



Quiz for the launch of:
5th edition of Ghadially's
Ultrastructural Pathology
of the Cell and Matrix.
Chapter 15: Cell Junctions

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Deputised:

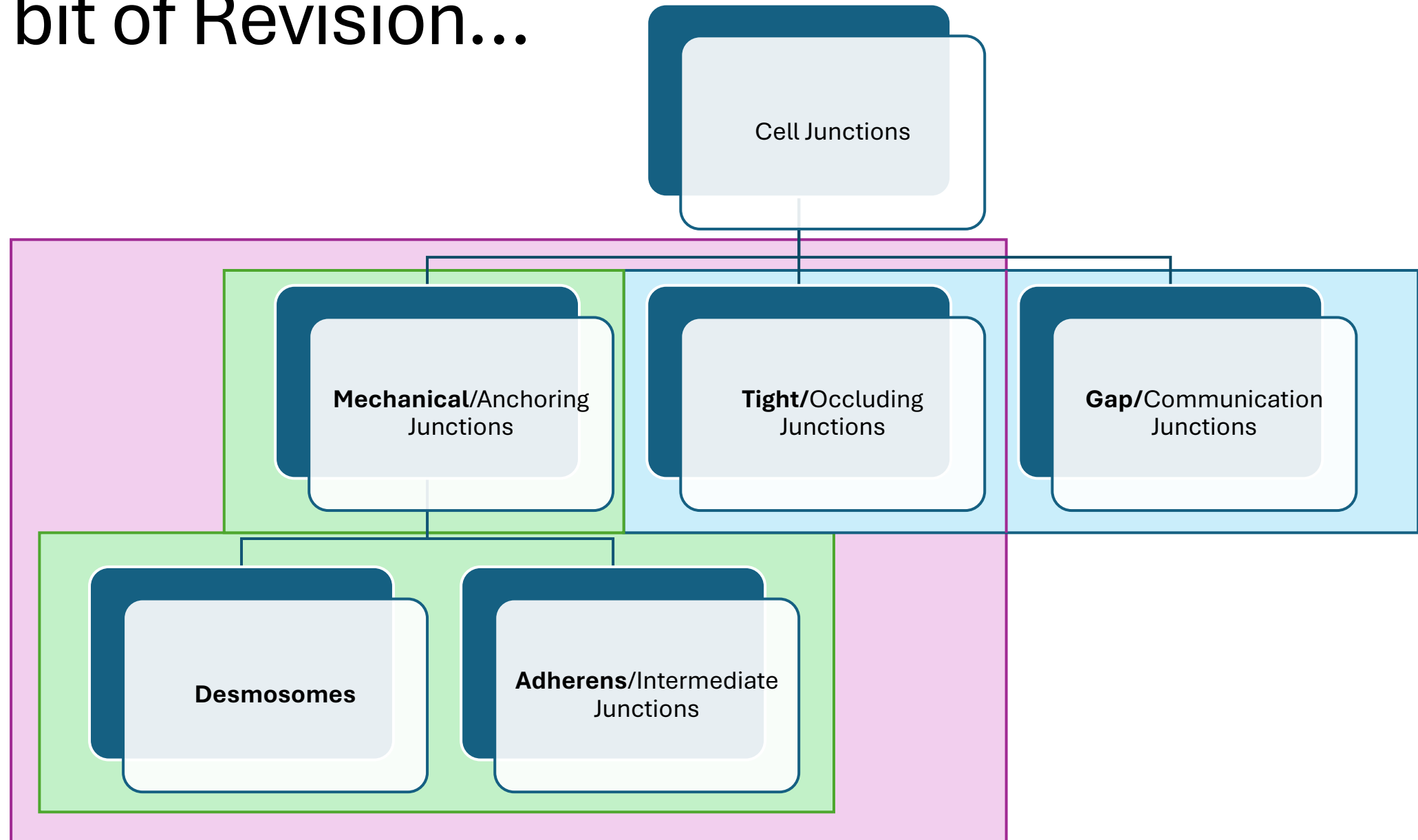
Dr Joseph Roscamp, Sheffield UK

BDIAP, PathSoc, Belgium Society of Pathology & ACEM

Ghent, Belgium

Thursday 26th June 2025

A bit of Revision...



- Note all of the EM images used in this presentation are taken from Chapter 15 of the 5th Ed Ghadially's Ultrastructural Pathology of the Cell and Matrix 2025

Q1 – Which box A, B, C or D highlights a Desmosome?

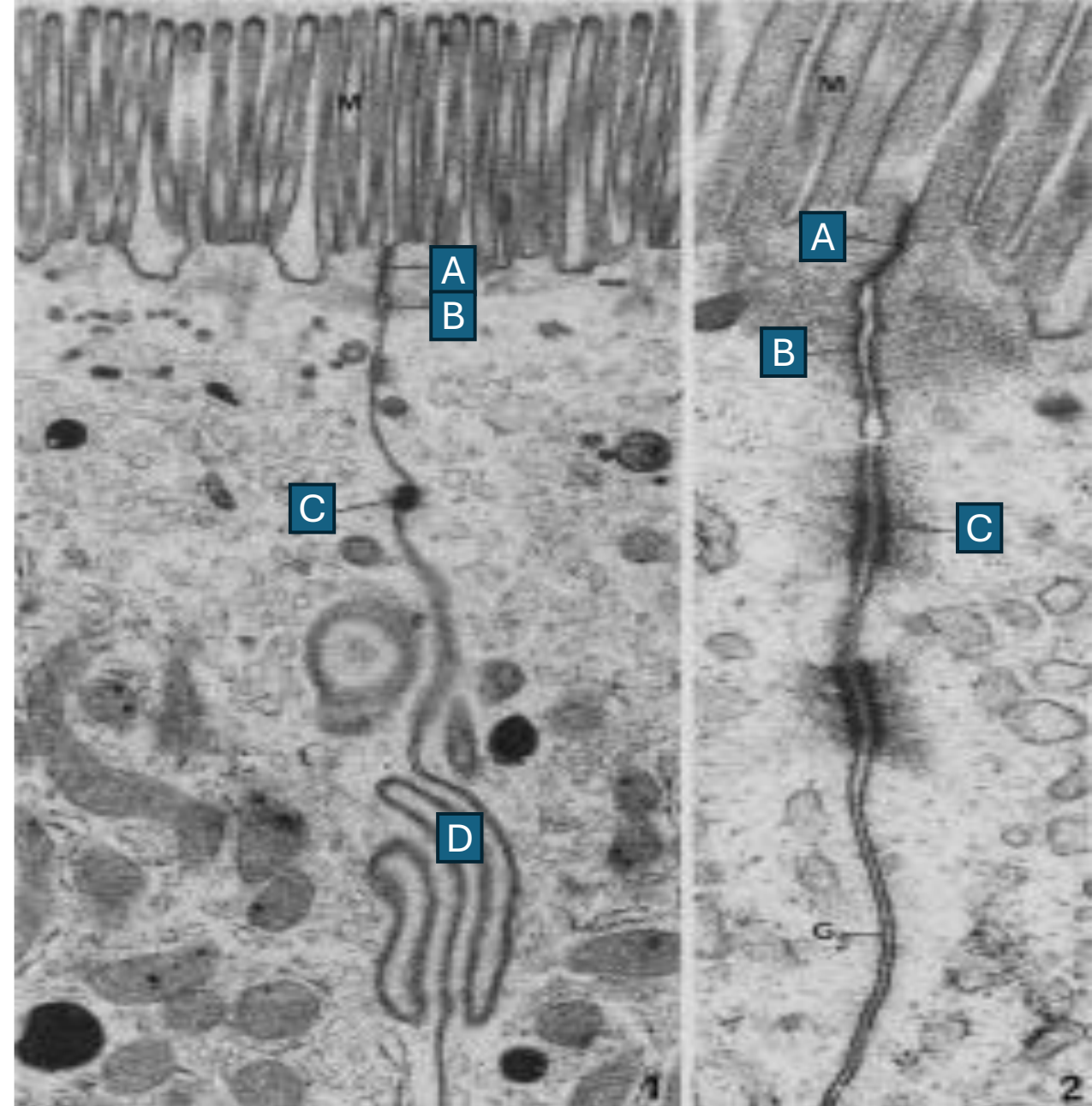


PLATE 15.1 The apical junction complex between adjacent human intestinal epithelial cells is illustrated here.'

Q1 – Which box A, B, C or D highlights a Desmosome?

C

A1 – You will find the answer to this in the legend of Plate 15.1 and on page 665

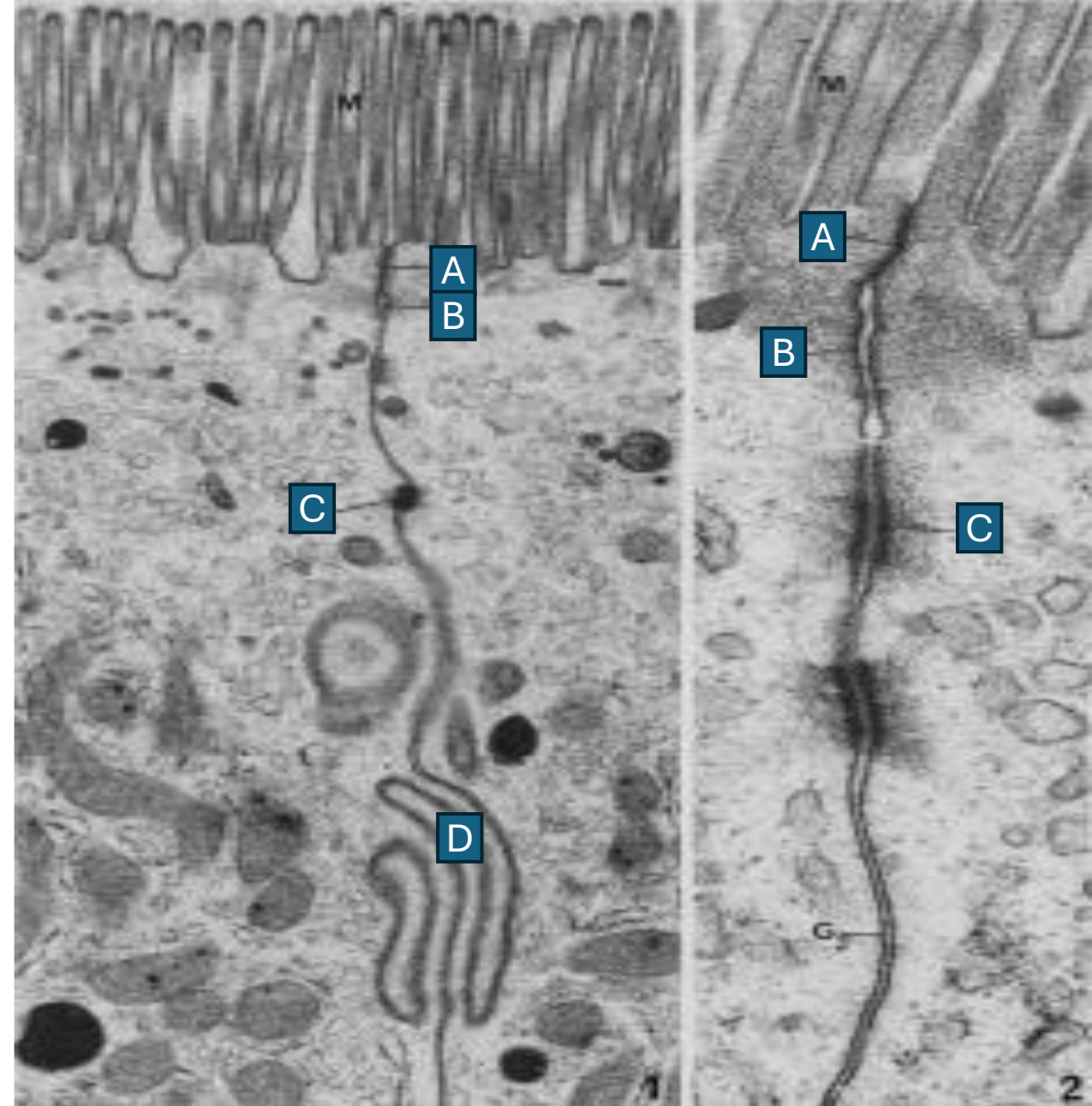


PLATE 15.1 The apical junction complex between adjacent human intestinal epithelial cells is illustrated here.'

Q2 – What is the indicated Junction, and what further test could we do to help in discerning this?

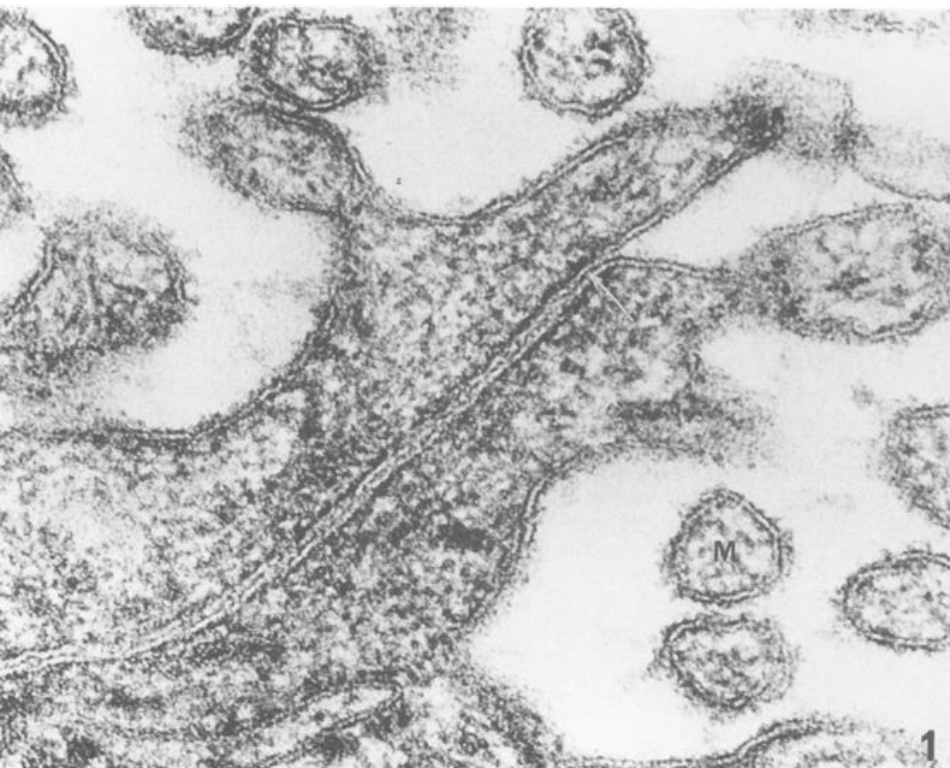


PLATE 15.4 (Electron micrographs courtesy of Dr A. Martinez-Palomo). **Figure 1 A** between acinar cells of mouse mammary gland, showing the characteristic pentalaminar structure (black-white-black-white-black).

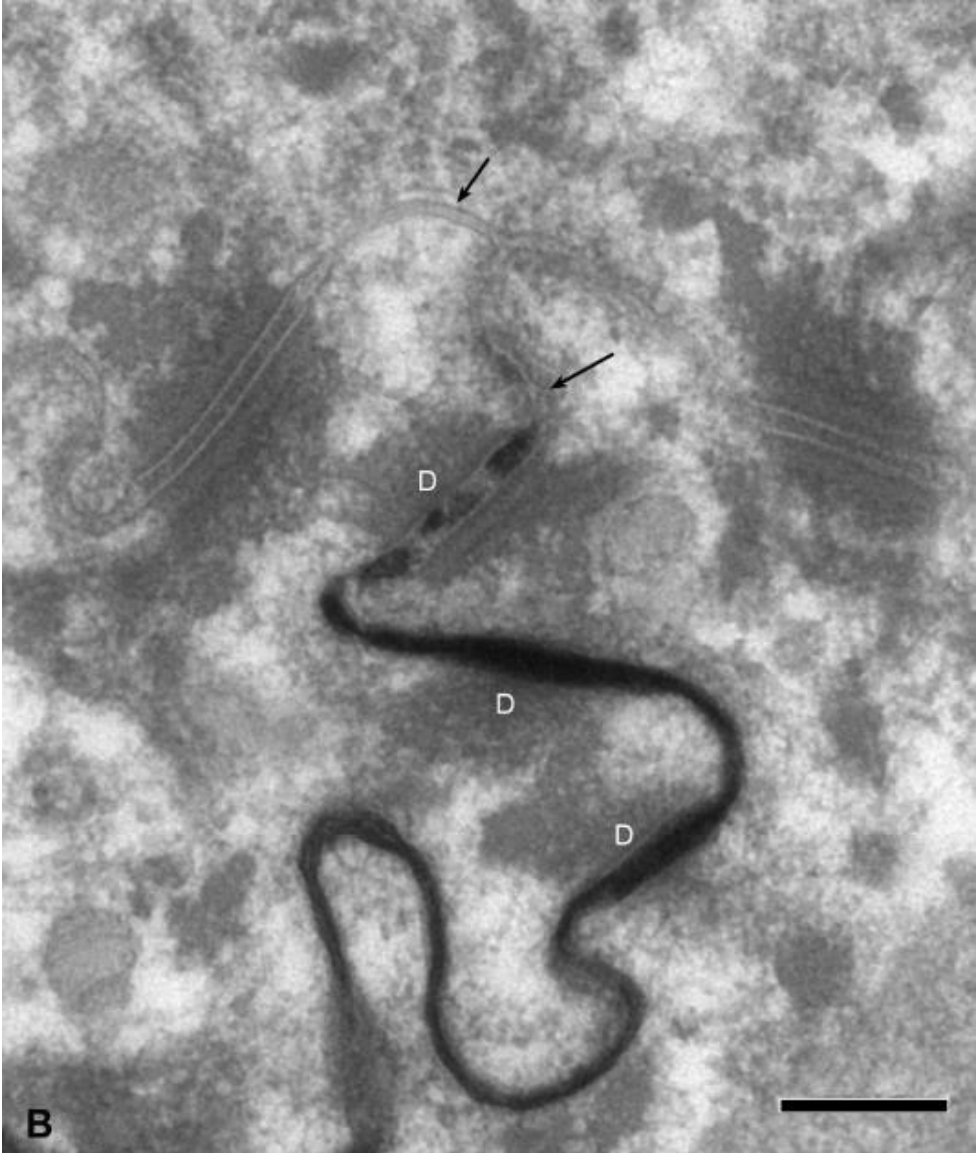


PLATE 15.3 Mouse epidermis

penetration assay highlights functionality of the : the tracer permeates throughout several (D) until it is stopped at the apical portion of the extracellular space

Q2 – What is the indicated Junction, and what further test could we do to help in discerning this?

Tight Junction, paracellular tissue infiltration studies
A2 – You will find the answer to this in the legend of plate 15.3 and 15.4 on pages 666 & 667 and in the second section of page 666



PLATE 15.4 (Electron micrographs courtesy of Dr A. Martinez-Palomo). **Figure 1 A** between acinar cells of mouse mammary gland, showing the characteristic pentalaminar structure (black-white-black-white-black).

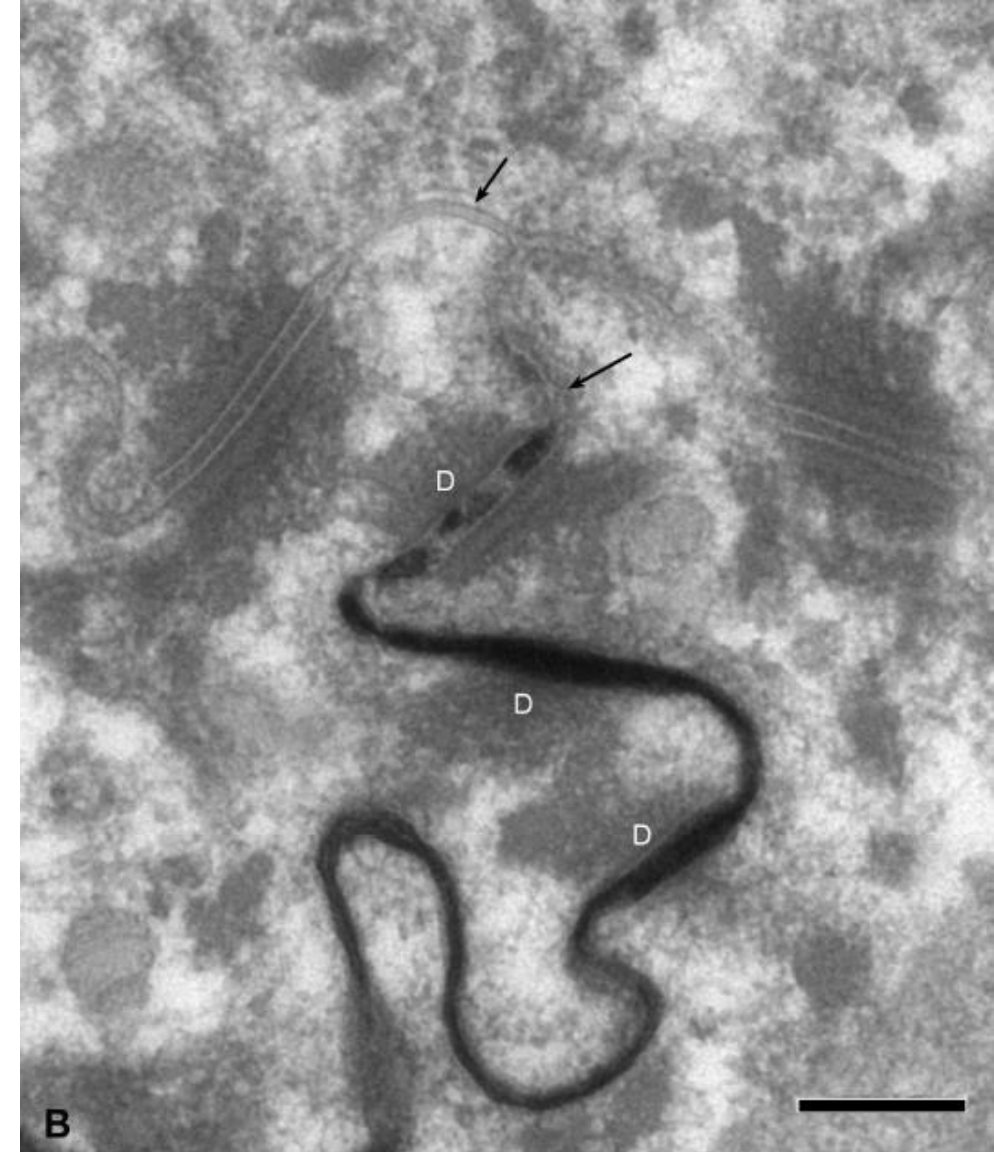


PLATE 15.3 Mouse epidermis

penetration assay highlights functionality of the : the tracer permeates throughout several (D) until it is stopped at the apical portion of the extracellular space

Q3 – What two junctions do these freeze-fractured EMs reveal ?



PLATE 15.8 Details of _____ seen in a freeze-fractured specimen of mouse liver. Note the particles (P) and pits (O) on the membrane fracture faces, $\times 100,000$ (electron micrograph courtesy of Dr T. M. Mukherjee and Dr J. G. Swift).



PLATE 15.7 Details of _____ as seen in a freeze-fractured specimen of mouse intestine. Note the meshwork of ridges (arrows) and grooves (arrowheads) on the membrane fracture faces, $\times 60,000$ (electron micrograph courtesy of Dr T. M. Mukherjee and Dr J. G. Swift).

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Gap junction & Tight junction respectively

A3 – Answers can be found in legend of Plate 15.7 and 15.8 on pages 670 & 671



PLATE 15.7 Details of _____ as seen in a freeze-fractured specimen of mouse intestine. Note the meshwork of ridges (arrows) and grooves (arrowheads) on the membrane fracture faces, $\times 60,000$ (electron micrograph courtesy of Dr T. M. Mukherjee and Dr J. G. Swift).

Q4 – Which of the following indicates the plakin/armadillo protein rich desmosomal plaque?

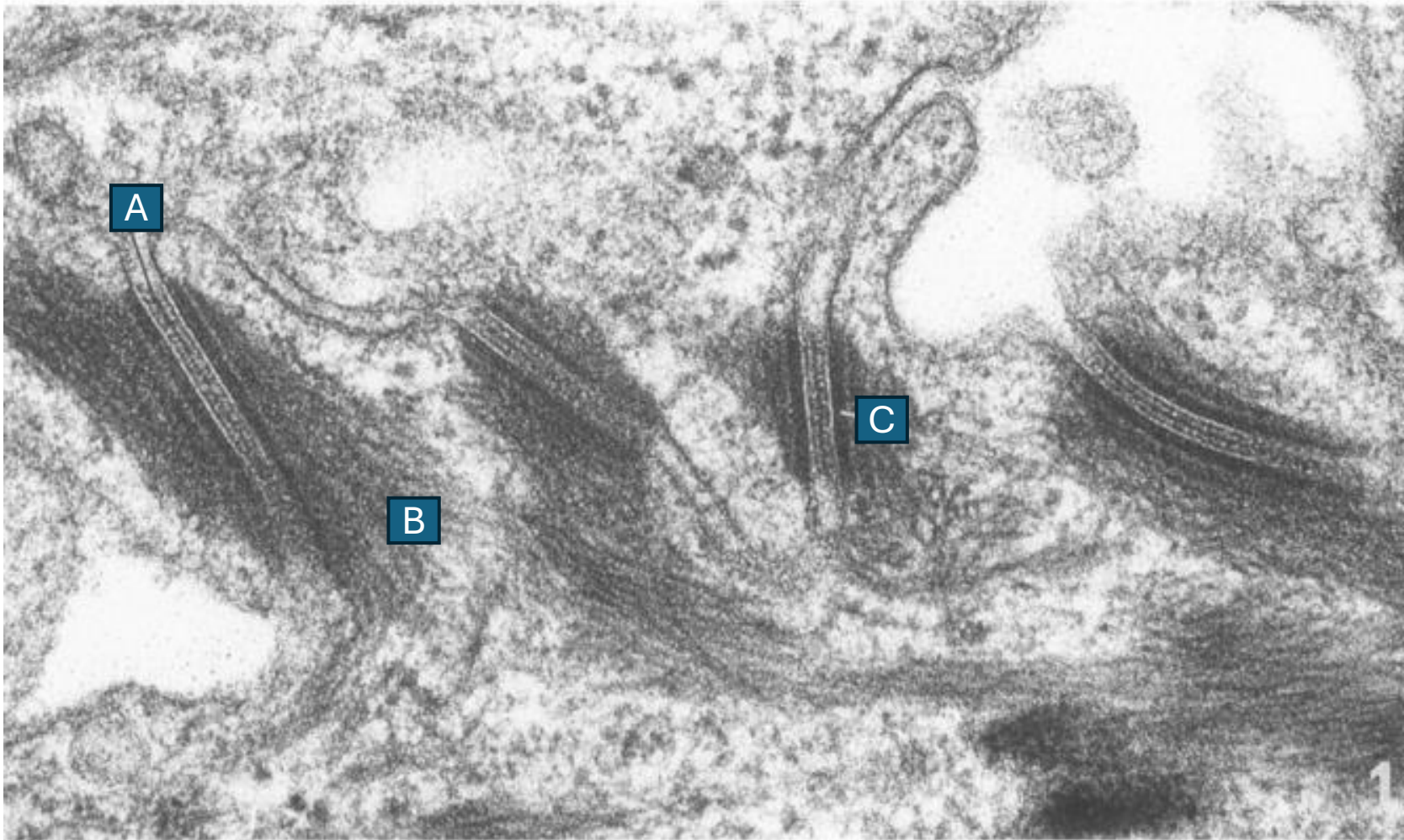
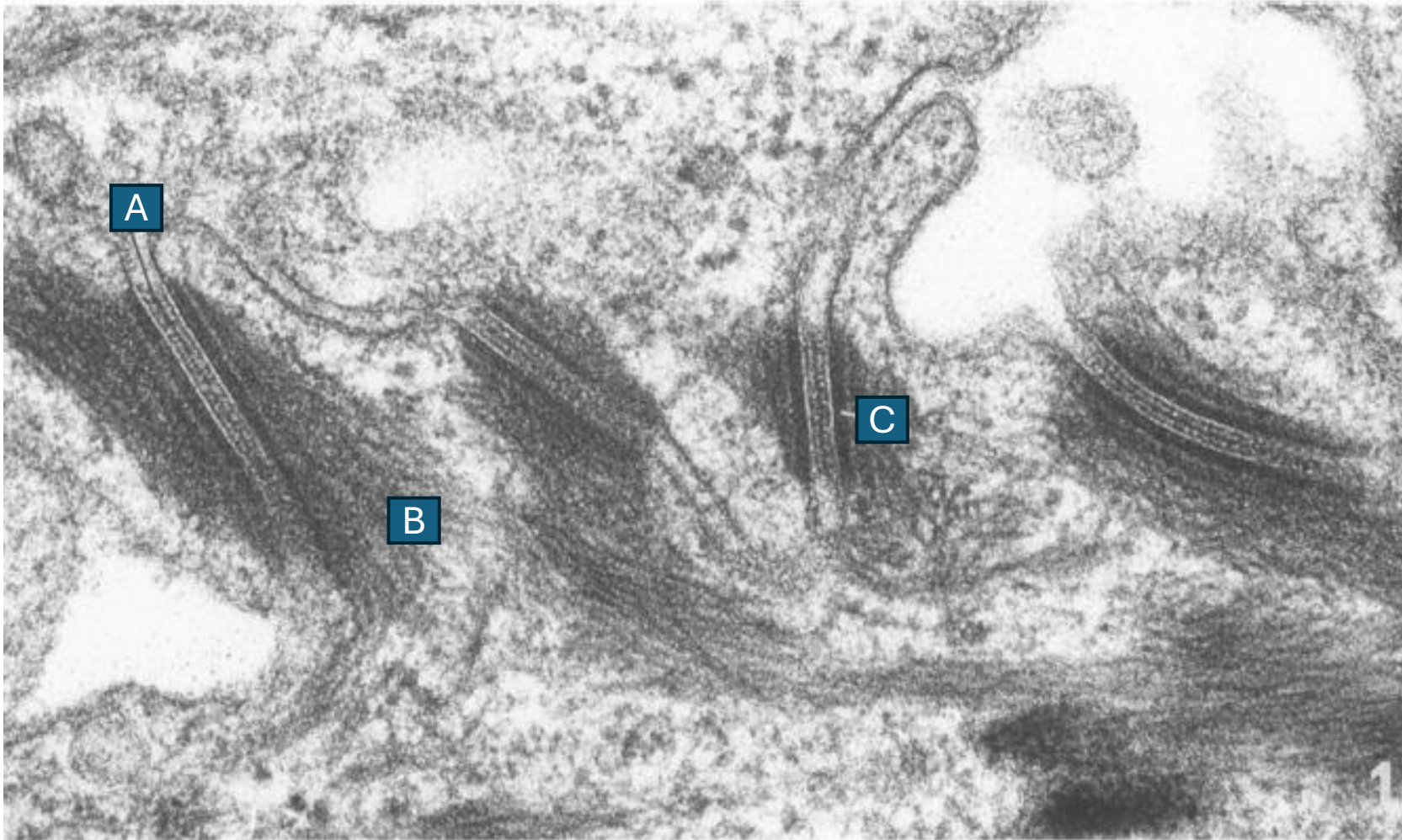


PLATE 15.5 Figure 1 Desmosomes from human skin.

Q4 – Which of the following indicates the plakin/armadillo protein rich desmosomal plaque?



C

A4 – the answer can be found in the legend of Plate 15.5 and in the section of text on page 667

PLATE 15.5 Figure 1 Desmosomes from human skin.

Q5 – Which of the following
archetypal desmosome feature is
cadherin rich?

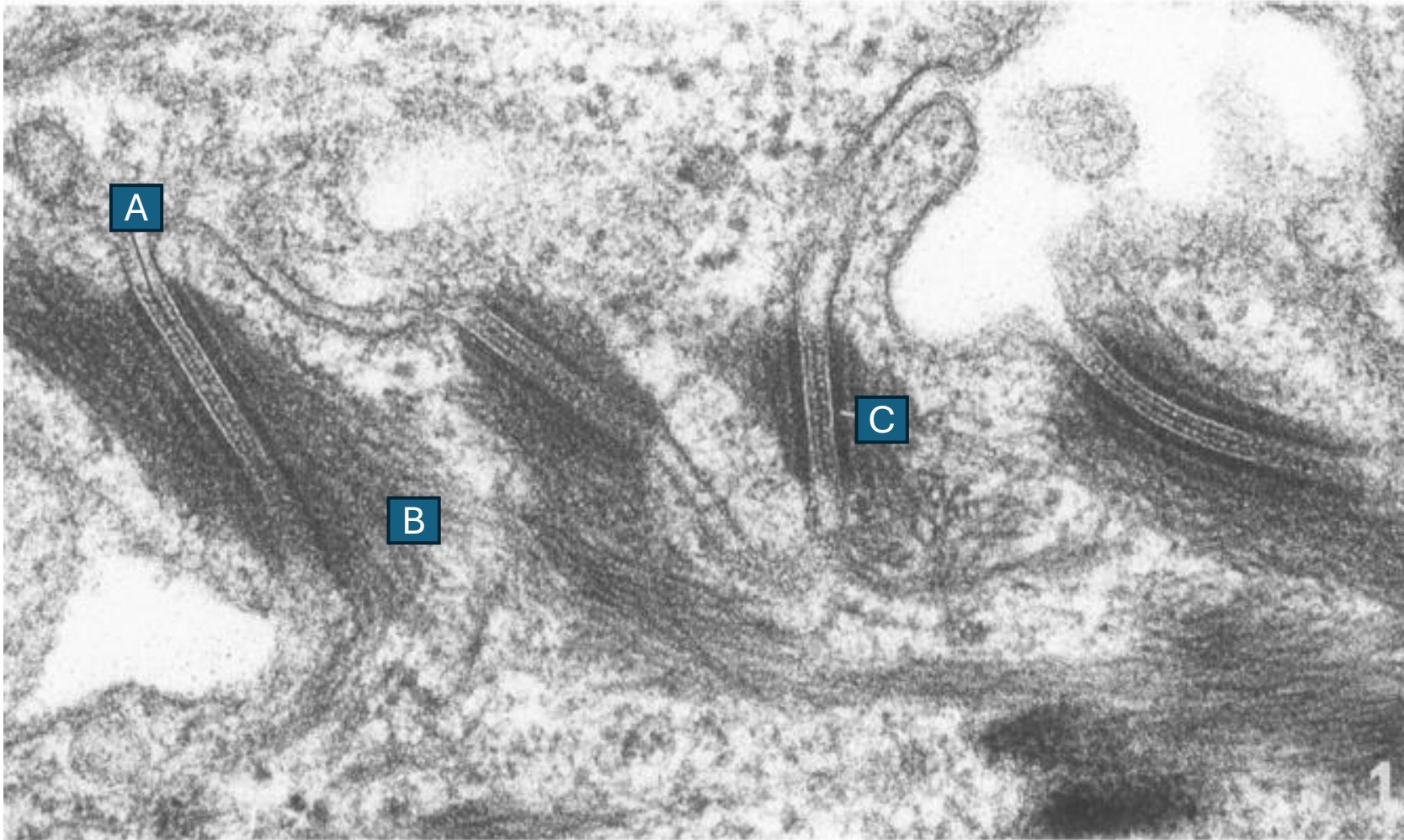


PLATE 15.5 Figure 1 Desmosomes from human skin.

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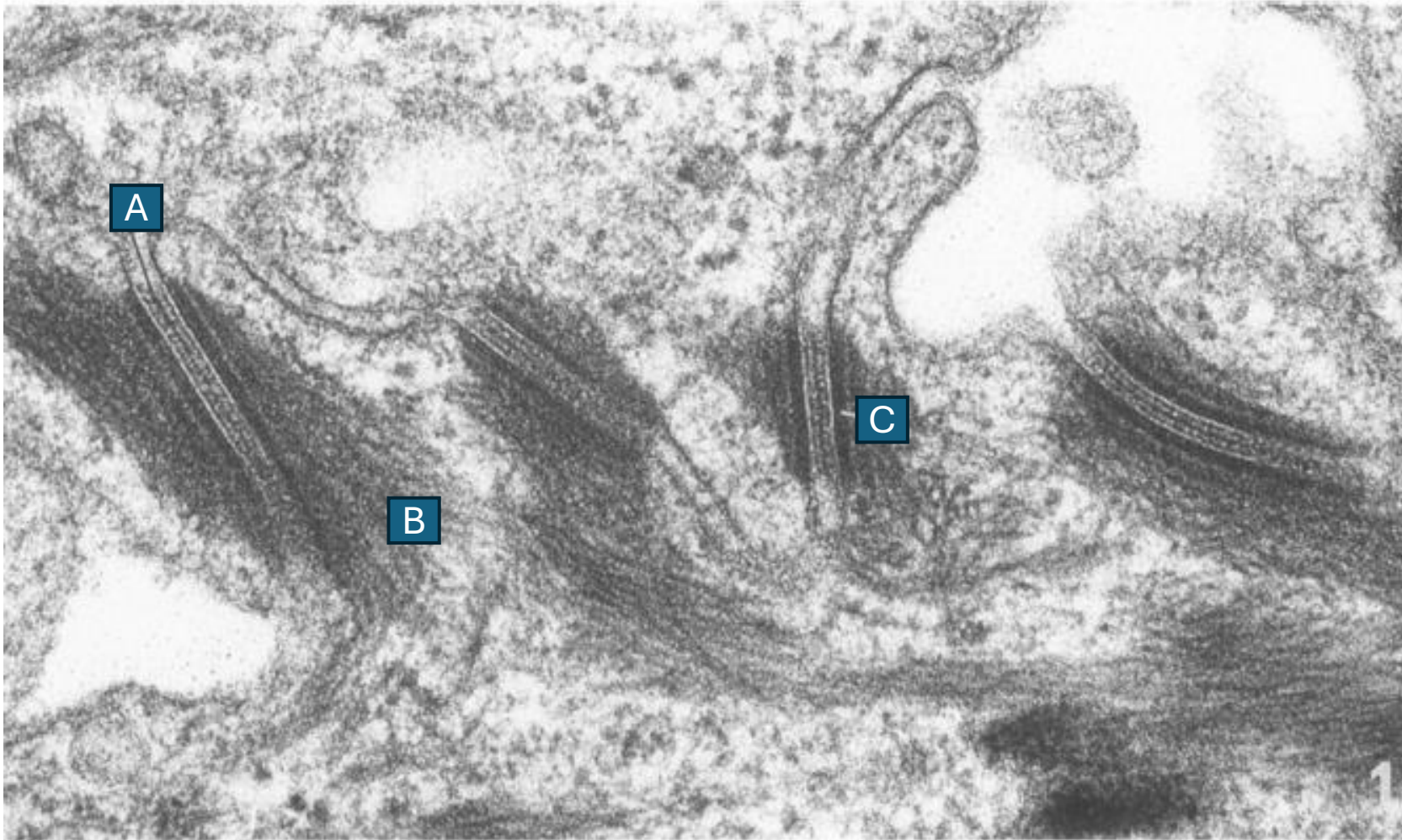


PLATE 15.5 Figure 1 Desmosomes from human skin.

A

A5 – the answer can be found in the legend of Plate 15.5 and in the section of text on page 667

Q6 – what are these cell junction structures, often seen in pathological states?

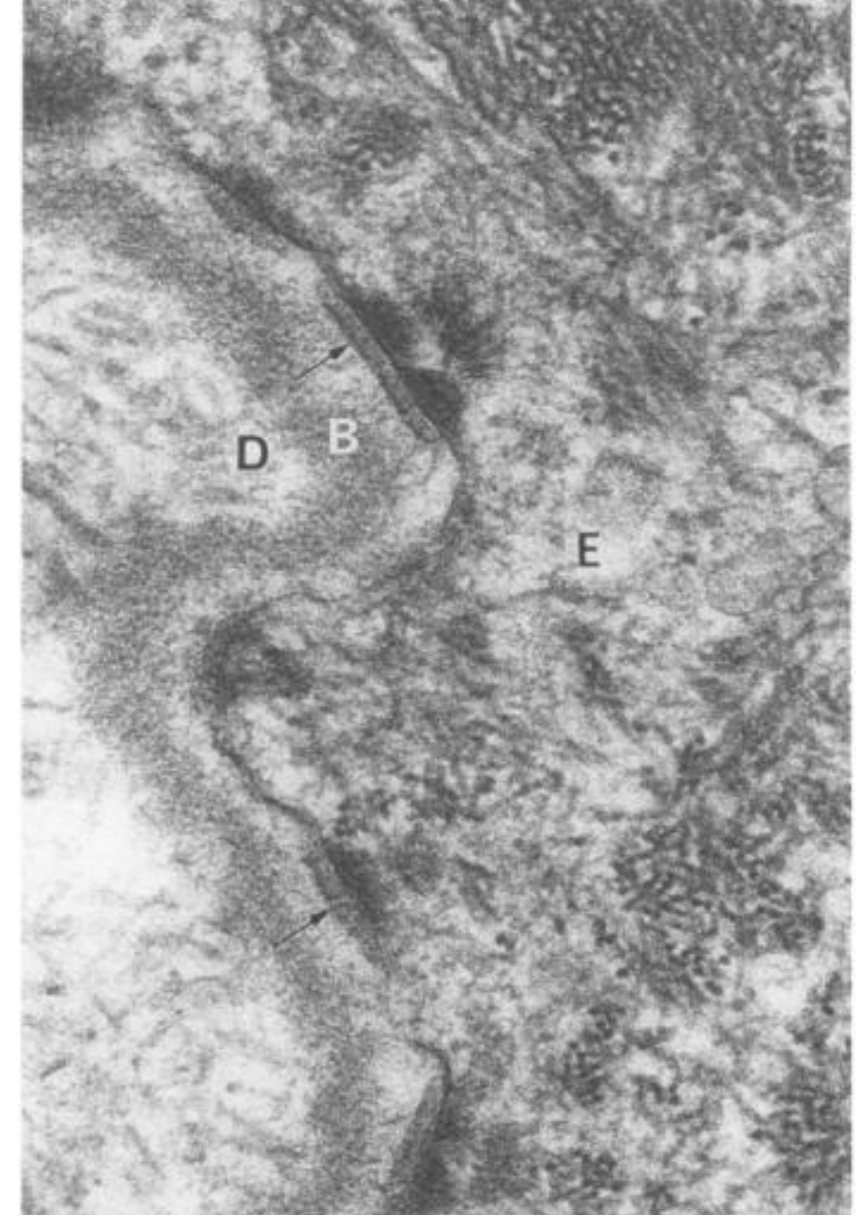


PLATE 15.5 **Figure 1** Desmosomes from human skin. Note the dense plaque (P), filaments (F), and dense line (D) in the intercellular space, $\times 96,000$. **Figure 2** (arrows) are seen at the junction of the epidermis (E) and dermis (D). Also seen is the basal lamina (B), composed of a lamina densa and lamina lucida. From the same specimen

Q6 – what are these cell junction structures, often seen in pathological states?

Hemidesmosomes

A6 – the answer can be found in the legend of Plate 15.5 page 667 and in the third paragraph of page 668.

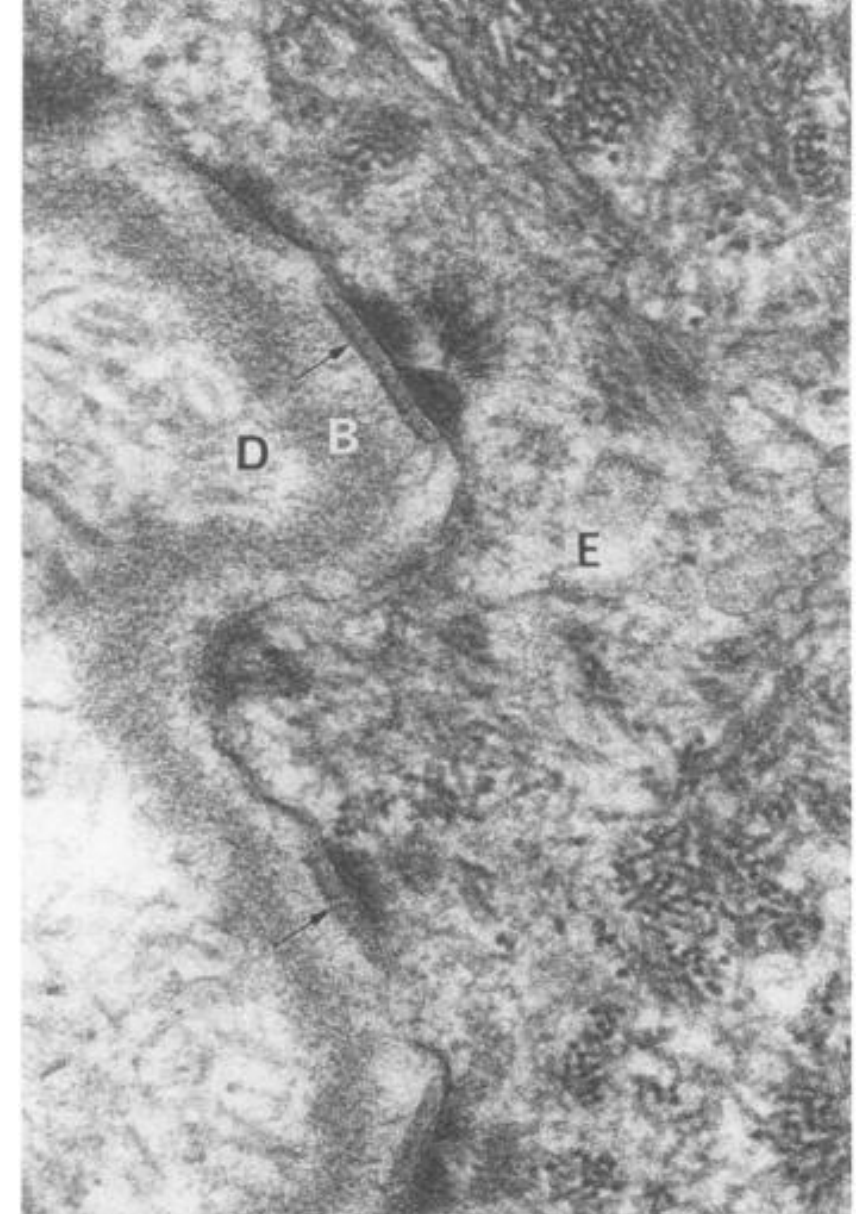


PLATE 15.5 **Figure 1** Desmosomes from human skin. Note the dense plaque (P), filaments (F), and dense line (D) in the intercellular space, $\times 96,000$. **Figure 2** (arrows) are seen at the junction of the epidermis (E) and dermis (D). Also seen is the basal lamina (B), composed of a lamina densa and lamina lucida. From the same specimen

Q7 – what is the name of this modified cell junction labelled by the blue arrow, present during the process of epidermal cornification ?

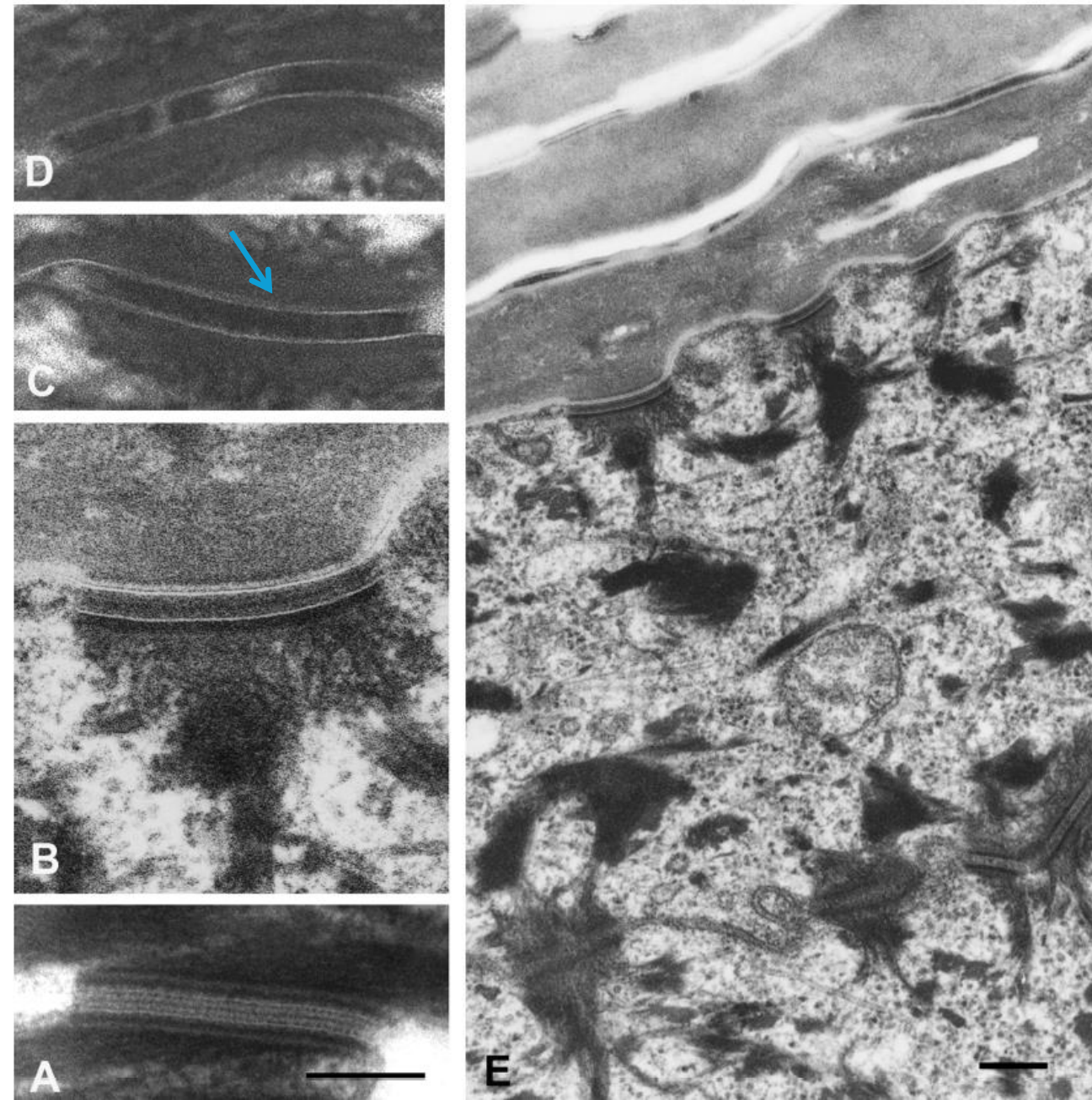


PLATE 15.9 Ultrastructural aspects of human epidermal desmosomes as observed during keratinization.

Q7 – what is the name of this modified cell junction labelled by the blue arrow, present during the process of epidermal cornification ?

Corneodesmosome

A7 – the answer can be found in the legend of Plate 15.9 on page 673 and in the second subsection on page 672

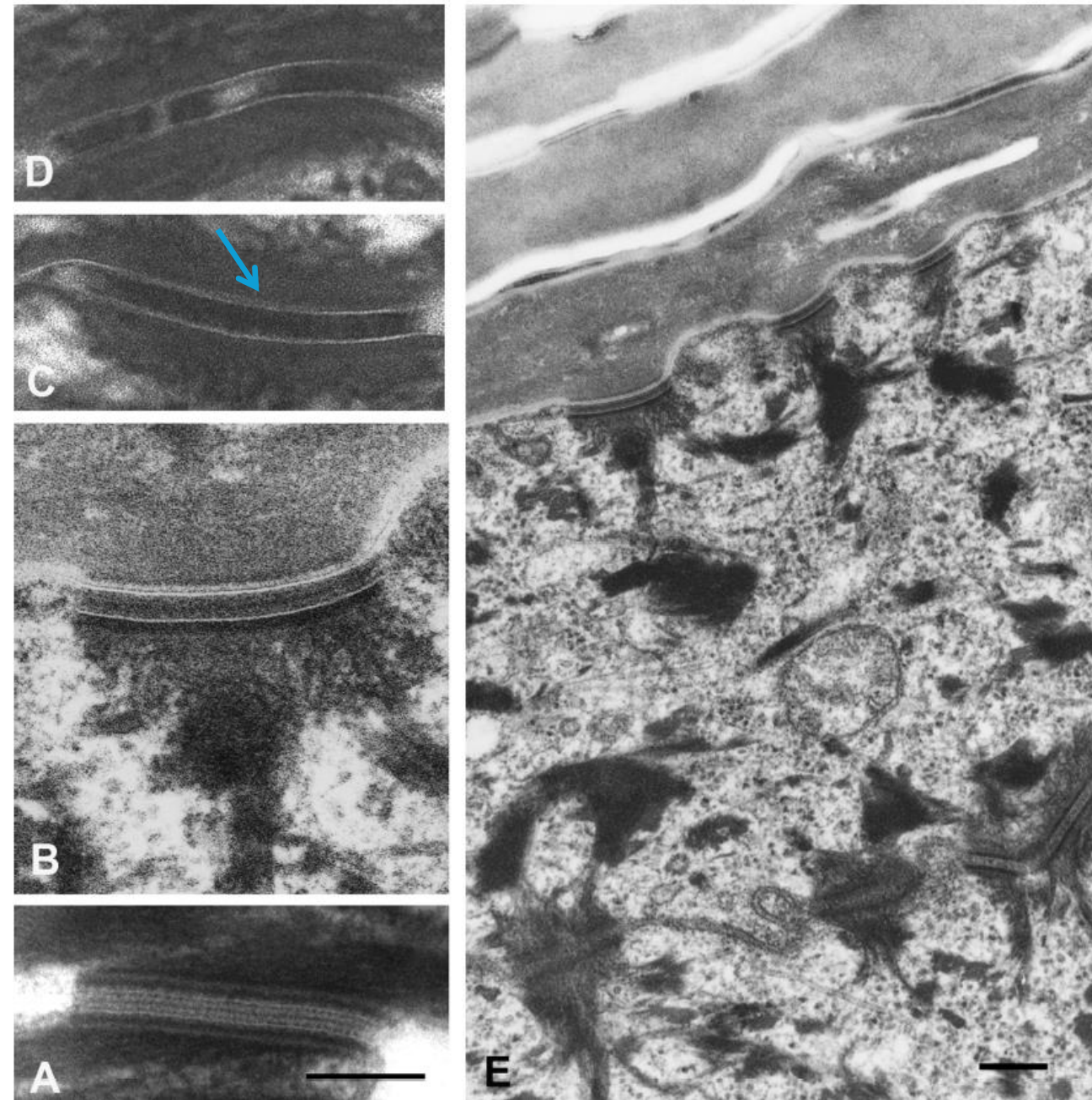


PLATE 15.9 Ultrastructural aspects of human epidermal desmosomes as observed during keratinization.

Q8 – what type of cell junction, thought to be specific to certain tumours, do these all show?

PLATE 15.15 From (Ghadially et al., 1995) Figure 1 Squamous cell carcinoma.

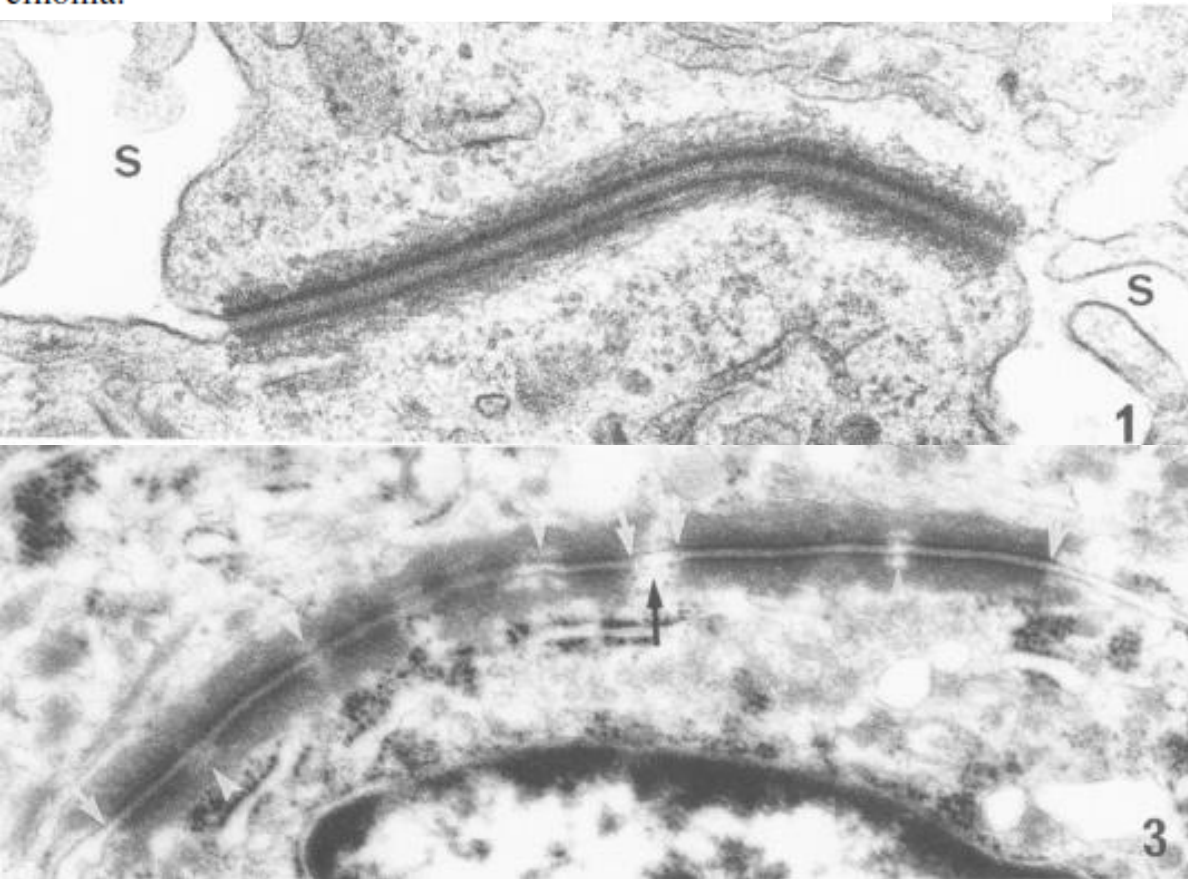


Figure 3 Mesothelioma.

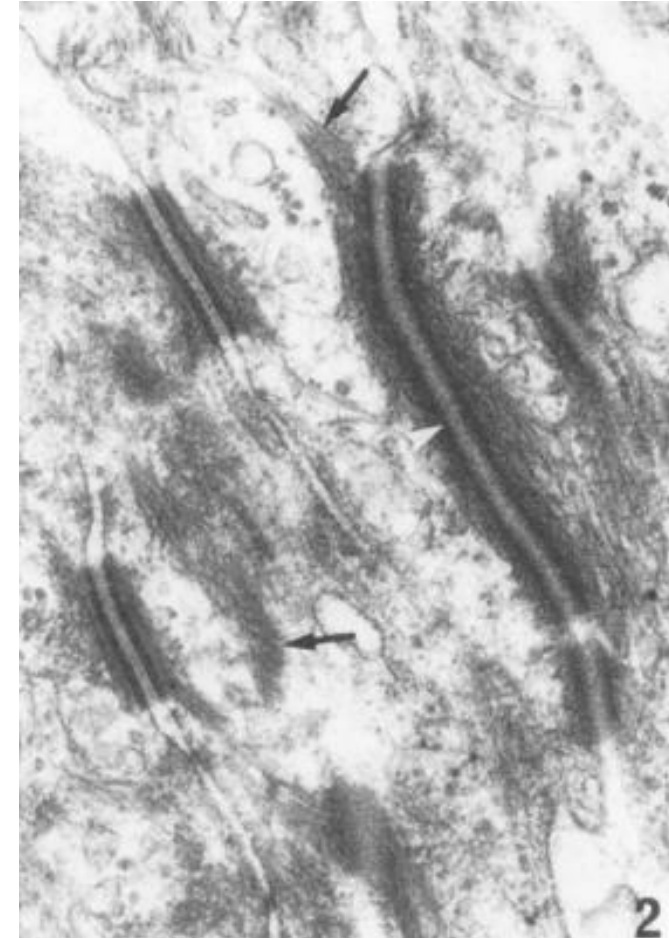


PLATE 15.16 Thymoma. Note the tonofibrils (arrows) and well-differentiated desmosomes, Figure 2

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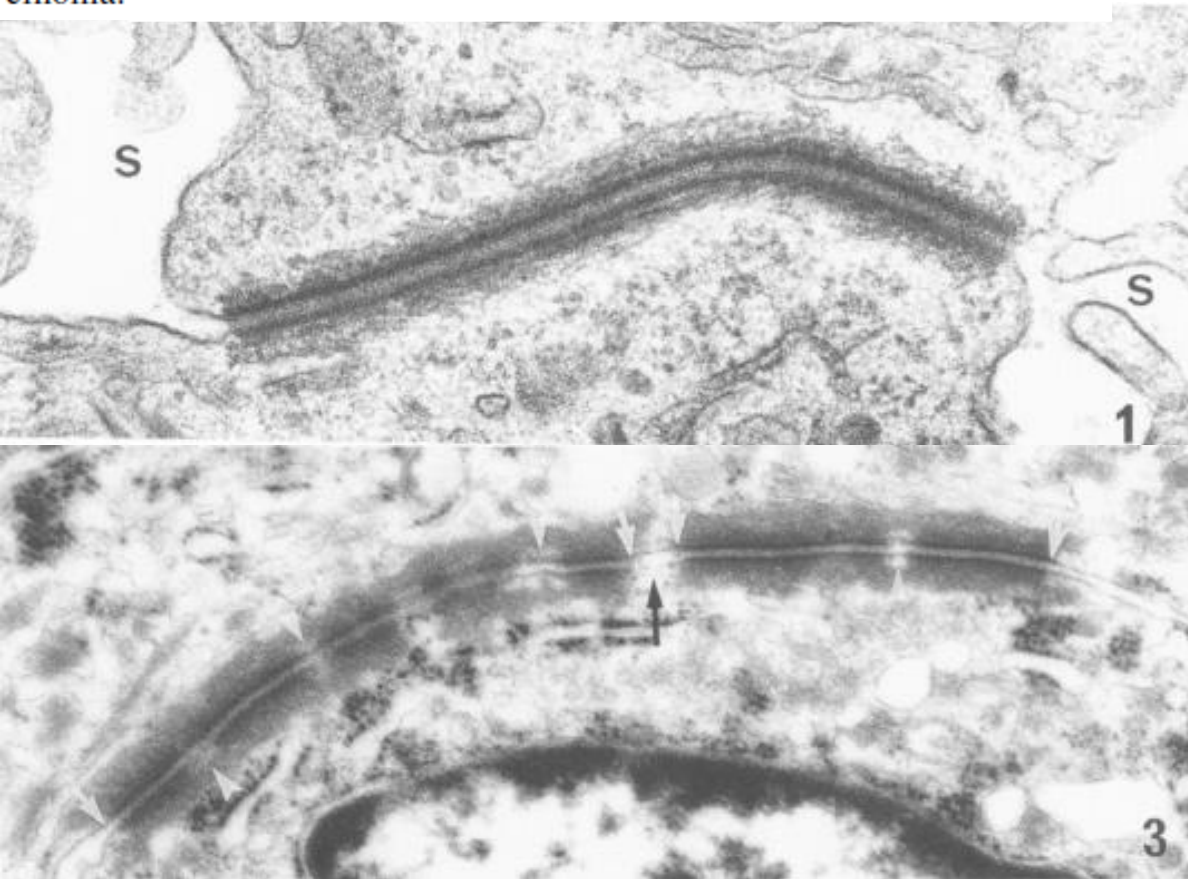


Figure 3 Mesothelioma.

Giant Desmosome

A8 – answer in the legends of Plates 15.15 and 15.16 on page 678

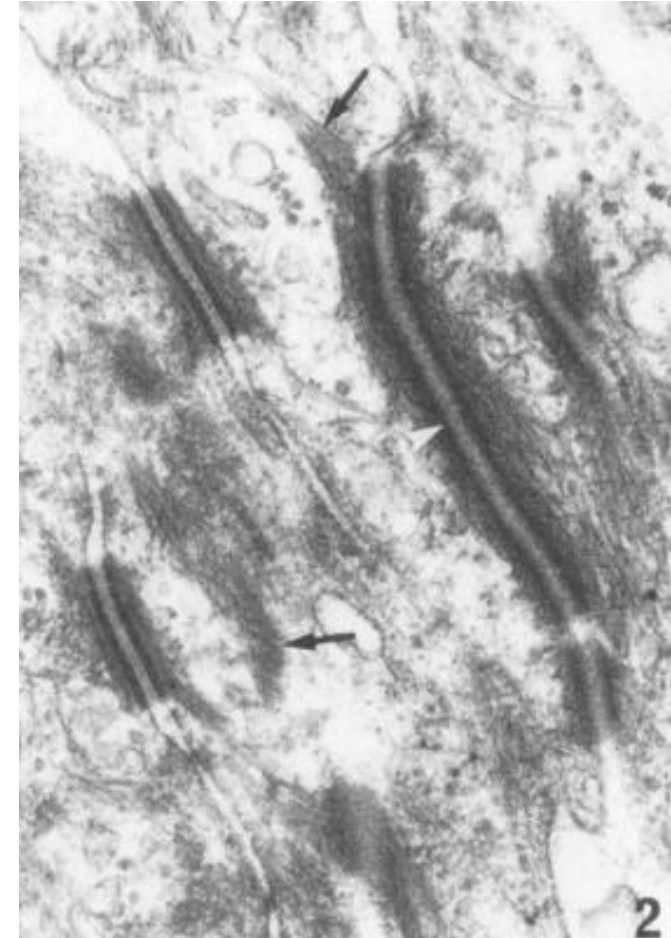


PLATE 15.16 Thymoma. Note the tonofibrils (arrows) and well-differentiated desmosomes, Figure 2

Q9 – what tumour is this? And why?

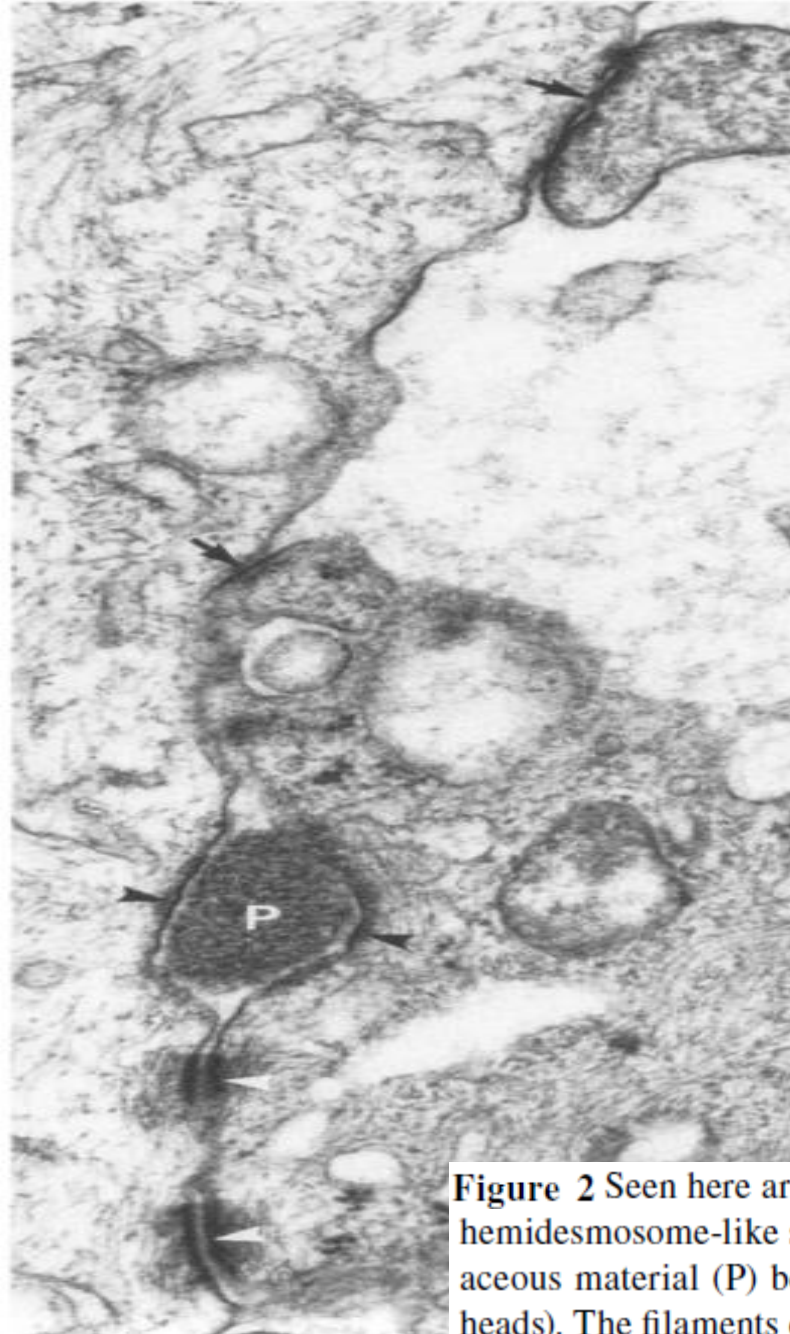


Figure 2 Seen here are structures interpreted as tight junctions (arrows), hemidesmosome-like structures (black arrowheads) enlarged by proteinaceous material (P) between cells, and true desmosomes (white arrowheads). The filaments converging on these desmosomes and elsewhere in the cell are vimentin filaments (Kartenbeck et al., 1984), and not the usual cytokeratin filaments, $\times 47,000$.

Q9 – what tumour is this? And why?

Meningioma – because it has true desmosomes, tight junctions and hemi-desmosome like structures

A9 – answer in the legend of Plate 15.18 on page 679, there is also an excellent summary of this answer is in the final paragraph of page 682

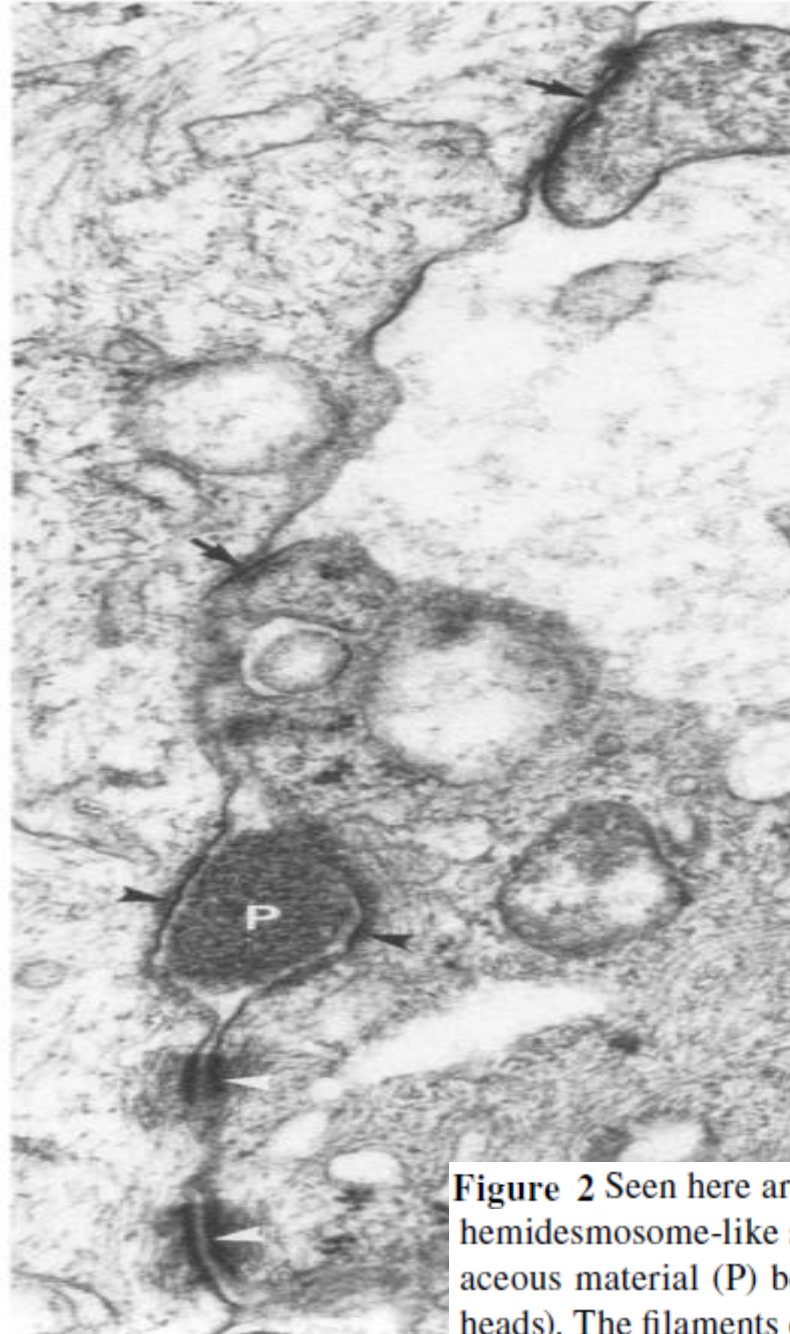


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Q10 – What cell junction can be seen in this image?

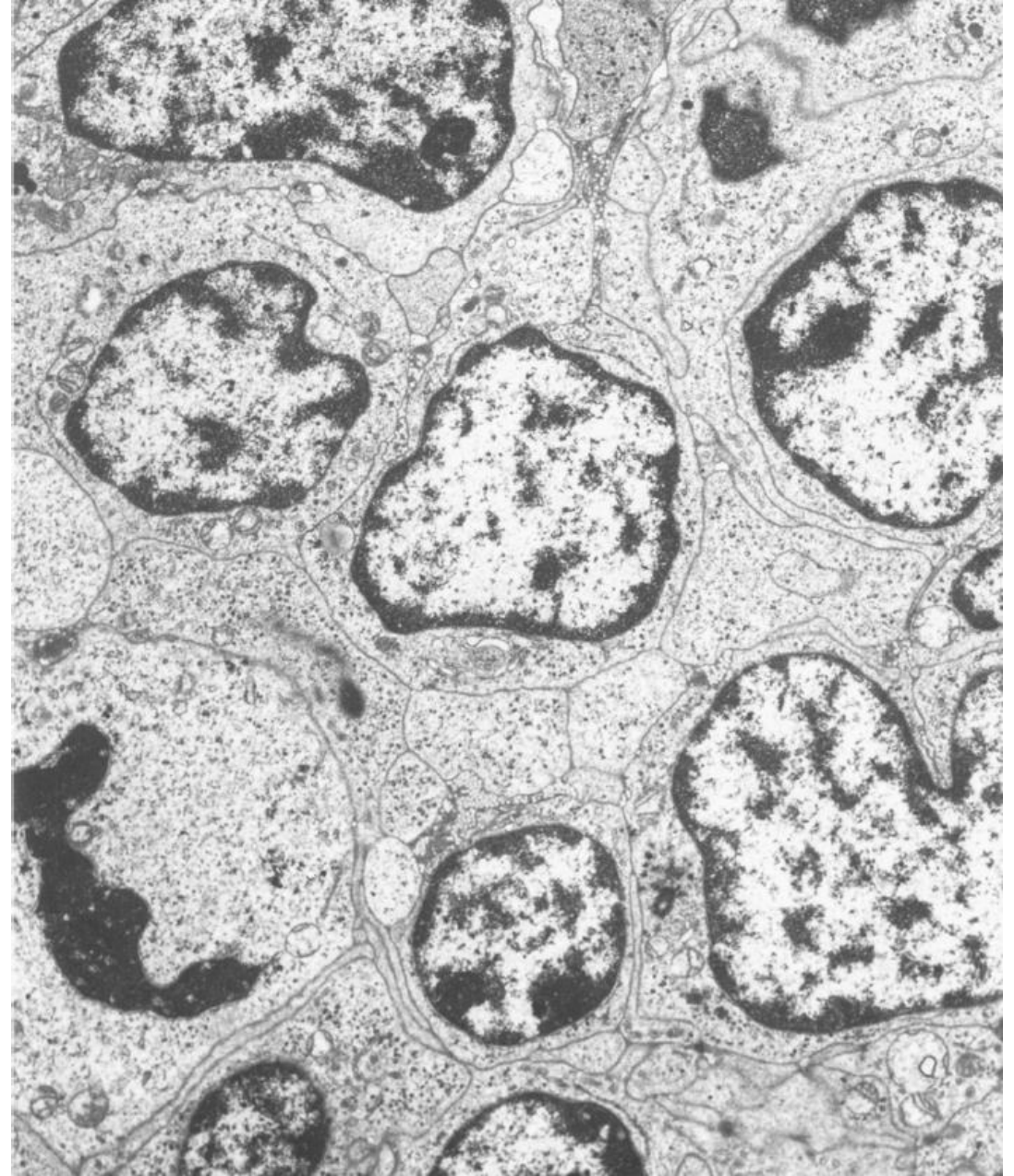


PLATE 15.21 Bone marrow from a case of lymphoblastic leukemia.

Q10 – What cell junction can be seen in this image?

None

A10 – the answer can be found in the legend of Plate 15.21 also in the final section of the Chapter on page 683

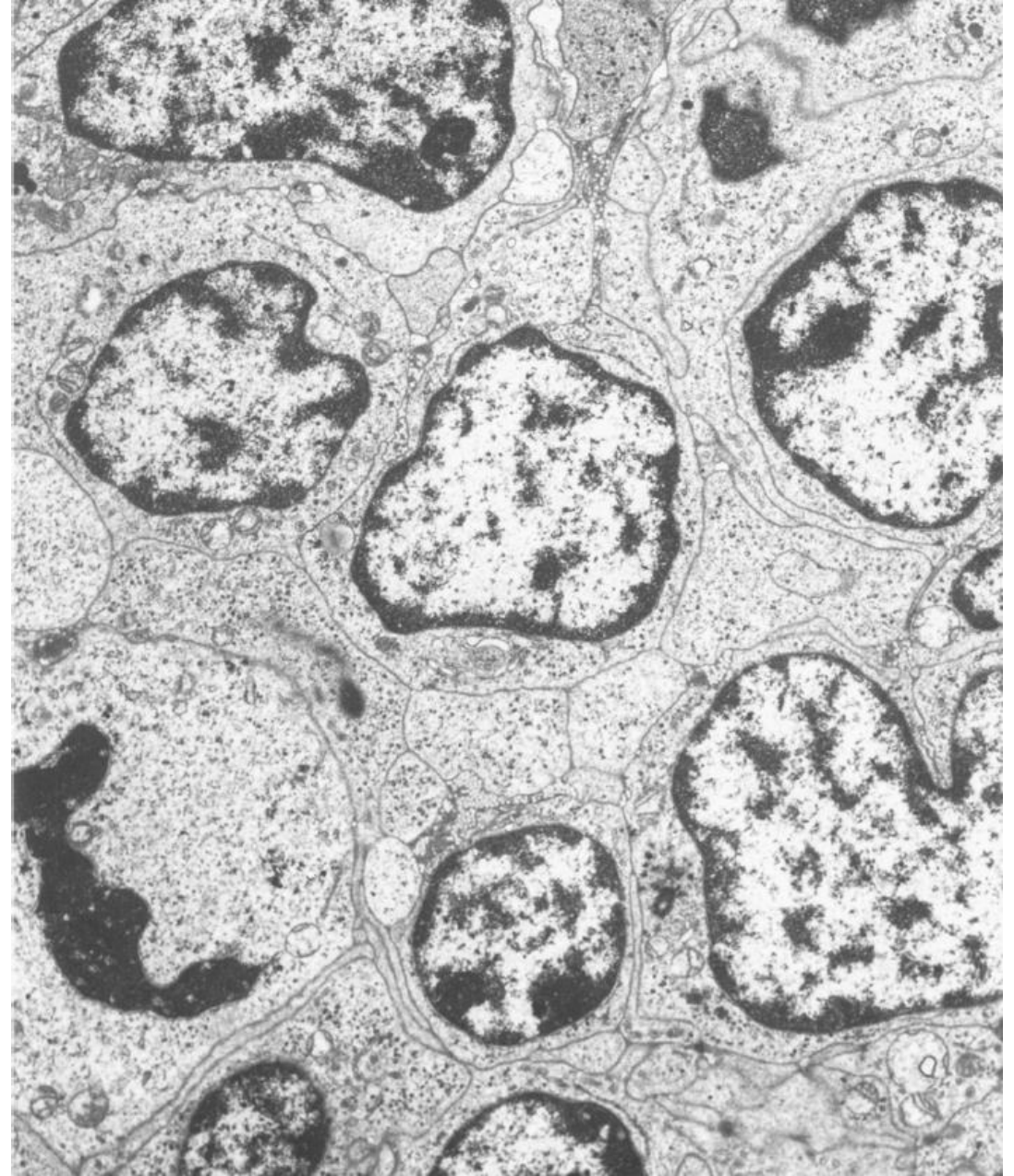


PLATE 15.21 Bone marrow from a case of lymphoblastic leukemia.

Acknowledgments

- Marek Haftek
- Anca Dragomir
- Bart Wagner

Any Questions?

- Answer – read Chapter 15: Cell Junctions of the 5th edition of Ghadially's Ultrastructural Pathology of the Cell and Matrix.