



Ultrastructure Atlas of Human Tissues

FRED E. HOSSLER

WILEY Blackwell

ULTRASTRUCTURE ATLAS OF HUMAN TISSUES

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This atlas is dedicated to my parents, Leroy E. and Mildred E. Hossler, who taught me to appreciate the beauty of living things and the value of fine, detailed images of them. Mildred was a well-known water color artist and school teacher in Hamburg, Berks County, Pennsylvania.

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Chapter 3

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FIGURE III-29. Adipocytes from adipose tissue in hypodermis of human upper leg. The very delicate connective tissue fibers on the adipocyte surfaces are composed primarily of collagen III. $\times 1353$.

FIGURE III-30. Human adipocytes. The large collagen fibers (C) in the center and lower left of the image are likely collagen I, and the delicate fibers (arrows) barely visible on the adipocyte cell surfaces are likely collagen III. ×1135.

FIGURE III-31. Adipocytes from connective tissue associated with the mesentery near the human gall bladder. The larger fibers (C) near the top of the image are likely collagen I, whereas the delicate fibers adhering to the cell surfaces (arrows) are likely collagen III. ×1025.

FIGURE III-32. Human adipocytes. ×848.

FIGURE III-33. (a) and (b) Adipocytes from human hypodermis. Fig. III-33b is a cross section of the cell surface of an adipocyte showing its nucleus within a thin rim of cytoplasm. ×1140.

FIGURE III-34. Adipocytes and collagen fibers in human adipose tissue. ×2050.

FIGURE III-35. High magnification of connective tissue fibers on the surface of a human adipocyte. The larger fibers seen on the cell surface are likely collagen I, and the finer fibers are likely collagen III. ×8632.

FIGURE III-36. Connective tissue fibers on the surface of an adipocyte in human connective tissue. The fibers represent several types of collagen. ~×9000.

FIGURE III-37. Connective tissue fibers on the surface of a human adipocyte. The fibers represent various types of collagen. ~×13 000.

FIGURE III-38. High magnification image of the surface of an adipocyte from human hypodermis

showing details of collagen fibers. The large fibers are likely collagen I (CI) and the small fibers are likely collagen III (CIII). ×11 785.

FIGURE III-39. High magnification of collagen fibers on the surface of an adipocyte from human hypodermis. The large fibers likely are collagen I (CI), and the small fibers are likely collagen III (CIII). ×8000.

STEREO PAIR III-80. Adipocytes from human dermis.

STEREO PAIR III-81. Adipocytes from human dermis.

FIGURE III-40. Two mast cells (M) in the lamina propria of the human colon. Note the distinct cytoplasmic granules and the numerous surface microvilli, characteristic of mast cells. The edge of a capillary (C) is seen at the lower right corner of the image and a segment of a peripheral nerve (N) is present at the top of the image. The thin strands (arrows) seen within the connective tissue matrix are cytoplasmic processes of flattened fibroblasts. B, collagen bundles; G, ground substance; E, endothelial cell. ×5614.

FIGURE III-41. Mast cell in the lamina propria of the human stomach. Note the prominent cytoplasmic granules. ~×17 096.

FIGURE III-42. (a) Mast cell in the lamina propria of the human stomach. (b) Mast cell in the lamina propria of the human colon. Note the prominent cytoplasmic granules of the mast cells in each image. G, Golgi complex. (a) ~×11 790 and (b) ~×15 454.

FIGURE III-43. (a) and (b) Mast cells in the lamina propria of the human colon. Note the abundant

cytoplasmic granules and surface microvilli. (a) ~×15 540 and (b) ~×13 700.

FIGURE III-44. (a) and (b) Mast cells in the lamina propria of the human ileum. (c) Mast cell in the interlobular connective tissue of the human liver. (d) Mast cell in the lamina propria of the human stomach. ×6452. C, collagen fibers; G, ground substance.

FIGURE III-45. Mast cell in the lamina propria of the human ileum. Note the prominent granules in the cytoplasm and the abundant microvilli on the cell surface. C, collagen fibers; G, ground substance. ~×60 923.

FIGURE III-46. (a) and (b) Plasma cells and one mast cell (M) in the lamina propria of the human colon. Note characteristic chromatin pattern and rough endoplasmic reticulum-rich cytoplasm in all plasma cells. (a) ×7411 and (b) ×6382.

FIGURE III-47. This plasma cell in the lamina propria of the human colon displays all the classic characteristics of this cell type—an eccentric nucleus with a “spoke wheel” heterochromatin pattern, a perinuclear Golgi “halo” region in the cytoplasm, and a cytoplasm rich in profiles of rough endoplasmic reticulum. Arrows, mitochondria; arrowhead, centriole. ~×25 000.

FIGURE III-48. (a) Plasma cell in the lamina propria of the human jejunum. (b) Plasma cell in the lamina propria of the human ileum. In each case note “spoke wheel” pattern of heterochromatin and rough endoplasmic reticulum-rich cytoplasm. Arrows, mitochondria.

FIGURE III-49. (a), (b), and (c) Plasma cells in the lamina propria of the human colon. Note the eccentric nuclei and rough endoplasmic reticulum-rich cytoplasm in each cell. In (a) and (b), note the very distinct “spoke wheel” pattern of the heterochromatin. N, nucleolus. The magnification of (a) is about 17 647.

FIGURE III-50. (a) to (d) Plasma cells in the lamina propria of the human ileum. Arrow, centriole; arrow heads, mitochondria. Image magnifications are about 10 000.

FIGURE III-51. Plasma cell cluster in the lamina propria of the human colon. Note typical “spoke wheel” chromatin pattern and rough endoplasmic reticulum-rich cytoplasm in these cells. N, nucleolus; arrow, centriole. $\times 10\,000$.

FIGURE III-52. Dense regular connective tissue in the cross section of a tendon from a human wrist surgery. $\times 58$.

FIGURE III-53. Dense regular connective tissue in the cross section of a tendon from a human wrist surgery. $\times 118$.

FIGURE III-54. (a), (b), and (c) Collagen type I fibers (cross section in (a) and long sections in (b) and (c) in dense regular connective tissue in tendons from a human wrist surgery. (a) $\times 1639$, (b) $\times 850$, and (c) $\times 336$.

FIGURE III-55. Collagen type I fibers from dense regular connective tissue in a section of tendon from a human wrist surgery. $\times 1034$.

FIGURE III-56. (a) and (b) Collagen type I fibers from the human flexor carpi radialis tendon. (a) $\times 752$ and (b) $\times 1540$.

FIGURE III-57. (a) and (b) Collagen type I fibers in dense regular connective tissue from the human flexor carpi radialis tendon. (a) ×4069 and (b) ×5000.

FIGURE III-58. Collagen type I fibers from a tangentially sectioned human flexor carpi radialis tendon. ×2600.

STEREO PAIR III-82. Cross section of human gastrocnemius tendon.

STEREO PAIR III-83. Human gastrocnemius tendon.

STEREO PAIR III-84. Human gastrocnemius tendon.

STEREO PAIR III-85. Human gastrocnemius tendon.

STEREO PAIR III-86. Human gastrocnemius tendon.

STEREO PAIR III-87. Human flexor carpi radialis tendon.

STEREO PAIR III-88. Human flexor carpi radialis tendon.

STEREO PAIR III-89. Human flexor carpi radialis tendon (lateral view).

STEREO PAIR III-90. Human flexor carpi radialis tendon (lateral view).

STEREO PAIR III-91. Collagen I fibers in human gastrocnemius tendon (tangential section).

STEREO PAIR III-92. Collagen I fibers in human gastrocnemius tendon (tangential section).

FIGURE III-59. Hyaline cartilage plate from human trachea, split open. P, perichondrium. ×59.

FIGURE III-60. Interior of hyaline cartilage plate from human trachea. P, perichondrium. ×202.

FIGURE III-61. (a) and (b) Interior of hyaline cartilage plates from human trachea. Arrows, chondrocytes in lacunae; arrowheads, lacunae. (a) ×168 and (b) ×340.

FIGURE III-62. Interior of hyaline cartilage plate from human trachea. Fibrous appearance of matrix (M) is due to collagen type II fibers embedded in ground substance. C, chondrocytes in lacunae; L, lacunae. ×509.

FIGURE III-63. Details of hyaline cartilage from human trachea. Note fibrous appearance of matrix (M) due to the presence of collagen type II fibers embedded in ground substance. C, chondrocytes in lacunae. ×991.

FIGURE III-64. Two chondrocytes embedded in hyaline cartilage matrix from the human trachea. ×8450.

FIGURE III-65. Chondrocytes in the matrix of hyaline cartilage from the human trachea. Because of their proximity to each other, these three cells are likely members of an isogenous group. The matrix immediately surrounding each cell is slightly different in appearance from the rest of the matrix, and was thus likely newly synthesized by these cells. ×6913.

FIGURE III-66. Fibrocartilage from human bunion surgery. The fibrous appearance of the cartilage matrix (M) is due to the presence of collagen type I fibers embedded in ground substance. Arrows, chondrocytes in lacunae. ×245.

FIGURE III-67. Fibrocartilage from human bunion surgery. Chondrocytes were extracted from the two