

WILLIS W. MATHEWS

THIRD EDITION

# ATLAS OF DESCRIPTIVE EMBRYOLOGY



# Atlas of Descriptive Embryology

Third Edition

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# Preface to the Third Edition

The preparation of this third edition provides an opportunity to add material which should adapt the *Atlas* to a greater variety of courses in embryology and developmental biology. A total of 46 new figures have been prepared. The major additions include a series on starfish development for those who prefer that group to the sea urchins, and an expansion of the section on the frog including: frontal sections of the 4-mm embryo; frontal and transverse sections of the 6-7-mm tadpole; and whole mount, sagittal section and transverse sections of the 10-mm tadpole. Also new are sections of human testis and of human uterus, a section of frog otic placode, a detailed view of chick blood islands, and of the trigeminal placodes, whole mount and sagittal section of the 5-6-mm pig embryo, detailed views of the 10-mm pig spinal nerves with the brachial plexus and of the pancreas and urogenital ridge.

More labels have been added to many of the old figures where space was available. These new labels together with those of the new figures required the addition of 57 new terms to the glossary. Also, an appendix of normal stages of chick development is now included.

It is my hope that the expanded third edition will prove to be even more useful to the teachers and students of embryology and developmental biology.

W.W.M.



# Preface to the First Edition

Descriptive embryology still constitutes a body of knowledge fundamental to modern developmental biology. Yet, the growth of experimental and biochemical embryology and other curricular demands allow less time for the course study of descriptive embryology. As a consequence, students have generally felt the need for detailed, accurate pictures of their laboratory materials which are fully labeled. This atlas was prepared, hopefully, to satisfy such a need. With its help, together with that of his text and laboratory manual, a student should be able to carry forward his studies quickly, efficiently and mainly by his own efforts. With descriptive embryology in hand, the student and his lecturer will then be free to devote more time to comparative, physiological and experimental studies of development.

The slide preparations which were photographed for this atlas were virtually all obtained from biological supply houses. The figures should, therefore, closely resemble the slides the student will receive for his laboratory work. They will provide a useful supplement to the reconstructions, diagrams and incompletely labeled photomicrographs found in most texts and manuals.

The problem of what to include in the atlas was easily resolved in its main features. The chick embryo has been standard laboratory material for the study of development since classical times. Amphibian and sea urchin embryos have been used for many important experimental investigations of development. Some acquaintance with the development of these groups prepares the student to understand the intricacies of the experiments. The pig embryo is certainly the most widely used example of mammalian development, so it was included without hesitation. Materials for the study of gametogenesis and fertilization are available in greater variety, but the cat, the rat and *Ascaris* serve very well.

The Glossary will likely prove to be valuable. It contains all terms used in the figures. Following each term is a list of figures in which it occurs. Then, related structures are given and the term defined. Next, the development of most structures including their origin and developmental fate is summarized. Important synonyms are also listed. The definitions of terms and summaries of development are occasionally incomplete where they were necessarily limited to the animal groups included in the atlas.

If a word of advice may be offered to the student, you will do well to study your slides and other preparations thoroughly. The illustrations in this atlas are not an adequate substitute for firsthand observations of embryos. No book of practical size could show all microscopic structures and their interrelations that are important. Use the atlas to check your identifications of structures, then fully explore the morphology of the parts with your microscope. The atlas will again be helpful in reviewing for exams. The figures will provide a quick recapitulation of your slides and the Glossary will supply a summary of the development of each part.

Many hollow organs and structures have been identified on the plates of this atlas by extending a label line to the cavity or lumen of the part. This practice helps to clarify the labels, but it should be recognized by the student that the organ so identified is actually the wall or tissue surrounding the space. Examples of this kind of labeling are: blood vessel, fig. 2; Graafian follicles, fig. 7; archenteron, figs. 29, 57.

My wife, Vivian, prepared the drawings inserted in many of the figures. I gratefully acknowledge this and much other help in preparing this atlas.

W.W.M.

<b>1</b>	<b>Gametogenesis</b> Figures: 1 Mature rat testis, section, low power • 2 Mature rat testis, section, high power • 3 Rat sperm smear • 4 Human testis, section of seminiferous tubule • 5 Mature cat ovary, section through cortex • 6 Mature cat ovary, section through large Graafian follicle • 7 Ovary of pregnant cat, section through corpora lutea • 8–12 Grasshopper testis, longitudinal section of testicular lobe	<b>1</b>
<b>2</b>	<b>Maturation and Fertilization in <i>Ascaris</i></b> Figures: 13 Sperm penetration stage • 14 First maturation division stage • 15 Second maturation division stage • 16 Pronuclear stage • 17 First cleavage division stage • 18 Second cleavage division stage	<b>13</b>
<b>3</b>	<b>Sea Urchin Development</b> Figures: 19 Sea urchin ovary, <i>Arbacia</i> • 20 Primary oocyte • 21 Fertilized egg • 22 Two-cell stage • 23 Four-cell stage • 24 Eight-cell stage • 25 Sixteen-cell stage • 26 Early blastula stage • 27 Late blastula stage • 28 Early gastrula stage • 29 Gastrula stage • 30 Prism stage • 31 Early pluteus larval stage • 32 Late pluteus larval stage, ventral view • 33 Late pluteus larval stage, lateral view	<b>15</b>
<b>4</b>	<b>Starfish Development</b> Figures: 34 Primary oocyte • 35 Fertilized egg • 36 Two-cell stage • 37 Four-cell stage • 38 Eight-cell stage • 39 16-cell stage • 40 Early blastula • 41 Late blastula • 42 Early gastrula • 43 Gastrula stage • 44 Late gastrula • 45 Bipinnaria larve, ventral view • 46 Bipinnaria larva, lateral view	<b>21</b>
<b>5</b>	<b>Early Development of the Frog</b> Figures: 47, 48 Frog testis, section • 49 Frog ovary, section showing growing oocytes • 50–52 Stages of frog development, <i>Rana pipiens</i> • Table 1, Frog developmental stages, <i>Rana pipiens</i> • 53 Early cleavage, 8-cell stage, median section • 54 Early cleavage, 32-cell stage, median section • 55 Late cleavage, blastula stage, median section • 56 Early gastrula stage, sagittal section • 57 Late gastrula stage, sagittal section • 58 Blastula of the frog and its transformation into the gastrula • 59 Gastrulation in the frog embryo from the posterior view • 60 External appearance of the gastrula and partial sections of the gastrula • 61 Migration of the presumptive organ-forming areas of the blastula during gastrulation in the amphibia • 62 Relationships of the major presumptive organ-forming areas at the end of gastrulation in the anuran amphibia • 63 Early neural tube stage of the frog, <i>Rana pipiens</i> • 64 Neural fold stage, transverse section through head region • 65 Neural fold stage, transverse section through foregut region • 66 Neural fold stage, transverse section through midgut region • 67 Neural tube stage (stage 16), transverse section through optic vesicles • 68 Neural tube stage (stage 16), transverse section through otic placode • 69 Neural tube stage (stage 16), transverse section through pharynx • 70 Neural tube stage (stage 16), transverse section through nephrotome • 71 Neural tube stage (stage 16), transverse section through hingut • 72 Tail bud stage (stage 17), sagittal section • 73 Tail bud stage (stage 17), frontal section through pharynx	<b>27</b>

6

**The 4-mm Frog Embryo (Stage 18)**

Figures: 74 Whole mount • 75 Sagittal section • 76 Frontal section through otic vesicles • 77 Frontal section through optic vesicles • 78 Frontal section through heart • 79 Transverse section through olfactory pits • 80 Transverse section through optic cups • 81 Transverse section through anterior pharynx • 82 Transverse section through otic vesicles • 83 Transverse section through liver diverticulum • 84 Transverse section through pronephros • 85 Transverse section through hindgut

51

7

**The 6–7-mm Frog Tadpole (Stages 20–21)**

Figures: 86 Whole mount, 6-mm tadpole (Stage 20) • 87 Sagittal section, 6-mm tadpole (Stage 20) • 88 Frontal section through optic cups • 89 Frontal section through pharynx • 90 Frontal section through heart • 91 Drawing of 6–7-mm frog tadpoles • 92 Transverse section through olfactory pit • 93 Transverse section through optic cups • 94 Transverse section through thyroid • 95 Transverse section through otic vesicle • 96 Transverse section through heart • 97 Transverse section through pronephros • 98 Transverse section through midgut • 99 Transverse section through cloaca • 100 Transverse section through proctodeum

61

8

**The 10-mm Frog Tadpole (Stage 24)**

Figures: 101 Whole mount • 102 Sagittal section • 103 Drawing of 10–18-mm tadpole • 104 Transverse section through olfactory organ • 105 Transverse section through eyes • 106 Transverse section through heart • 107 Transverse section glottis • 108 Transverse section through pronephros • 109 Transverse section through liver • 110 Transverse section through mesonephros • 111 Transverse section through cloaca

73

9

**Gametogenesis in Chickens**

Figures: 112, 113 Chicken testis, section • 114 Chicken ovary, section

81

10

**The Unincubated Chick Blastoderm**

Figures: 115 Chick embryo, stage 1, unincubated blastoderm, whole mount • 116, 117 Chick embryo, stage 1, unincubated blastoderm, longitudinal section

85

11

**The Notochordal Process Chick Embryo (Stage 5, 19–22 hours incubation)**

Figures: 118 Chick embryos, stages 4, 5, 8, and 9, whole mounts • 119 Chick embryo, whole mount • 120 Chick embryo, transverse section through notochordal process • 121 Transverse section through primitive knot • 122 Transverse section through anterior primitive groove • 123 Transverse section through posterior primitive groove

89

12

**The 4–5 Somite Chick Embryo (Stage 8, 26–29 hours incubation)**

Figures: 124 Whole mount • 125 Opaque whole mount • 126 Transverse section through pharyngeal membrane • 127 Transverse section through anterior intestinal portal • 128 Transverse section through neural groove • 129 Transverse section through somites • 130 Transverse section through neural plate

95

13	<b>The 13-Somite Chick Embryo (Stage 11, 40–45 hours incubation)</b> Figures: 131 Whole mount • 132 Sagittal section • 133 Diagrammatic ventral view of dissection of a stage 11 chick embryo • 134 Diagrammatic lateral view of dissection of a stage 11 chick • 135 Transverse section through optic vesicles • 136 Transverse section through pharyngeal membrane • 137 Transverse section through bulbus cordis • 138 Transverse section through otic placode • 139 Transverse section through anterior intestinal portal • 140 Transverse section through midgut • 141 Transverse section through segmental mesoderm • 142 Transverse section through neural groove • 143 Transverse section through area vasculosa	101
14	<b>The 2-Day Chick Embryo (Stage 15, 50–55 hours incubation)</b> Figures: 144, 145 Whole mount • 146 Diagram of dissection of stage 15 chick • 147 Whole mount, blood vessels injected • 148 Sagittal section • 149 Transverse section through mesencephalon • 150 Transverse section through ganglion of cranial nerve 5 • 151 Transverse section through trigeminal placode • 152 Transverse section through otic vesicle • 153 Transverse section through optic cups • 154 Transverse section through thyroid • 155 Transverse section through olfactory placodes • 156 Transverse section through atrium • 157 Transverse section through sinus venosus • 158 Transverse section through liver diverticula • 159 Transverse section through anterior intestinal portal • 160 Transverse section through mesonephros • 161 Transverse section through vitelline artery • 162 Transverse section through posterior intestinal portal	109
15	<b>The 3-Day Chick Embryo (Stage 18)</b> Figures: 163, 164 Whole mount • 165 Stage 19 chick embryo (3–3½ days incubation) • 166 Whole mount, blood vessels injected • 167 3-day chick embryo with 35 somites (stage 18), dorsal view • 168 Sagittal section • 169 Parasagittal section, right side • 170 Parasagittal section, left side • 171 Transverse section through otic vesicles • 172 Transverse section through pharynx • 173 Transverse section through thyroid • 174 Transverse section through hypophysis • 175 Transverse section through optic cups • 176 Transverse section through olfactory pits • 177 Transverse section through liver and pancreas • 178 Transverse section through anterior intestinal portal • 179 Transverse section through genital ridge • 180 Transverse section through vitelline arteries • 181 Transverse section through posterior intestinal portal • 182 Transverse section through allantois • 183 Transverse section through cloaca	123
16	<b>The 3½-Day Chick Embryo (Stage 20–21)</b> Figures: 184 Whole mount • 185 Reconstruction of circulatory system • 186 Sagittal section • 187 Parasagittal section	143
17	<b>The 5–6-mm Pig Embryo</b> Figures: 188 Whole mount • 189 Sagittal section	149
18	<b>The 10-mm Pig Embryo</b> Figures: 190 Opaque mount • 191 Whole mount • 192 Reconstruction of 10-mm pig embryo • 193 Reconstruction of circulatory system of a 9.4-mm pig embryo • 194 Sagittal section • 195 Parasagittal section • 196 Parasagittal section • 197 Transverse section through cranial nerve 4 • 198 Transverse section through accessory cranial ganglia • 199 Transverse section through jugular and superior cranial ganglia • 200 Transverse section through semilunar and geniculate cranial ganglia • 201 Transverse section through cranial nerve 6 • 202 Transverse section through pharyngeal pouch 1 • 203 Transverse section through Rathke's pouch • 204 Transverse section through thyroid • 205 Transverse section through fourth aortic arch	153



- 206 Transverse section through ultimobranhial body • 207 Transverse section through pulmonary aorta • 208 Transverse section through interatrial foramen • 209 Transverse section through interventricular foramen • 210 Transverse section through apical bronchus • 211 Transverse section through lateral lung buds • 212 Transverse section through caudal lung buds • 213 Transverse section through ductus venosus • 214 Transverse section through brachial plexus • 215 Transverse section through common bile duct • 216 Transverse section through gall bladder • 217 Transverse section through pancreas • 218 Transverse section through genital ridge • 219 Transverse section through urogenital sinus • 220 Transverse section through metanephros • 221 Transverse section through common iliac artery • 222 Transverse section through lumbo-sacral plexus • 223 Transverse section through spinal nerves

# 19

## **Human Uterus and Placenta**

Figures: 224 Human uterus, section • 225 Human placenta, section • 226 Human placenta, section

# 185

## **Glossary and Synopsis of Development**

189

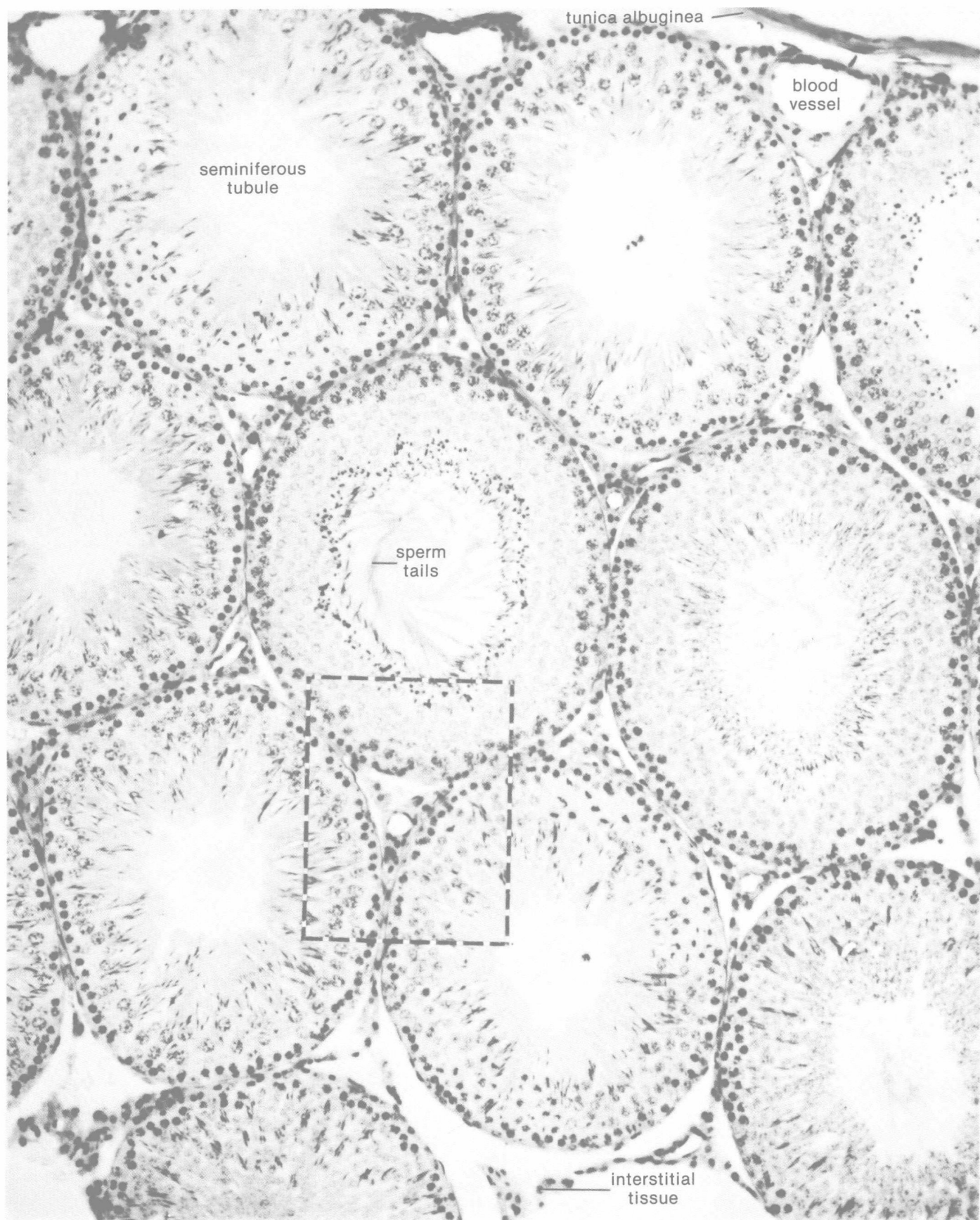
## **Photographic Data**

228

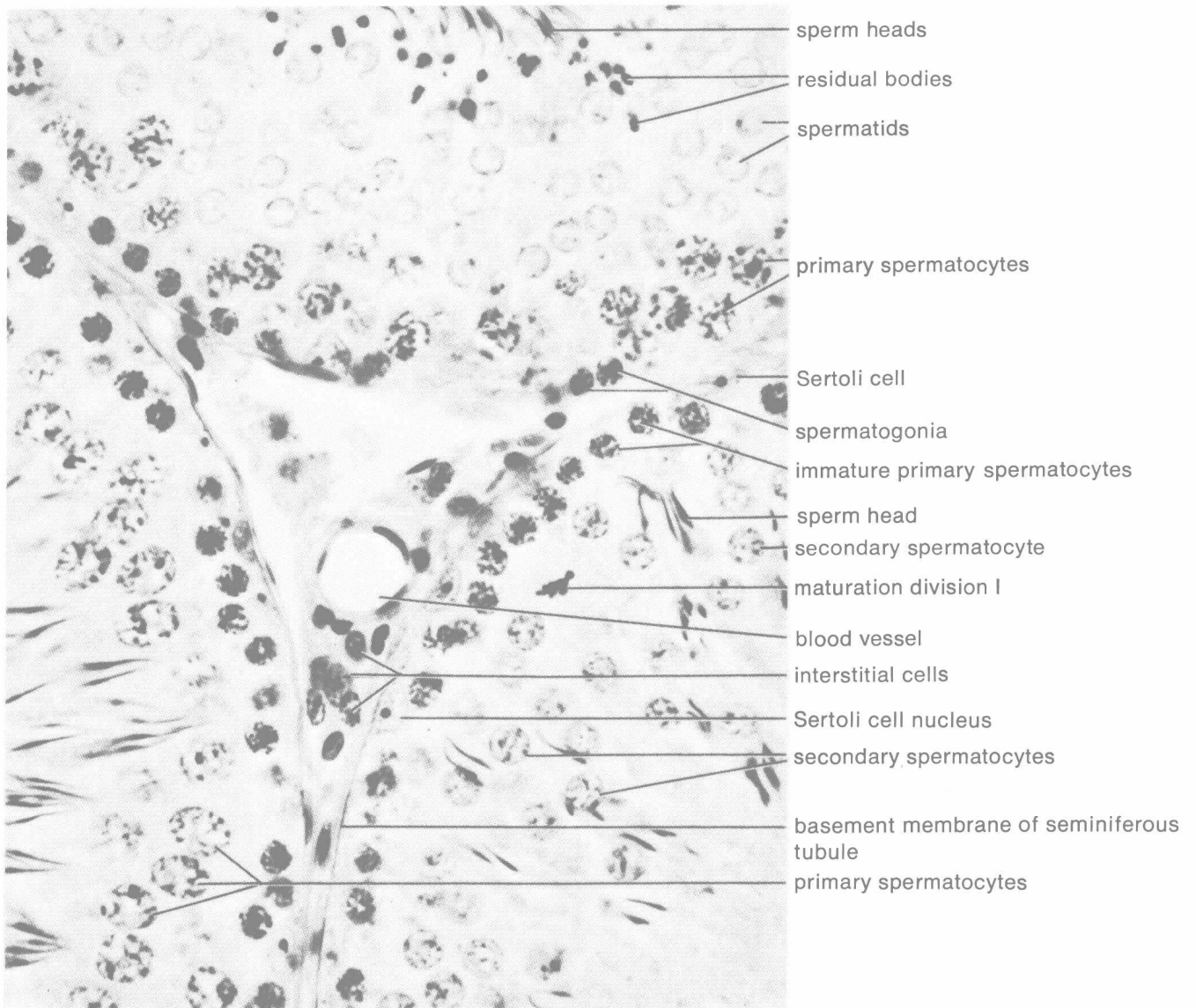
## **Appendix Normal Stages of Chick Development**

230

# 1. Gametogenesis

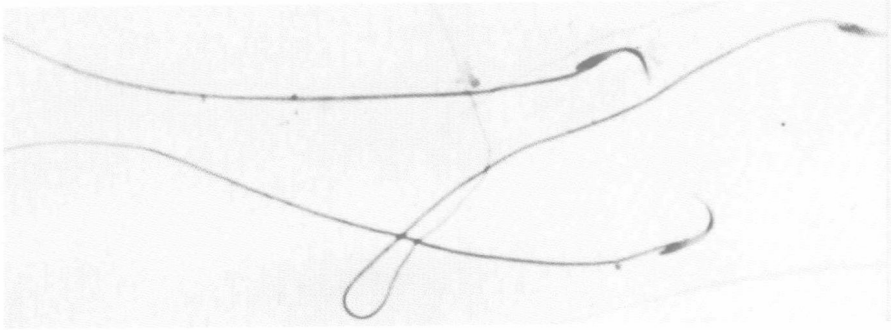


**Figure 1** Mature rat testis, section (mag. 200X). The dashed rectangle indicates the area shown in fig. 2.

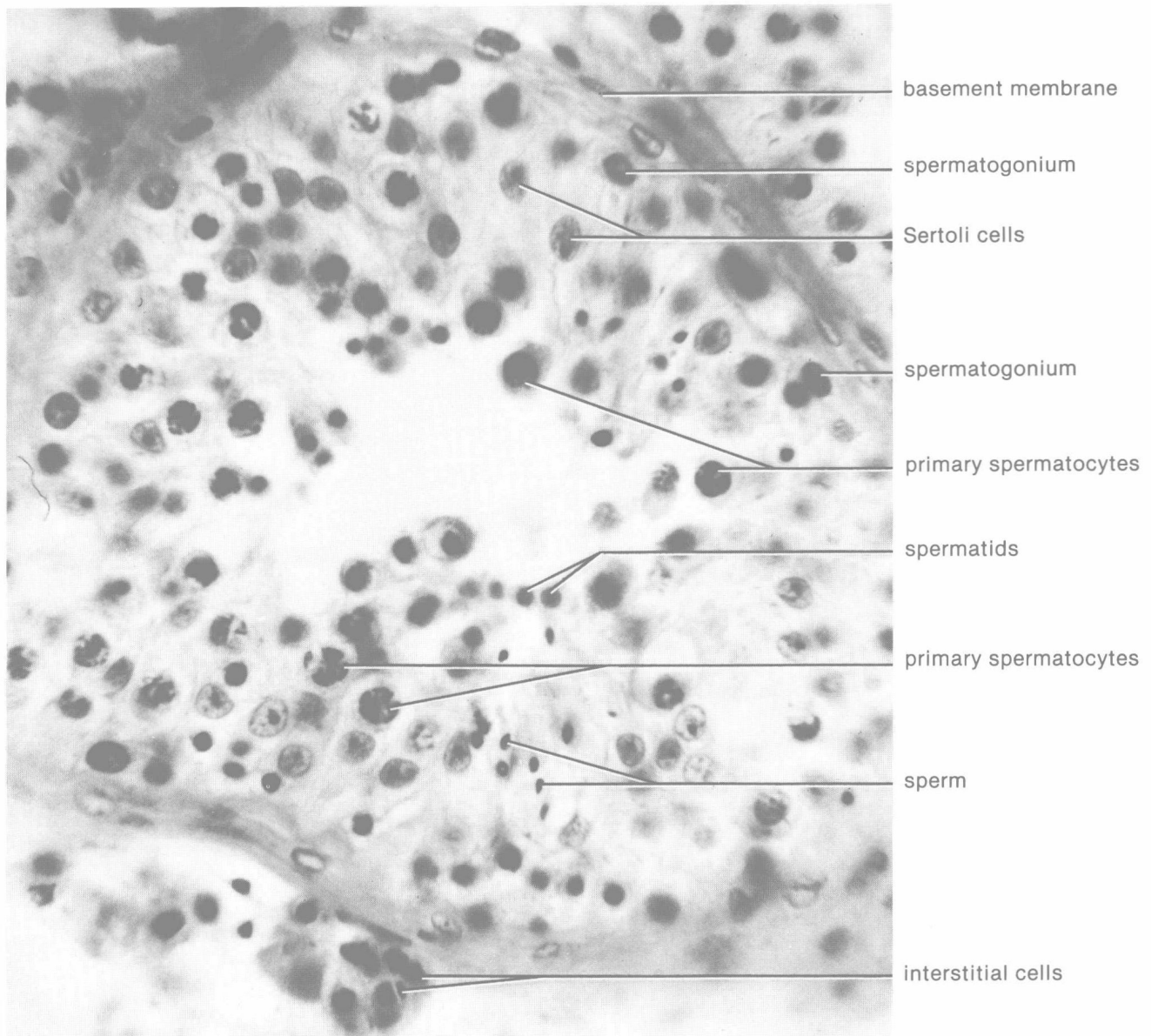


**Figure 2** Mature rat testis, section (mag. 650X). Label lines indicate cell nuclei. Outlines of surrounding cytoplasm are indistinct.



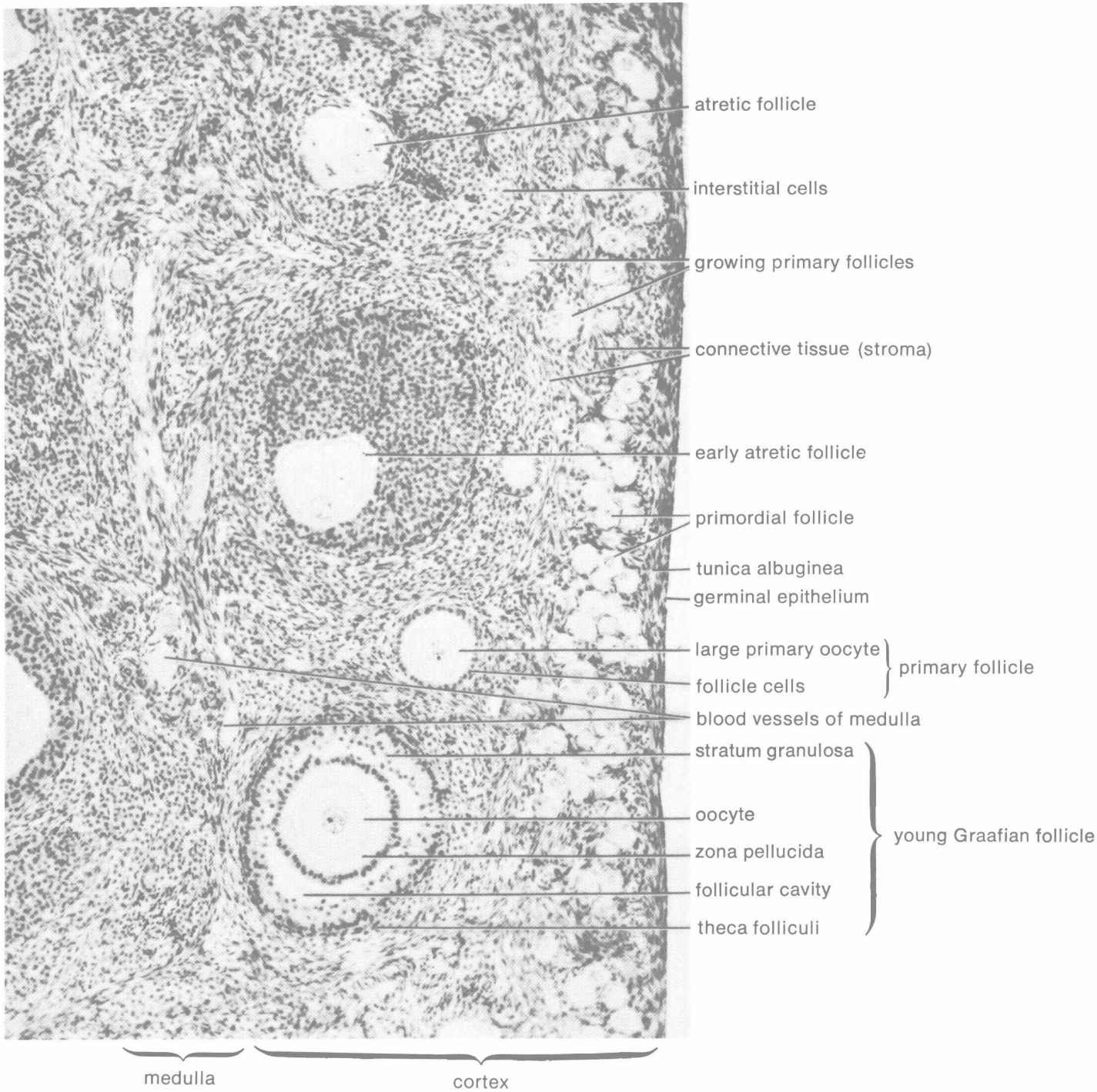


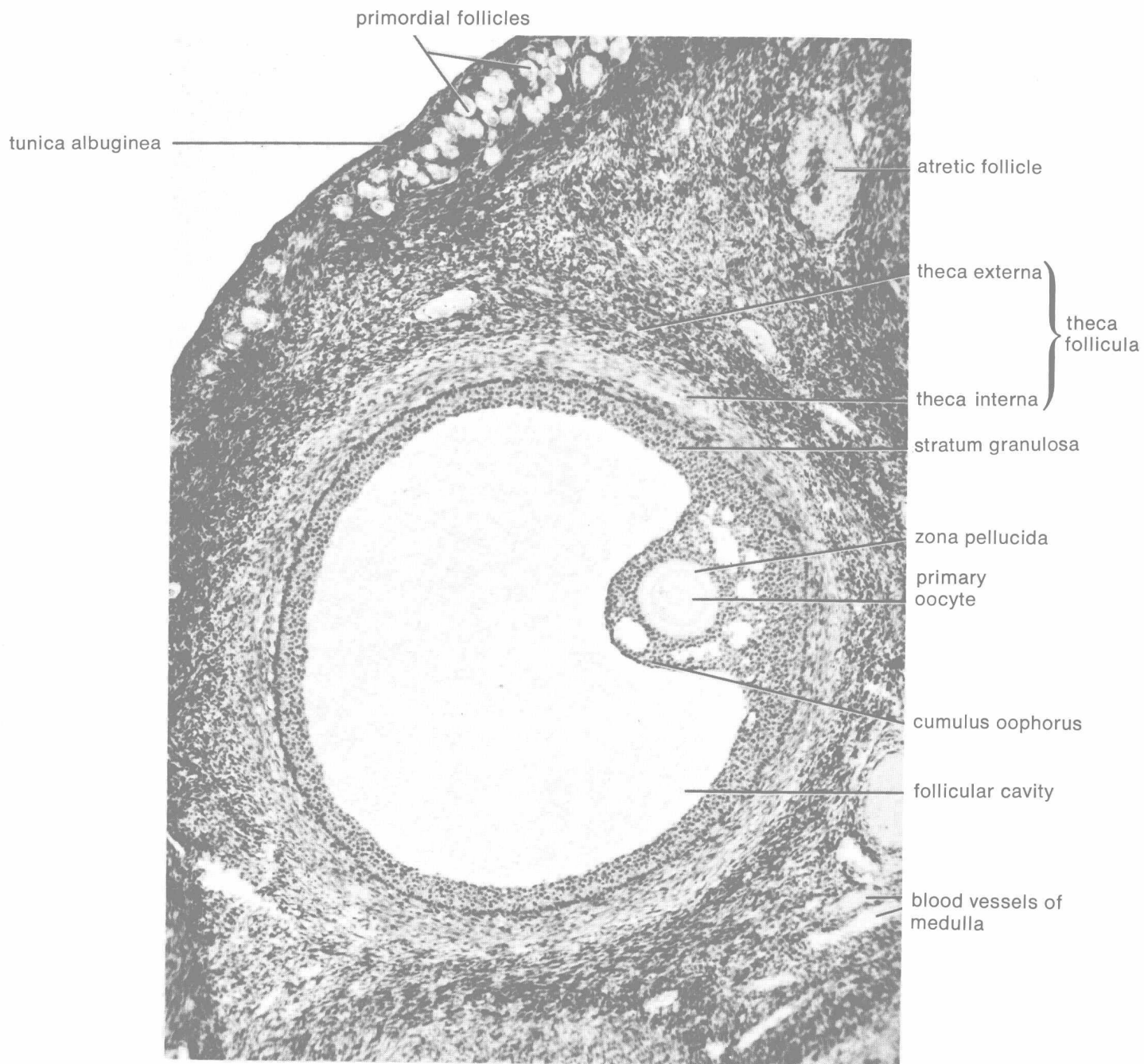
**Figure 3** Rat sperm smear (mag. 710X)



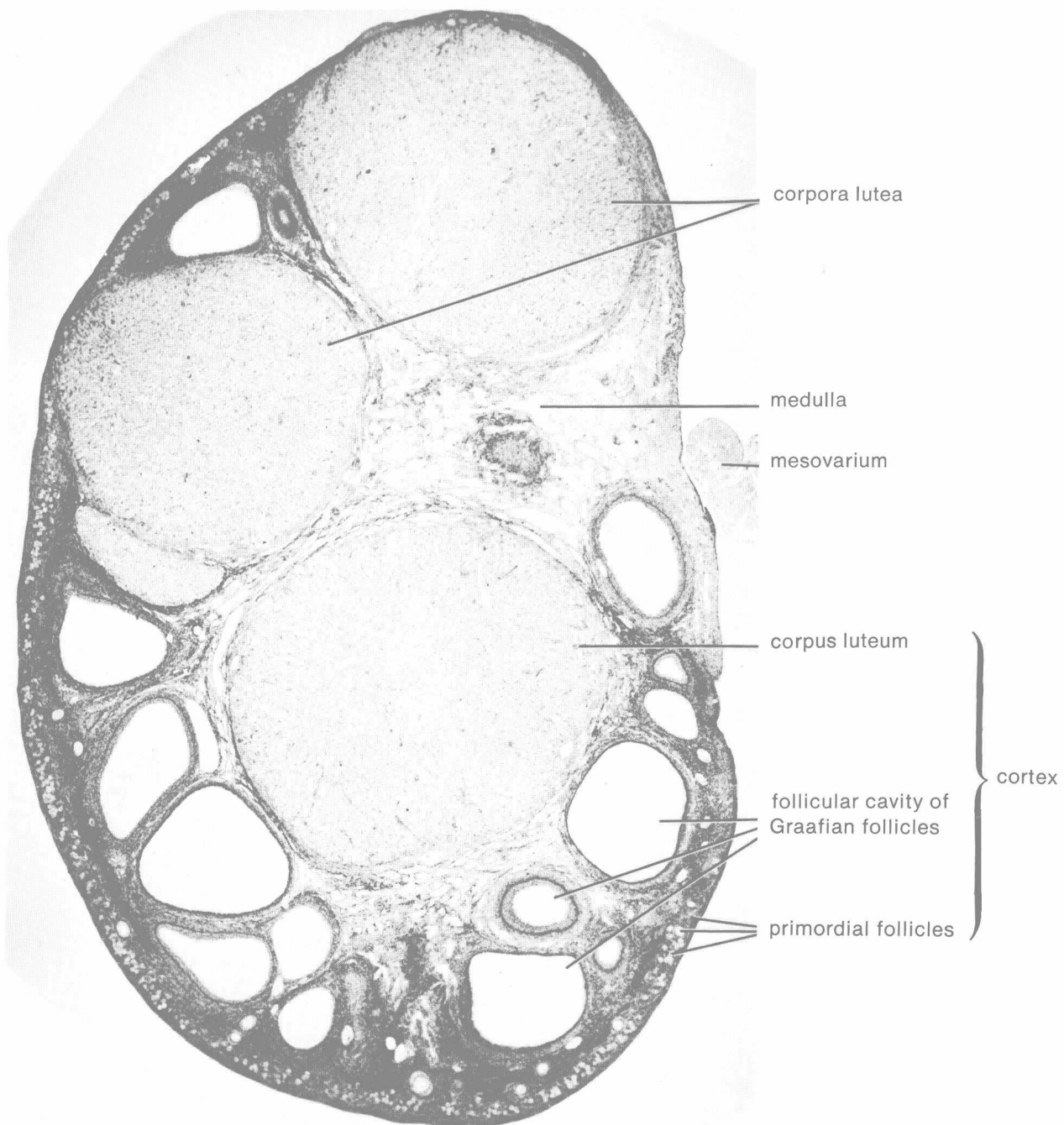
**Figure 4** Human testis, section of seminiferous tubule (mag. 675X)

**Figure 5** Mature cat ovary, section through cortex (mag. 125X)



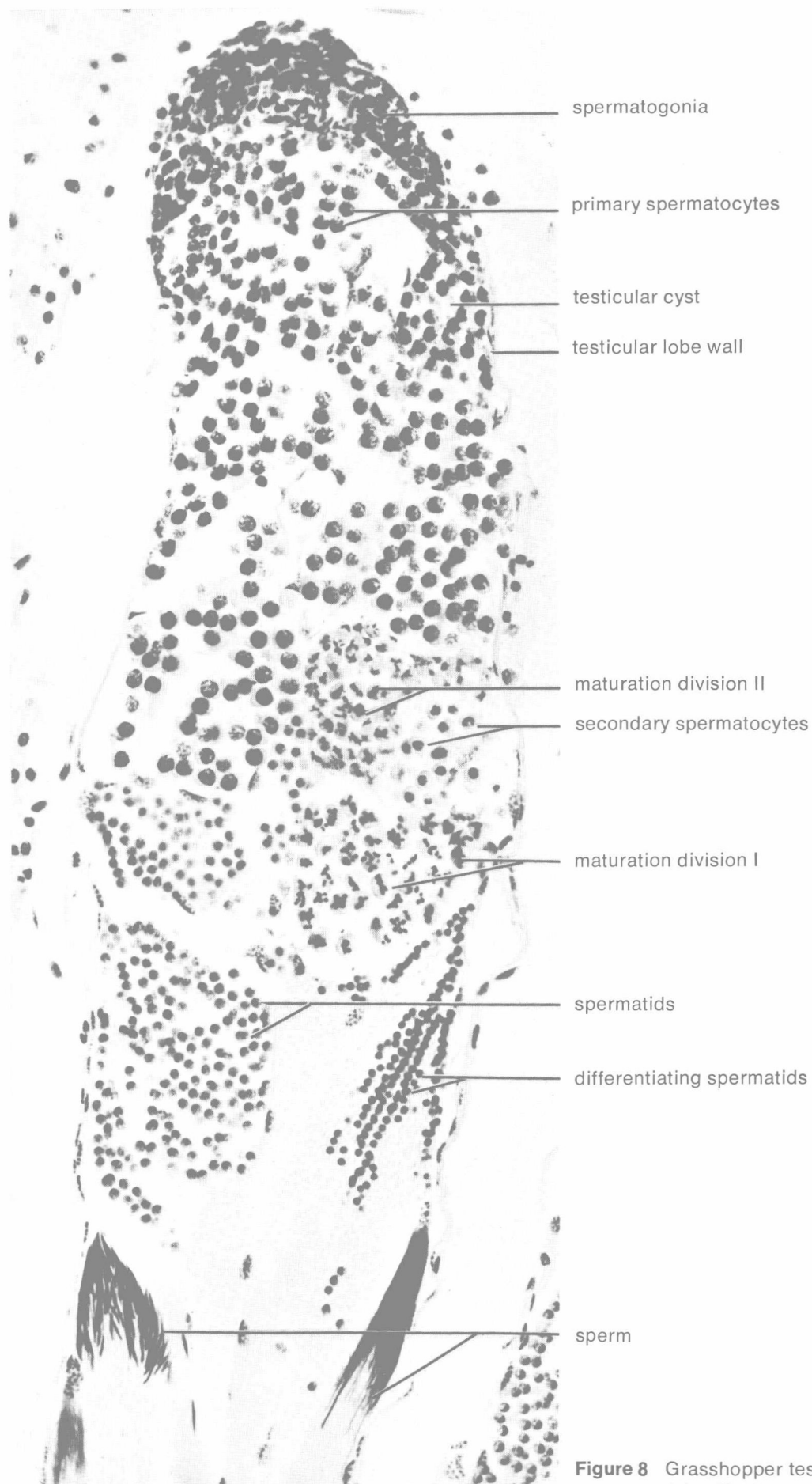


**Figure 6** Mature cat ovary, section through large Graafian follicle (mag. 90X)



**Figure 7** Ovary of pregnant cat, section through corpora lutea (mag. 25X)





**Figure 8** Grasshopper testis, longitudinal section of testicular lobe, Feulgen stain for DNA (mag. 190X)