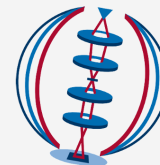


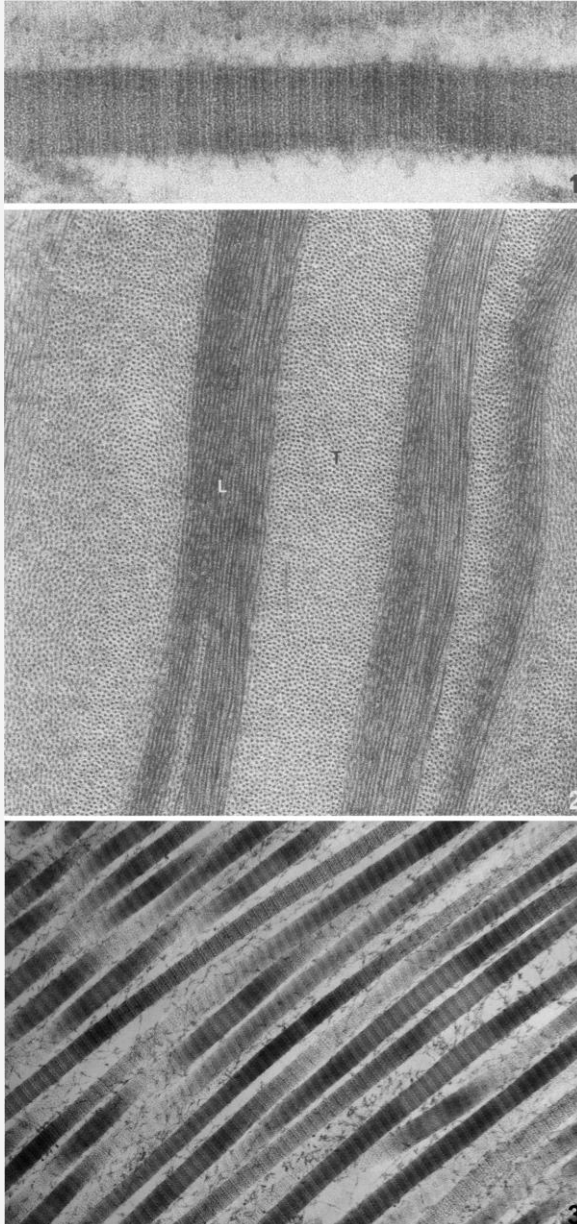
Universität
Münster

**Quiz for launch of:
5th edition of Ghadially's
Ultrastructural Pathology of the Cell and Matrix
Chapter 17 Extracellular Matrix**

Uwe Hansen, Robert Verdijk, and Bart E Wagner

BDIAP, Pathsoc, Belgium Society of Pathology & ACEM
Ghent, Belgium
Thursday 26th June 2025

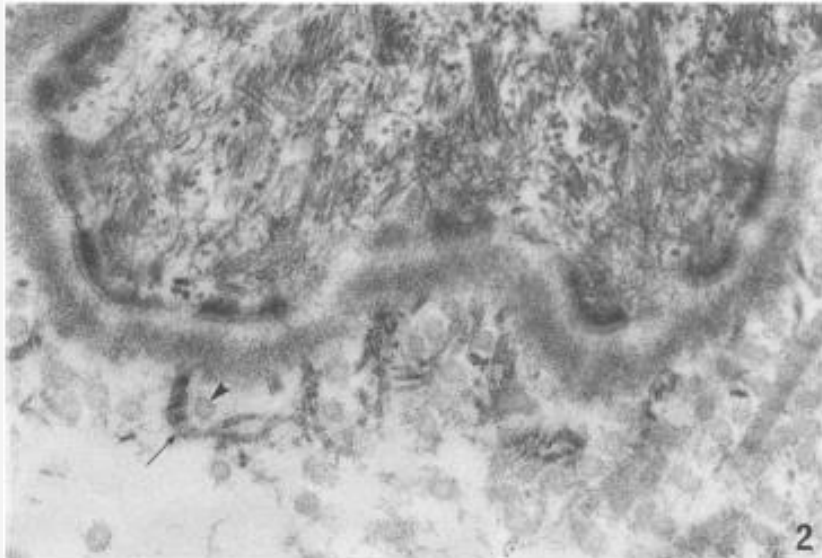
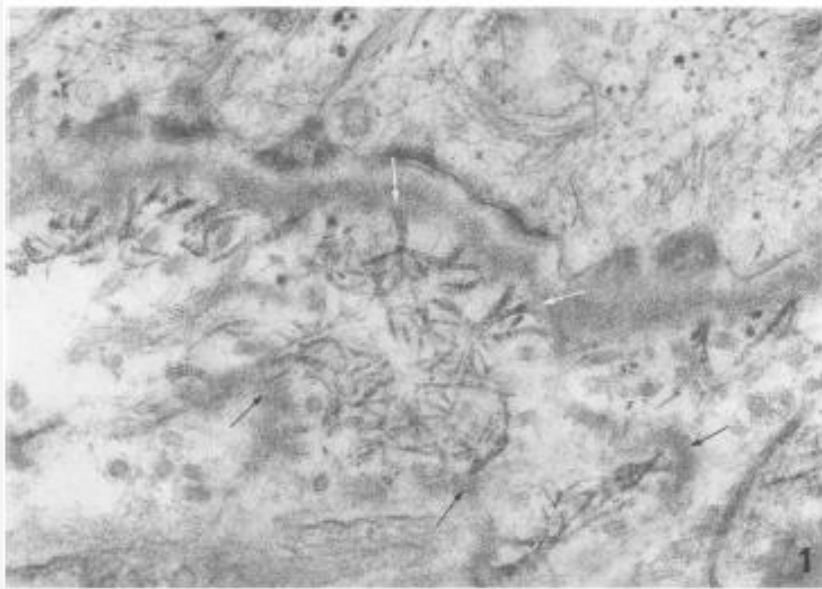




Q1. What is the appearance (e.g. shape) of collagen fibrils in different tissues?

A1. You find the answer on plate 17.4.

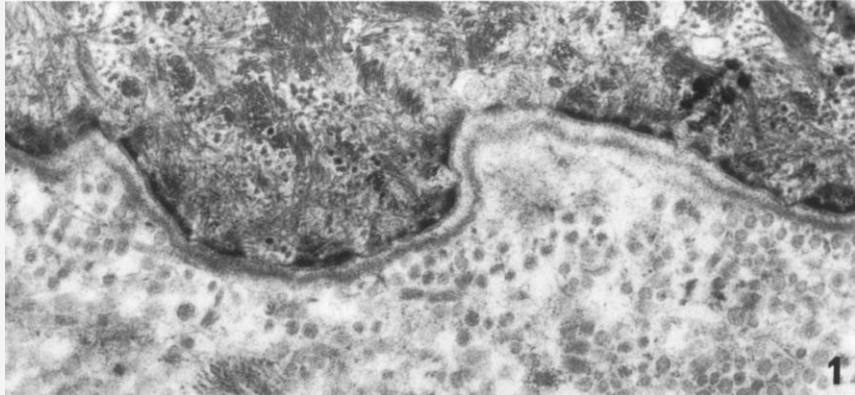
PLATE 17.4 Figure 1 A collagen fibril from the nucleus pulposus of a human intervertebral disc, showing alternating dark and light bands and fine cross striations. The dark and light bands are more easily appreciated at lower magnifications (see Figure 3 below), x 190,000. Image by FN Ghadially 1997. 4th edition of this book. Figure 2 The stroma (substantia propria) of a human cornea. Note alternating lamellae composed of uniformly thick collagen fibrils cut transversely (T) and longitudinally (L), x 30,000. Image by FN Ghadially 1997. 4th edition of this book. Figure 3 Longitudinal section of dermal collagen fibrils with associated collagen VI. Original magnification, x 20,000. Image by BE Wagner. Not previously published.



Q2. Where could you get information about anchoring fibrils in a skin biopsy?

A2. You will find the answer to this on plate 17.6 and the paragraph starting on page 713.

PLATE 17.6 Skin biopsy from an area of cutaneous rash that developed in a case of rheumatoid arthritis after chrysotherapy. **Figure 1** Numerous anchoring fibrils are seen attached to the lamina densa of the basal lamina. Note how some of the fibrils (white arrows) fan out at the site of attachment. Also seen are collections of anchoring fibrils attached to structures (black arrows) that may be regarded as tangentially cut basal lamina belonging to epithelium not included in the section, or as anchoring plaques lying free in the matrix, $\times 48,000$. Image by FN Ghadially 1997. 4th edition of this book. **Figure 2** High-power view of anchoring fibrils. A banded anchoring fibril (arrow) is hooking around a transversely cut collagen fibril (arrowhead), $\times 88,000$. Image by FN Ghadially 1997. 4th edition of this book.



Q3. Where could you find further information on alterations of anchoring fibrils?

A3. You will find examples on plate 17.7 and in the paragraph starting on page 713.

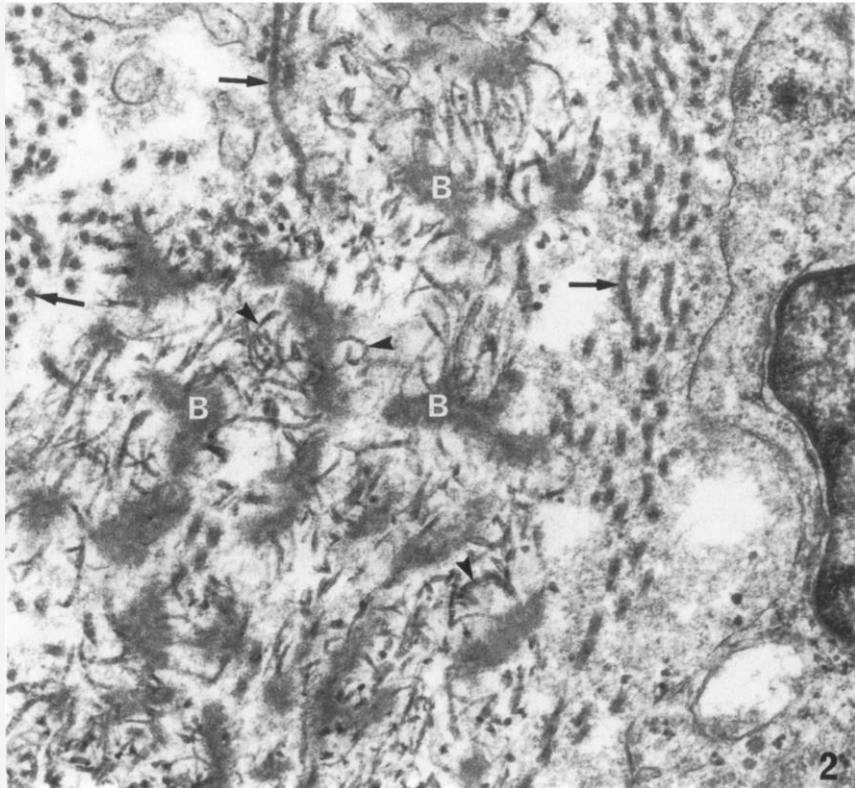
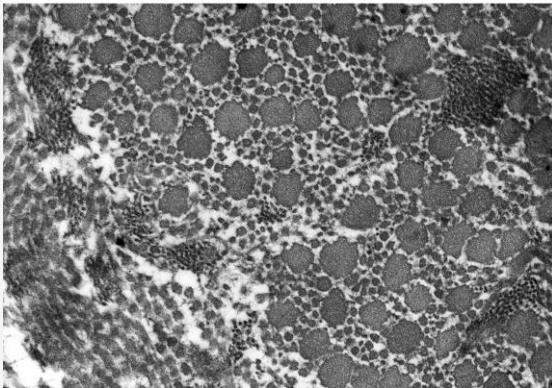
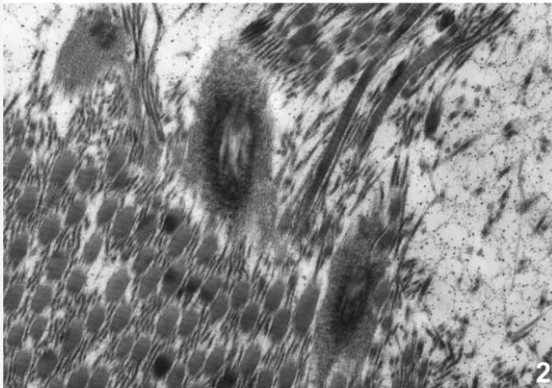
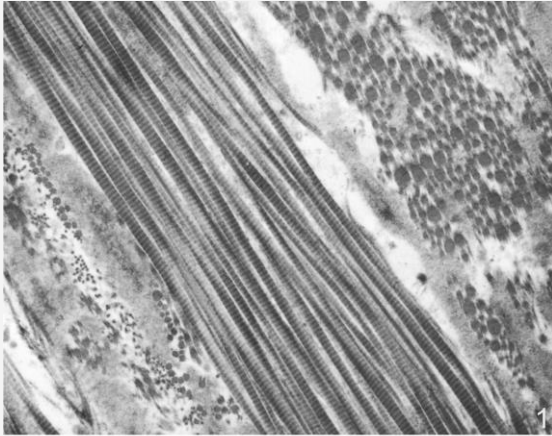


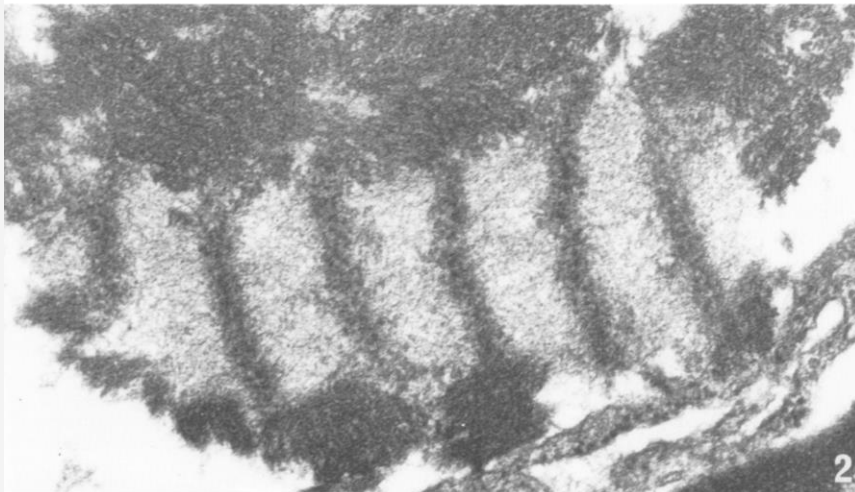
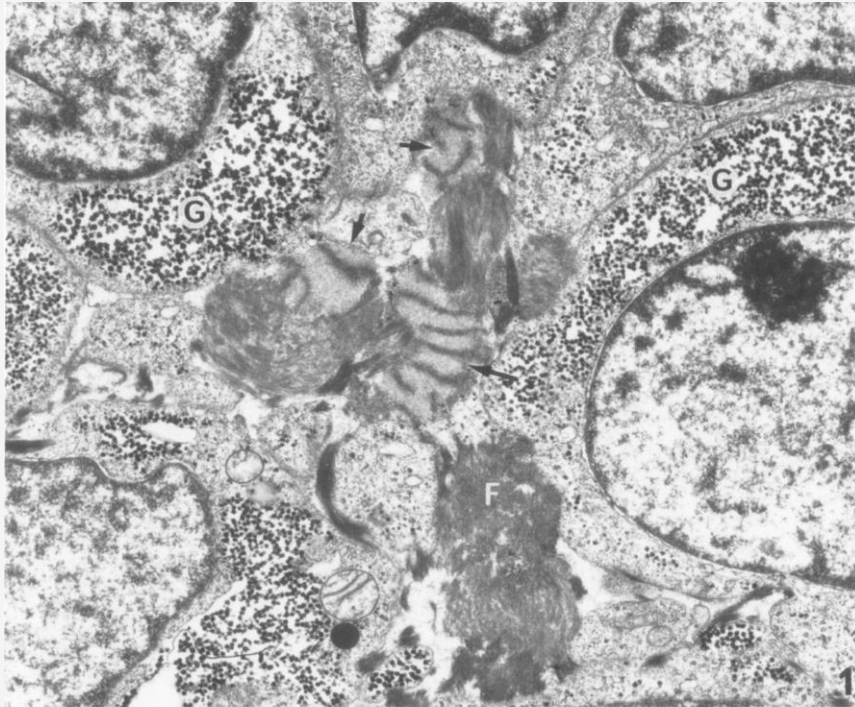
PLATE 17.7 Figure 1 Biopsy of grossly unaffected skin from a case of epidermolysis bullosa dystrophica. Note the absence of anchoring fibrils. In some areas of the specimen, a few small slender rudimentary fibrils were present, x 50,000. Image by FN Ghadially 1997. 4th edition of this book. Figure 2 Malignant spindle cell tumor. Note the native collagen fibrils (arrows) and the numerous anchoring fibrils (arrowheads) attached to or radiating from structures acceptable as anchoring plaques or segments of basal lamina (B). Image by FN Ghadially 1997. 4th edition of this book. Compare with Plate 17.6, Figure 1, x 46,000.



Q4. Where could get information about the organisation and morphology of collagen fibrils in the sclera?

A4. You find examples and further information on plate 17.5 and in the figure legend.

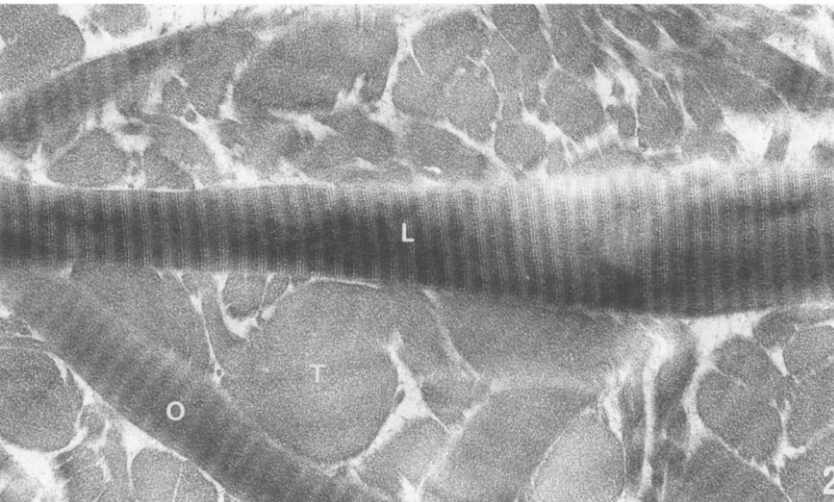
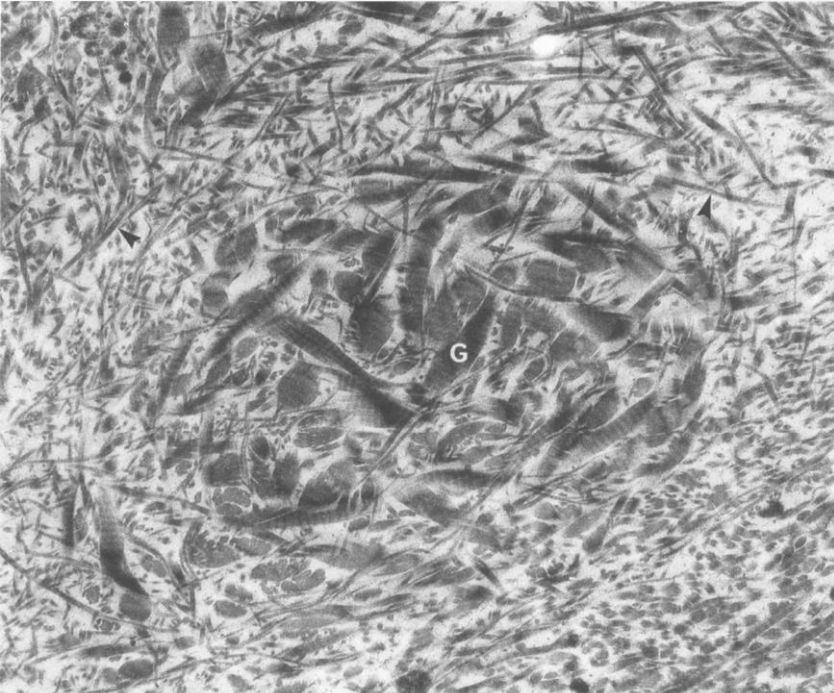
PLATE 17.5 Figure 1 Normal sclera showing lamellae of collagen fibrils in perpendicular orientation to each other, also collagen fibrils showing spiral effect and elaunin fibers with banded peri-elastic material. Original magnification x 10,400. Image by U Hansen. Not previously published. Figure 2 Sclera from a patient with uveal effusion syndrome showing elaunin fibers with increased perielastic material and increased proteoglycan. Original magnification x 9,200. Image by BE Wagner. Not previously published. Case courtesy of Dr H S Mudhar. Figure 3 Sclera from another patient with uveal effusion syndrome showing marked bimodal collagen fibril diameter variation and oxytalan fibers. Original magnification x20,000. Image by BE Wagner. Not previously published. Case courtesy of Dr H S Mudhar.



Q5. Ewing's sarcoma. What are the typical characteristics?

A5. See plate 17.12 for further information.

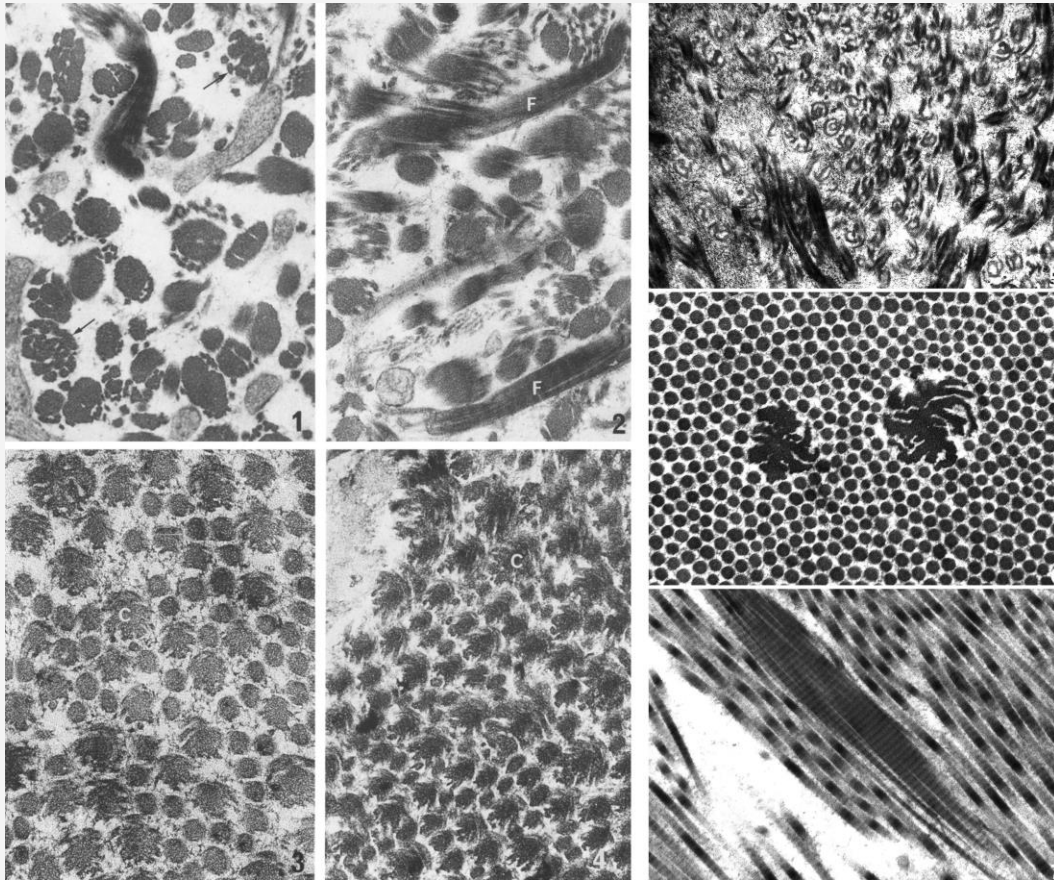
PLATE 17.12 Ewing's sarcoma (from Ghadially and Mierau, 1985, *J. Submicrosc. Cytol.* 17:645)
Figure 1 The tumor cells contain the characteristic focal deposits of glycogen (G). Fibrin (F) and banded structures (arrows) are seen between the tumor cells. The periodicity of banding of the fibril indicated by the long arrow is 252 nm, x 14,500. Figure 2 High-power view of a banded fibril that has a banding periodicity of 272 nm, x 71,000.



Q6. What are giant collagen fibrils and where could you find such fibrils?

A6. You will find the answer on plate 17.16 and in the paragraph starting on page 721.

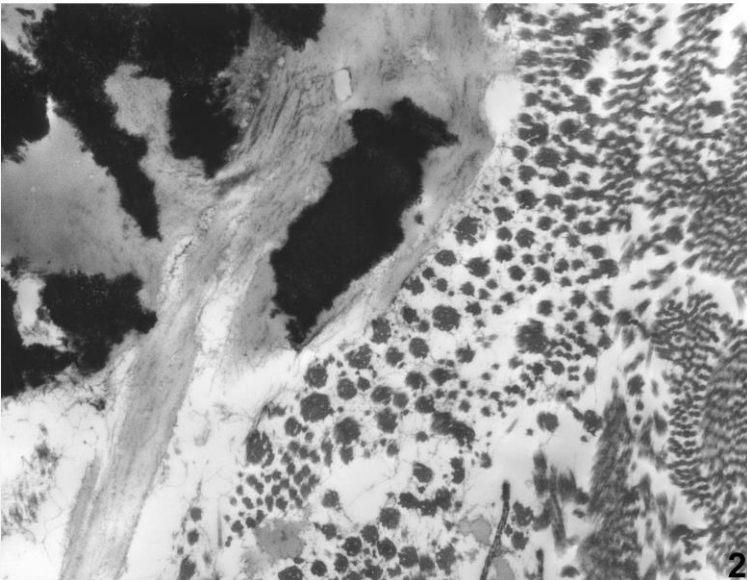
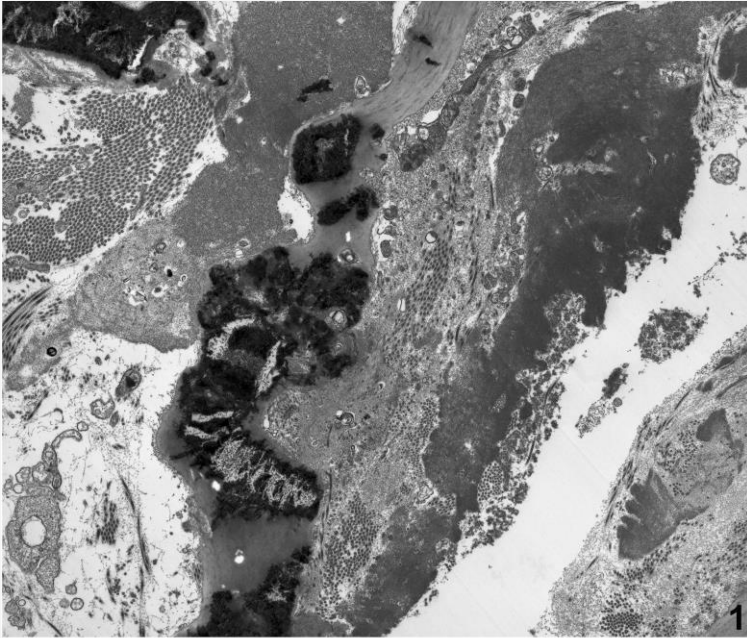
PLATE 17.16 Giant collagen fibrils in osteoarthrotic cartilage. Figure 1 A focal area of amianthoid change (microscar) or amianthoid fiber in osteoarthrotic cartilage is seen here. Compare the thickness of the giant fibrils (G) with the native collagen fibrils (arrowheads), x 27,000 (from Ghadially, Lalonde, and Yong, 1979, Virchows Arch. B Cell Pathol. 31:81). Figure 2 Another focal area of amianthoid change showing transversely (T) and longitudinally (L) cut giant collagen fibrils. Major and minor bands are evident in the giant fibril (L) running horizontally across the picture, but, as is to be expected, minor bands are not evident in the obliquely (O) cut fibril, x 66,000 (from Ghadially, Lalonde, and Yong, 1979, Virchows Arch. B Cell Pathol. 31:81).



Q7. What are spiraled collagen fibrils and in which cases could you find such morphological aberrant collagen fibrils?

A7. You will find examples and detailed information on plate 17.20 and the figure legend for plate 17.20.

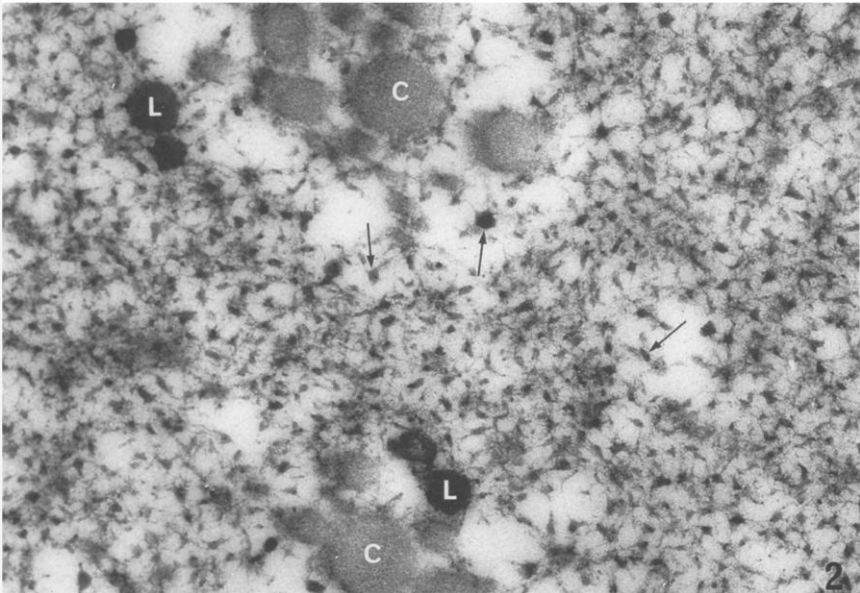
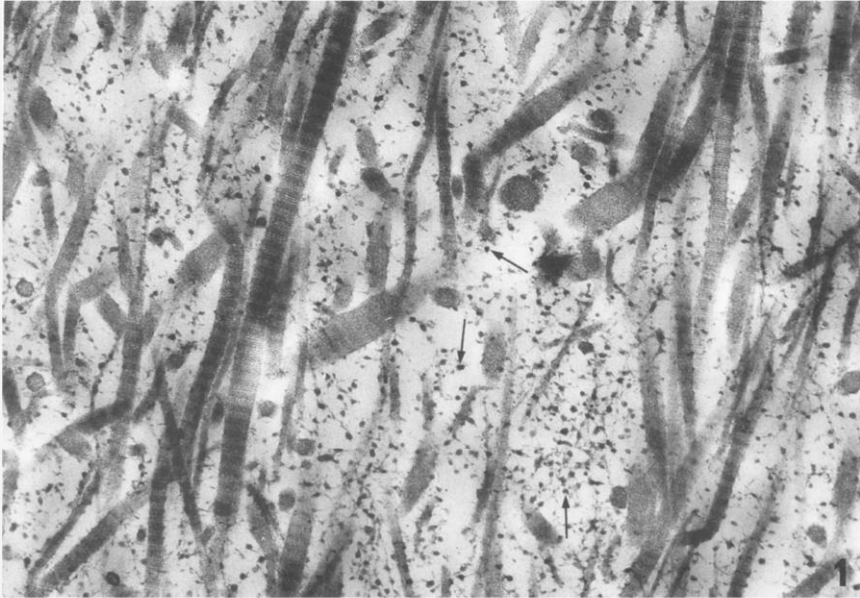
PLATE 17.20 Figures 1 and 2 Spiraled collagen from a case of epiphyseal dystosis. In transverse section (arrows), the fibrils have a ragged motheaten appearance. In longitudinal section, the fibrils (F) appear spiraled or frayed, x 58,000; x 56,000. Image by FN Ghadially 1997. 4th edition of this book. Figures 3 and 4. The transversely sectioned spiraled collagen (C) in these electron micrographs has a flower-like appearance. It comes from skin injured by handling Norway saltpeter (can also be seen in electric current damage; personal comment, I Hau.er-Stiller), x 47,000; x 40,000 (from Otkjaer-Nielsen, Christensen, Flentzer, Johnson, and Kobayasi, 1978, Acta Derm. Venereol. Suppl. (Stockh.) 58:323). Figure 5 Dermis from patient with dermatosparaxis Ehlers-Danlos Syndrome showing aberrant (hieroglyphic) collagen fibrils in an abundant filamentous background (original magnification x 20,000). Image by BE Wagner. Not previously published. Case courtesy of Dr M C Cohen. Figure 6 Dermis from a patient with osteogenesis imperfecta COL1A1 in transverse sectional orientation showing aberrant collagen fibrils (original magnification x 20,000). Image by BE Wagner (from M Balasubramanian, GJ Sobey, BE Wagner, LC Peres, J Bowen, J Bexon, MK Javaid, P Arundel, NJ Bishop 2016 Ultrastructural Pathology Vol 40, No 2, 71–76). Figure 7 Dermis from same patient with osteogenesis imperfecta COL1A1 (as in Figure 6 above) in longitudinal sectional orientation showing aberrant collagen fibrils (original magnification x 20,000). Image by BE Wagner. Not previously published.



Q8. How could you identify a calcified elastic fiber in a skin biopsy?

A8. You could find the answer on plate 17.26 and in the paragraph starting on page 731.

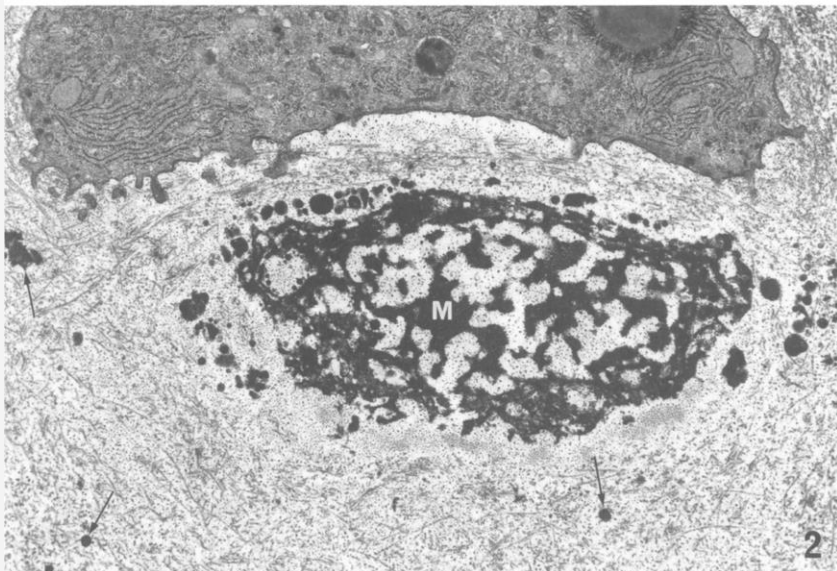
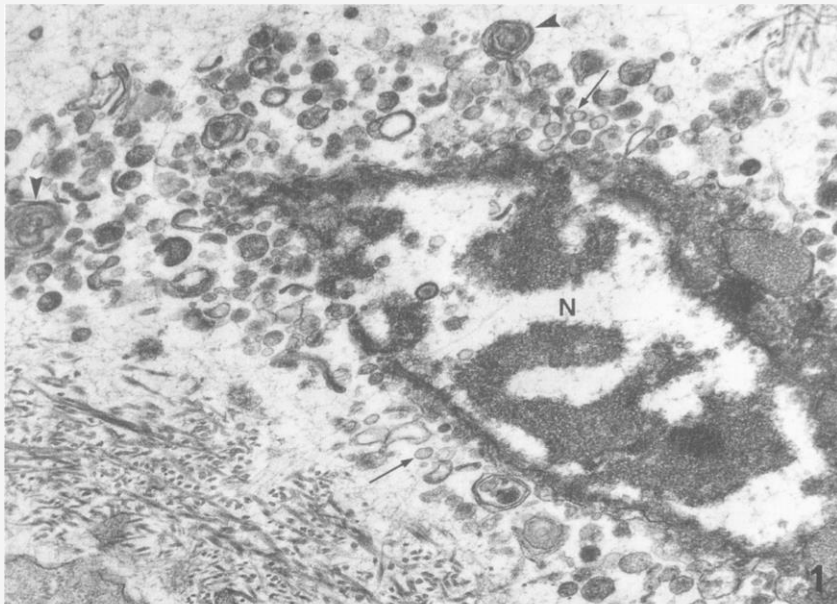
PLATE 17.26 A calcified elastic fiber from the skin of a couple of cases of pseudoxanthoma elasticum. **Figure 1** Partially calcified elastic fiber with unclassified peri-elastic filamentous protein aggregates as seen in a proportion of cases. Glutaraldehyde fixed tissue. Image by BE Wagner. Not previously published. Case courtesy of Dr D.N. Slater. **Figure 2** Partially calcified elastic fiber surrounded by moderate numbers of aberrant collagen fibrils as seen in a proportion of cases. Formalin fixed paraffin processed tissue. Image by B.E. Wagner. Not previously published. Case courtesy of Dr D.N. Slater.



Q9. How could you identify proteoglycans in cartilage?

A9. You will find the answer on plate 17.35.

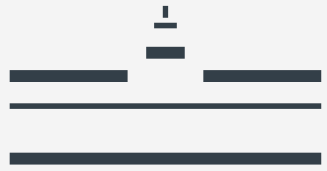
PLATE 17.35 Figure 1 Zone III of rabbit articular cartilage. Numerous proteoglycan particles (arrows) are seen among the collagen fibrils, x 45,000. Image by F.N. Ghadially 1997. 4th edition of this book. Figure 2 Rabbit semilunar cartilage. Note the numerous proteoglycan particles (arrows), cross-cut collagen fibrils (C), and intramatrix granular lipidic debris (L), x 86,000. Image by F.N. Ghadially 1997. 4th edition of this book.



Q10. How could you identify necrosis and disintegration in articular cartilage?

A10. You will find the answer on plate 17.40.

PLATES 17.40 Figure 1 Necrosis and disintegration of a chondrocyte from rabbit articular cartilage. Note the necrotic nucleus (N) and the membranous debris derived from the breakdown of cellular components. Some of these membranous formations present as small vesicles (arrows), others as larger vacuolar and whorled membranous structures (arrowheads), x 27,000. Image by F.N. Ghadially 1997. 4th edition of this book. Figure 2 Necrosis and disintegration of one member of a chondrocyte pair from rabbit articular cartilage. The resultant necrotic debris presents as granules and masses of electron-dense material (M). Some of it (arrows) appears to have drifted into the surrounding matrix, x 16,000 (from Ghadially, 1978, Fine structure of joints. In: L. Sokoloff (ed.), The Joints and Synovial Fluid, Academic Press, London).

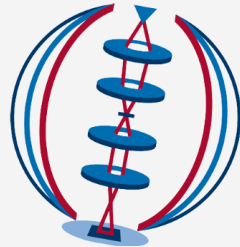


Universität
Münster

Any further questions?



Uwe Hansen



Thank you for your attention.