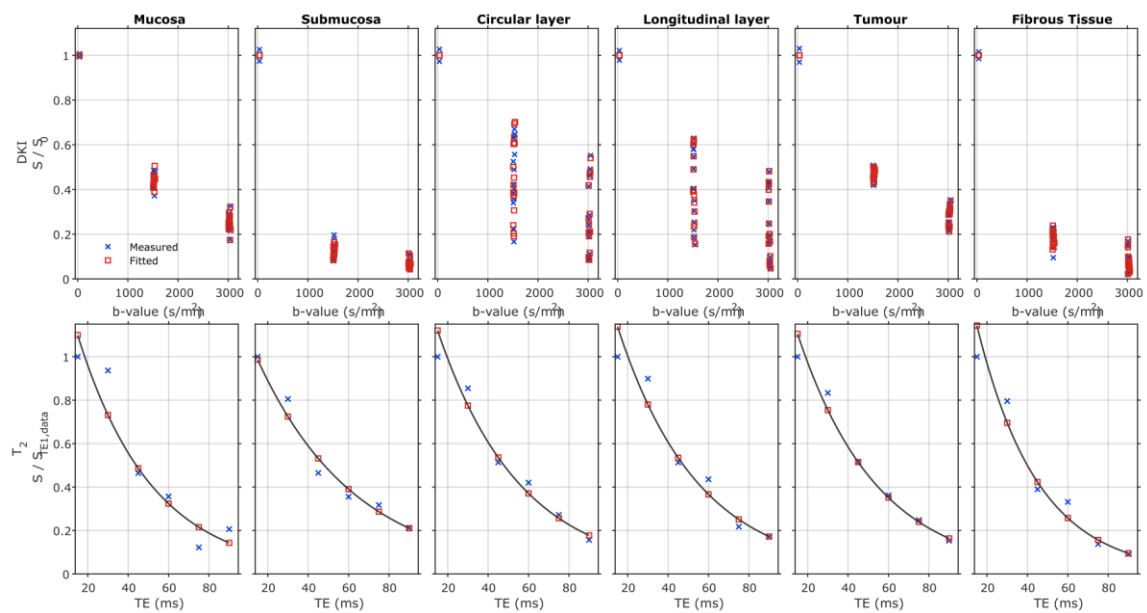


Figure S2 - A representative voxel shows measured signal decay (red) and model fits (blue) for diffusion kurtosis (top row) and T₂ relaxation (bottom row) across tissue-specific regions of interest.