



CONTINUING EDUCATION IN TOXICOLOGIC PATHOLOGY REPRODUCTIVE SYSTEM

Third Conference

ORGANIZED BY SOCIETY FOR TOXICOLOGIC PATHOLOGY IN INDIA (STPI)

OCTOBER 29-31, 2010

The Atria Hotel, # 1, Palace Road, Bangalore - 560 001



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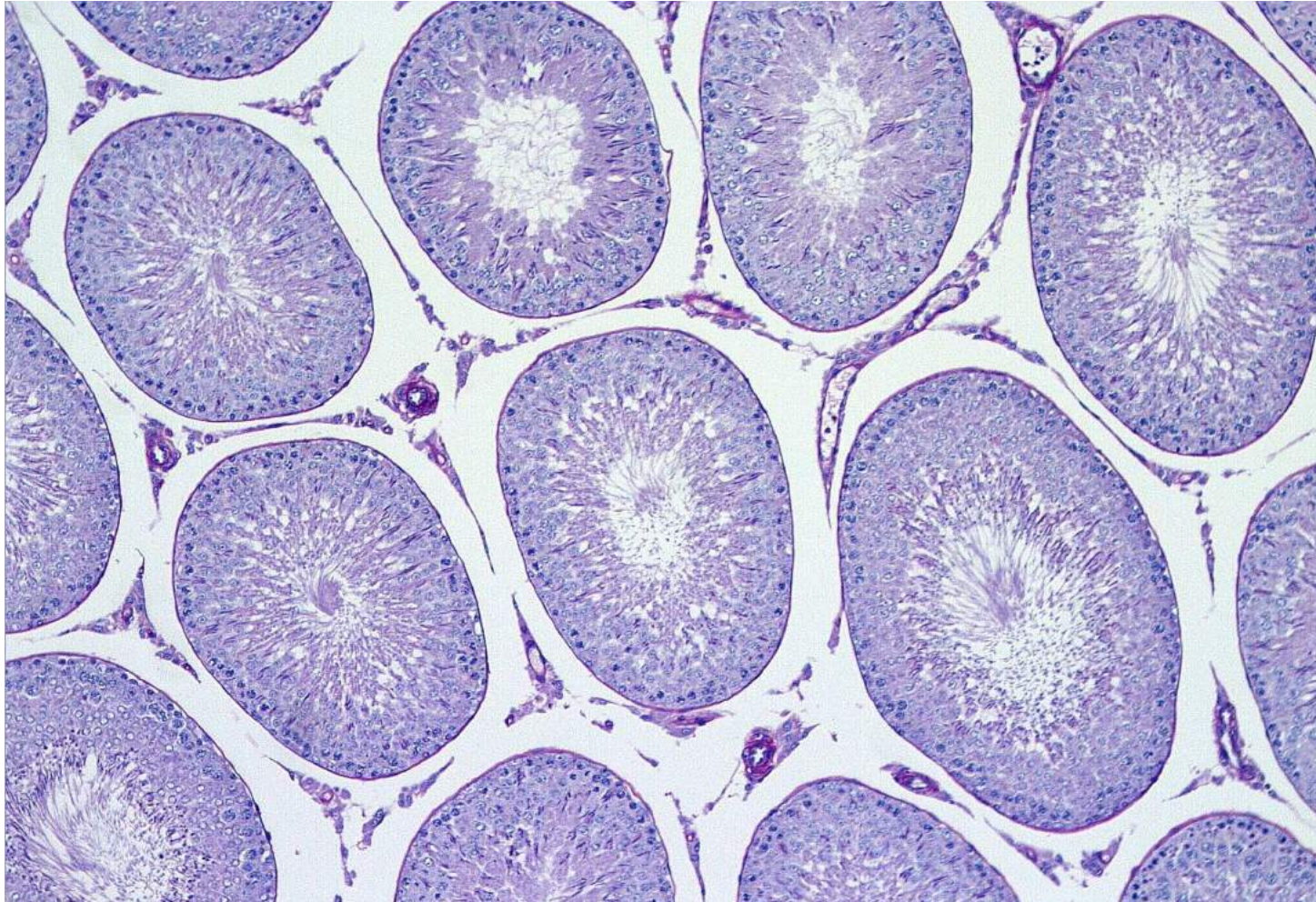
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RCC
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Staging of Spermatogenesis



Dr. K. Kamala
Advinus Therapeutics Ltd, Bangalore

Staging-Definition



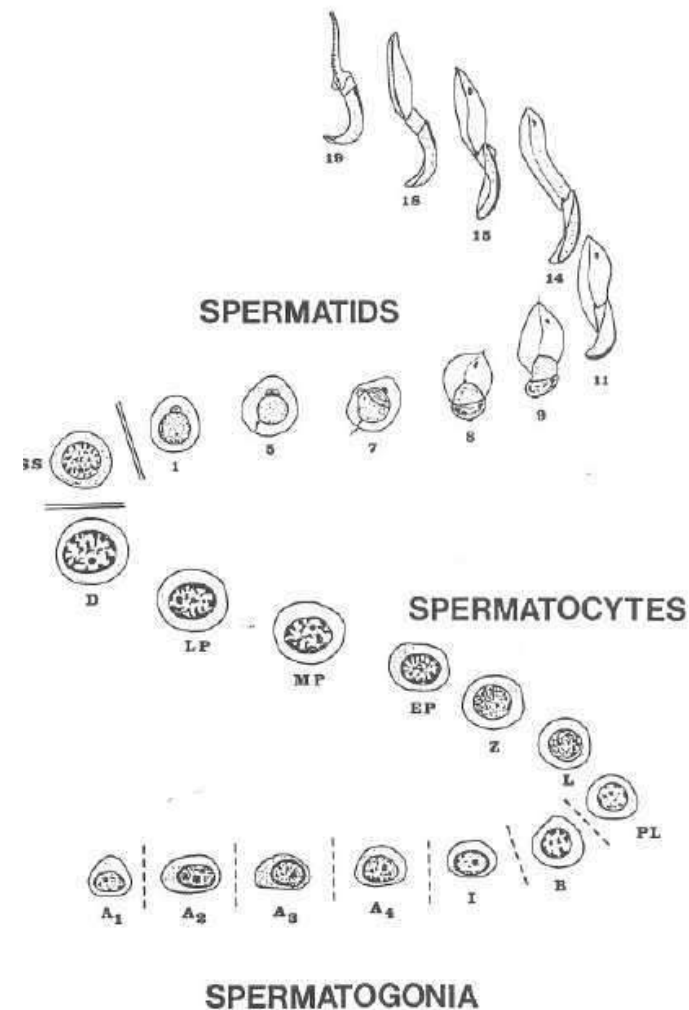
- Integerated cell association within the seminiferous tubules

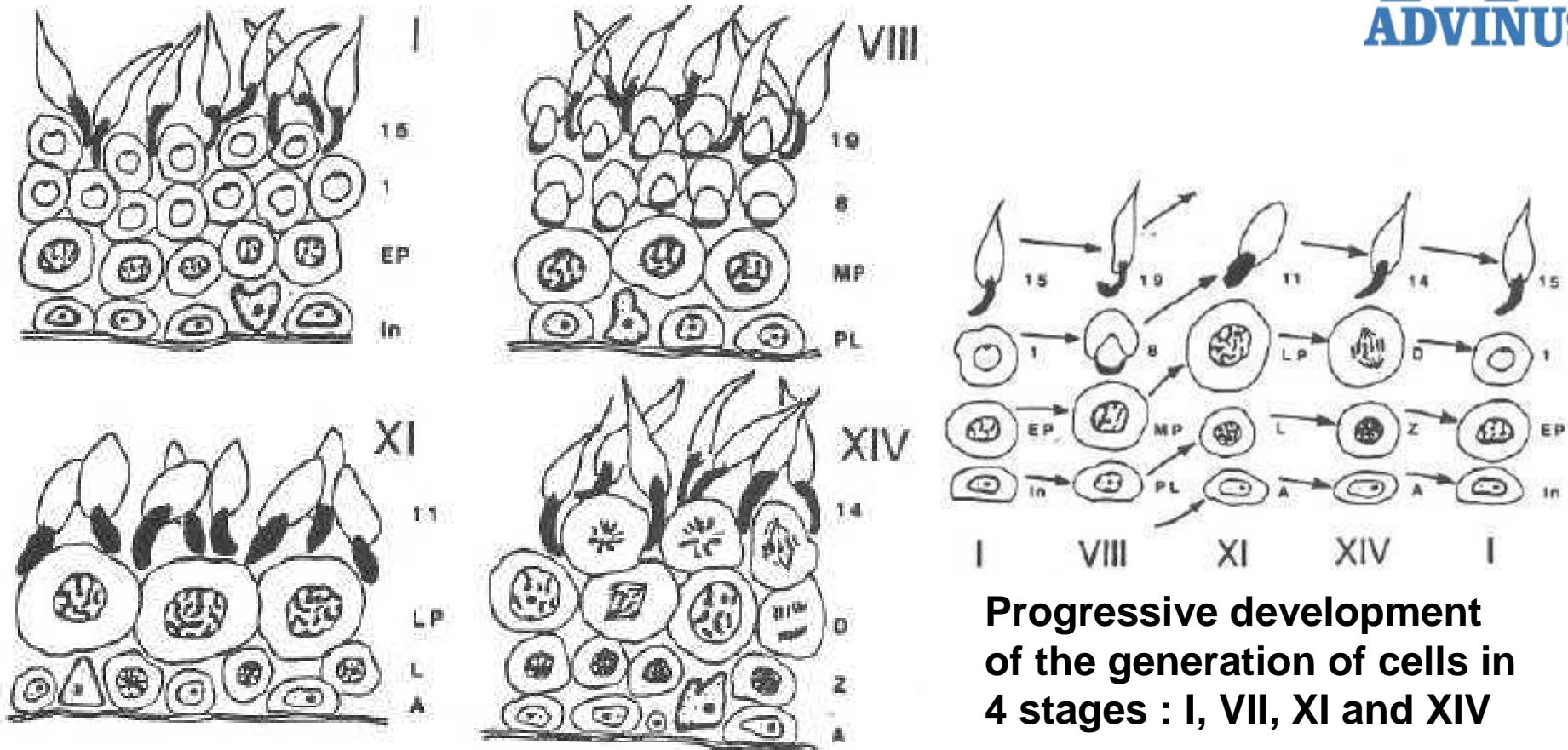
- Application
- Cell types

Spermatogonia—
proliferative, differentiative

Spermatocytes-
primary, secondary

Spermatids-
round, elongated





Progressive development of the generation of cells in 4 stages : I, VII, XI and XIV

CELLULAR MAKE UP OF 4 THE STAGES

Four generation of cells develop simultaneously and in precise synchrony with each other.

STAGING



- **No.of stages**

- Rats-XIV

- Mouse-XII

- **Collection and processing**

Modified Davidson's fluid

Bouin's fluid

4 micron thick paraffin sections with PAS and Hematoxylin

Distribution of Stages



Stage VII-21%

Stage II- 5%

Stage I- 14%

Stage IV- 5%

Stage XII- 9%

Stage X- 3%

Stage VIII-8%

Stage IX- 3%

Stage VI- 7%

Stage XI- 3%

Stage XIV-7%

Stage III- 2%

Stage V- 7%

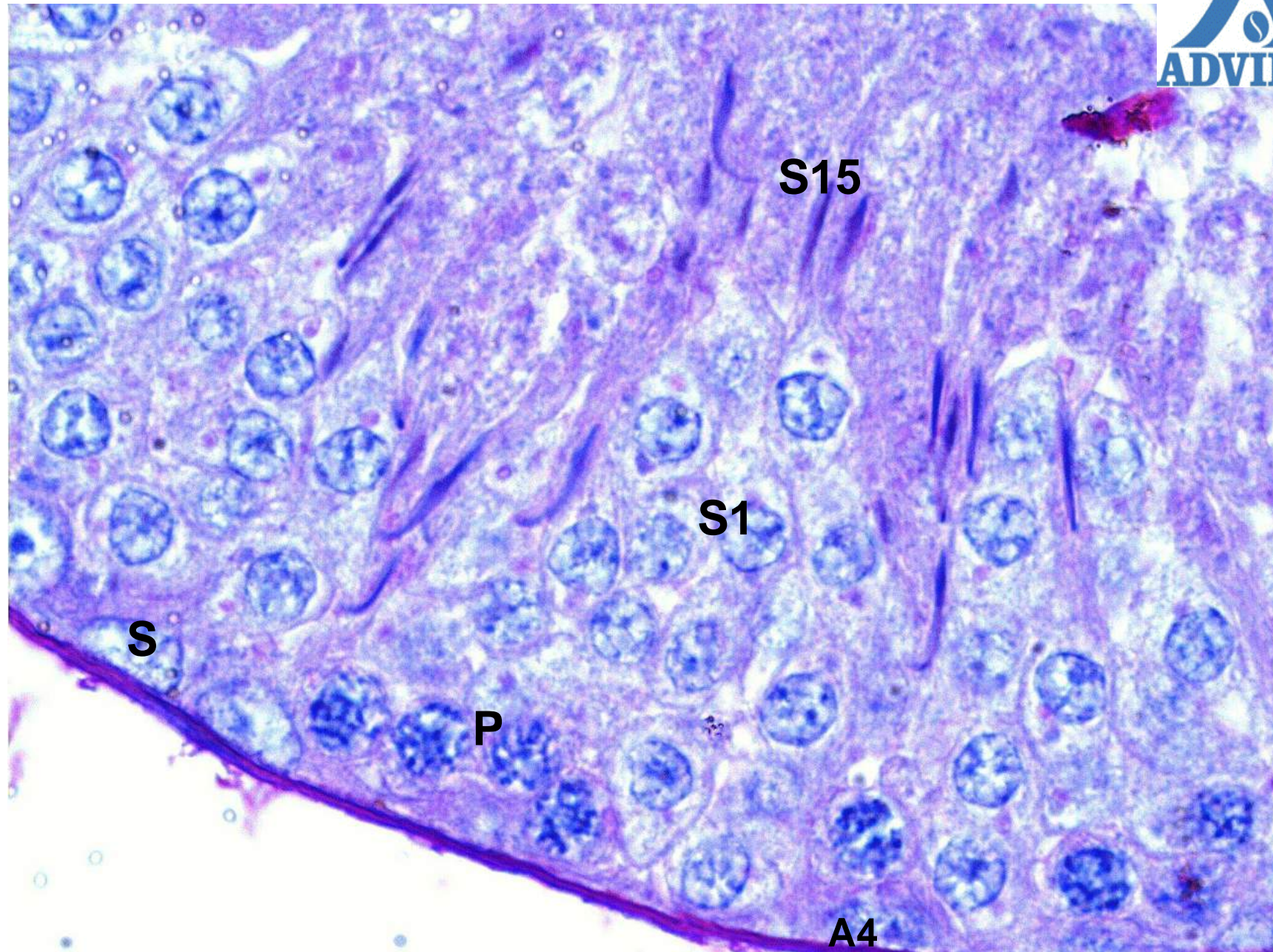
Stage XIII- 6%

Stage-I- Key features

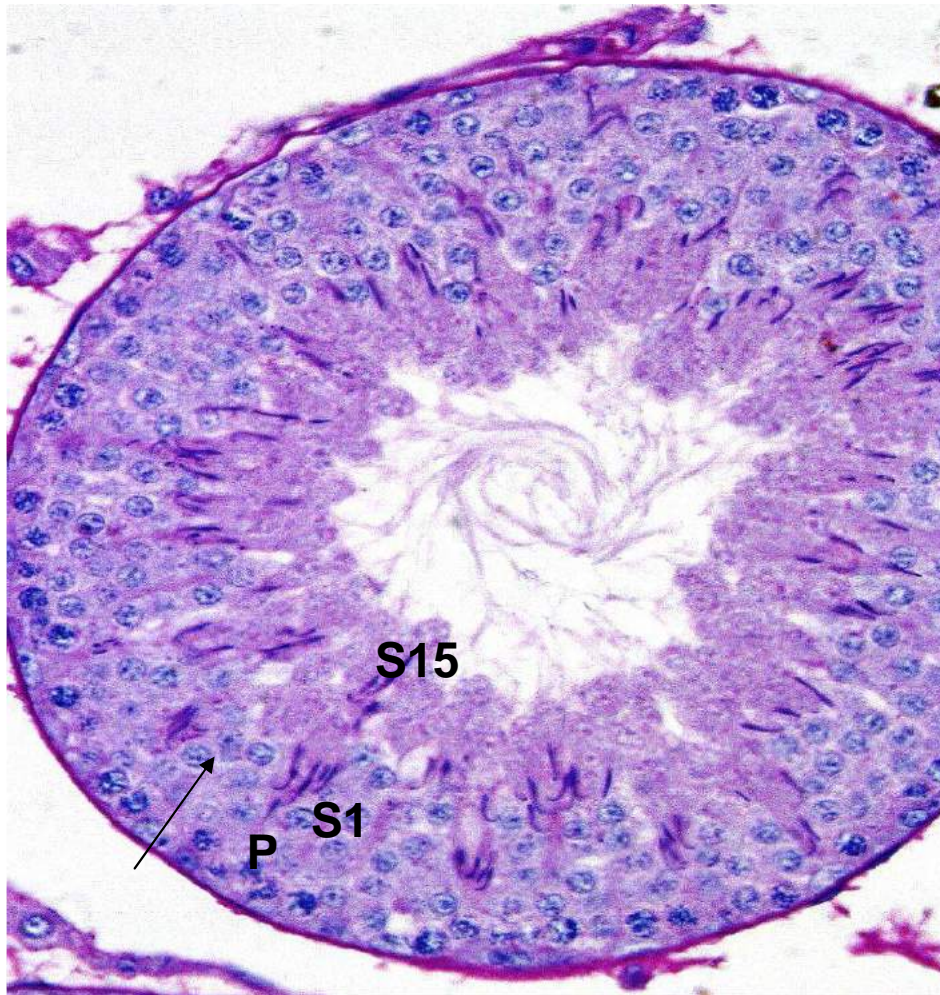


- Smaller step 1 spermatids
- Combined 14 and Deg. Spermatocytes
- Flagellum not prominent

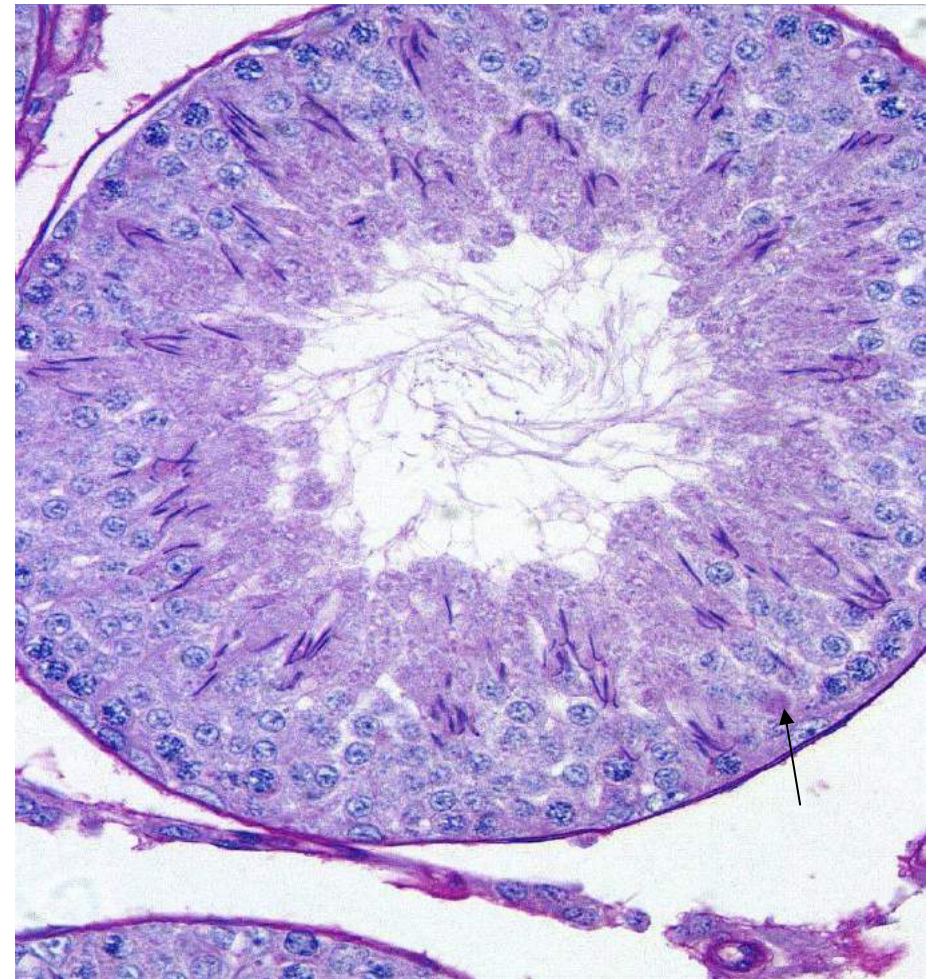
Stage I-PAS&H



Stage I –PAS&H



Smaller step 1 spermatids



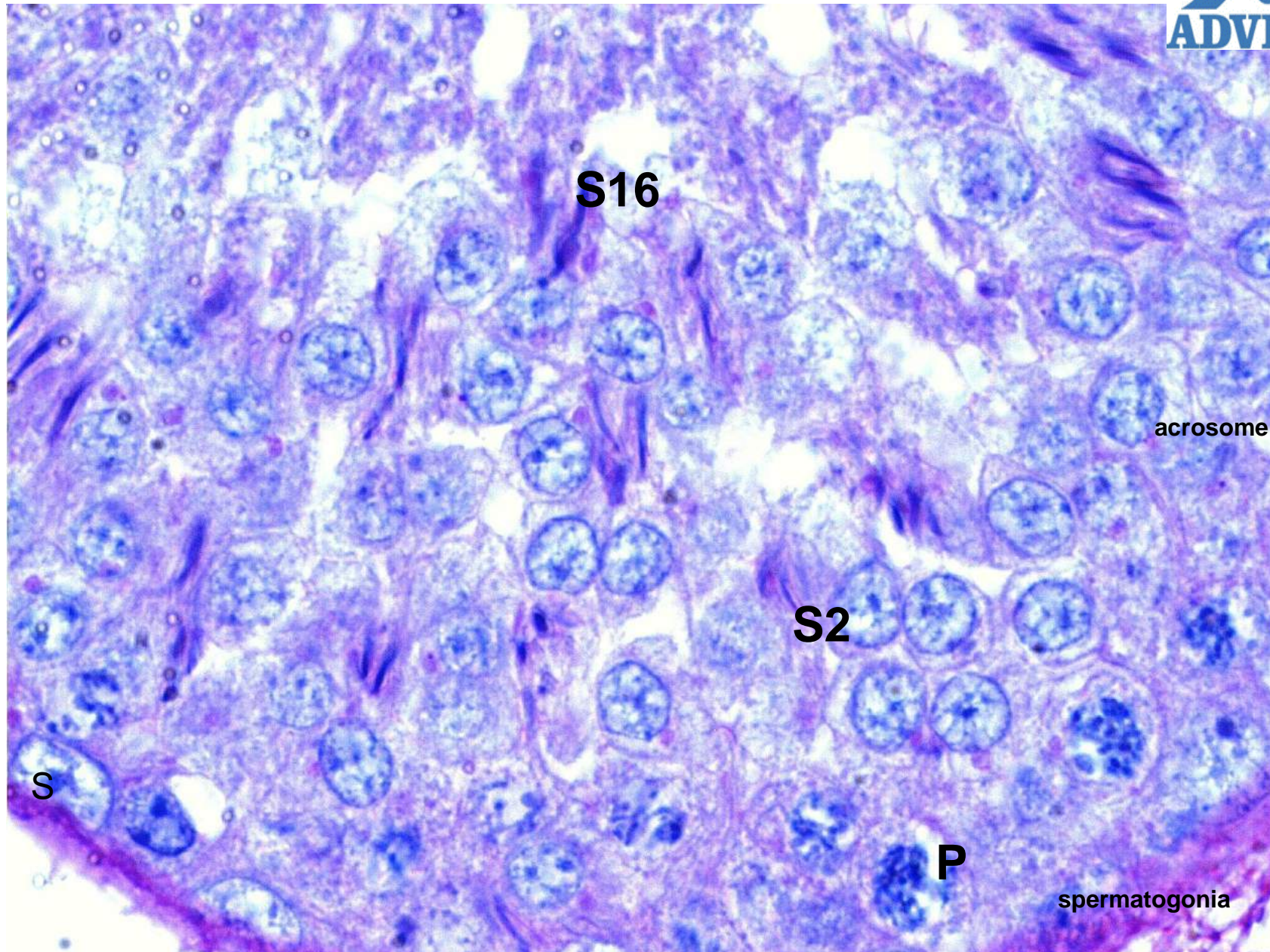
•Combined 14 and Deg. spermatocytes

Stage-II-III Key features

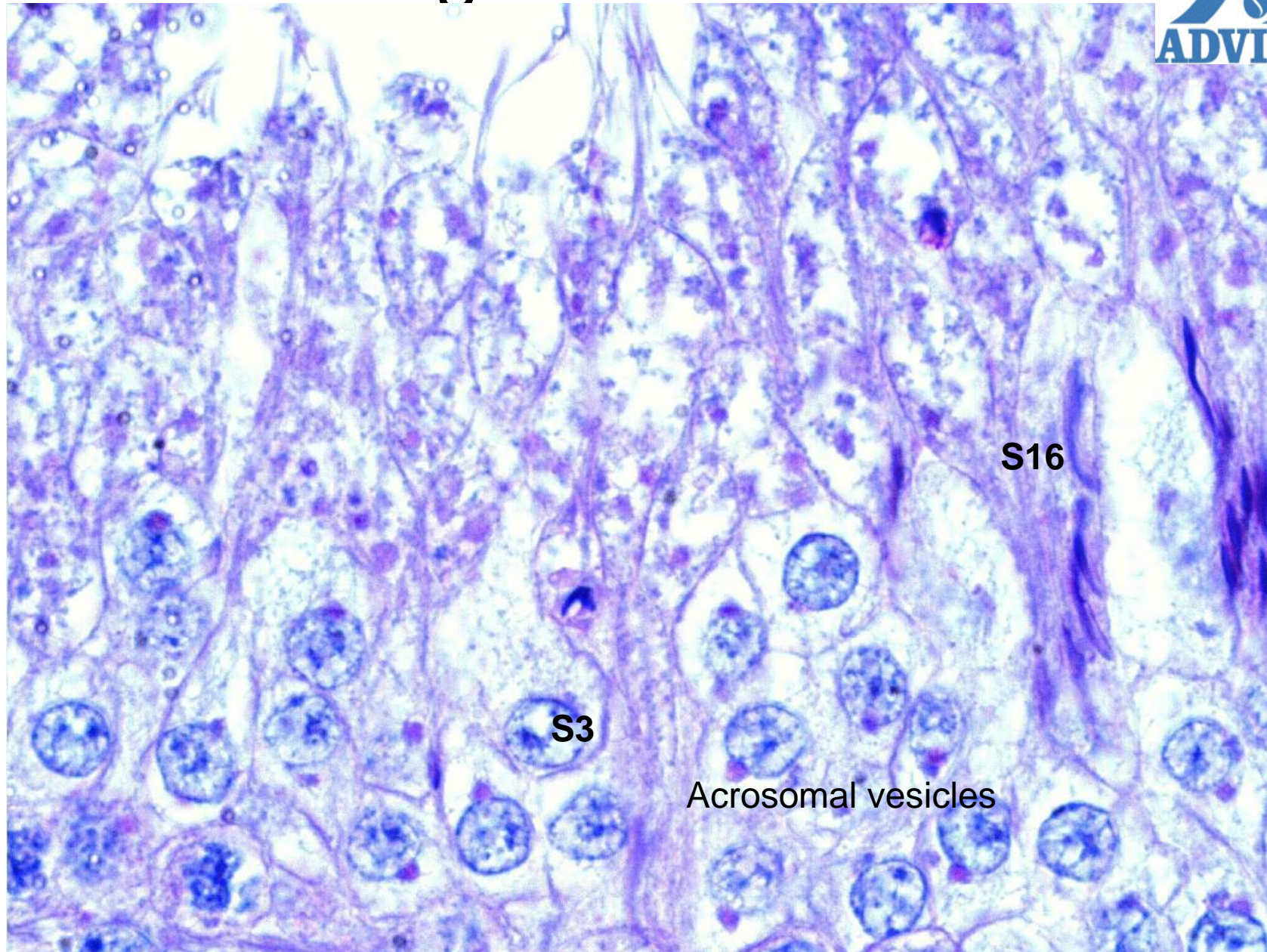


- Proacrosome vesicles
- Elongated spermatids towards Sertoli cells
- Step 2 and spermatids and spermatogonia size difference

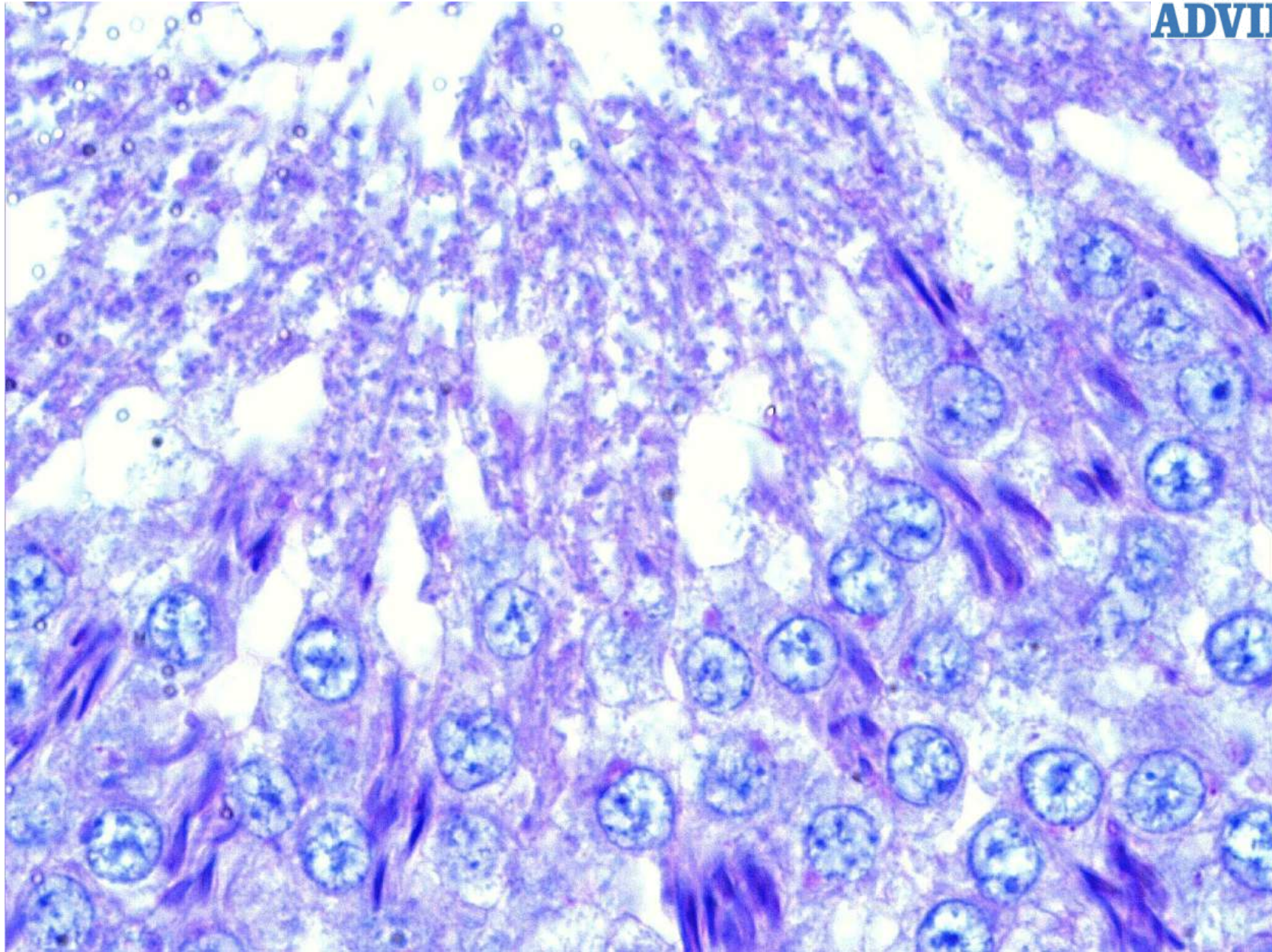
Stages II-III PAS&H



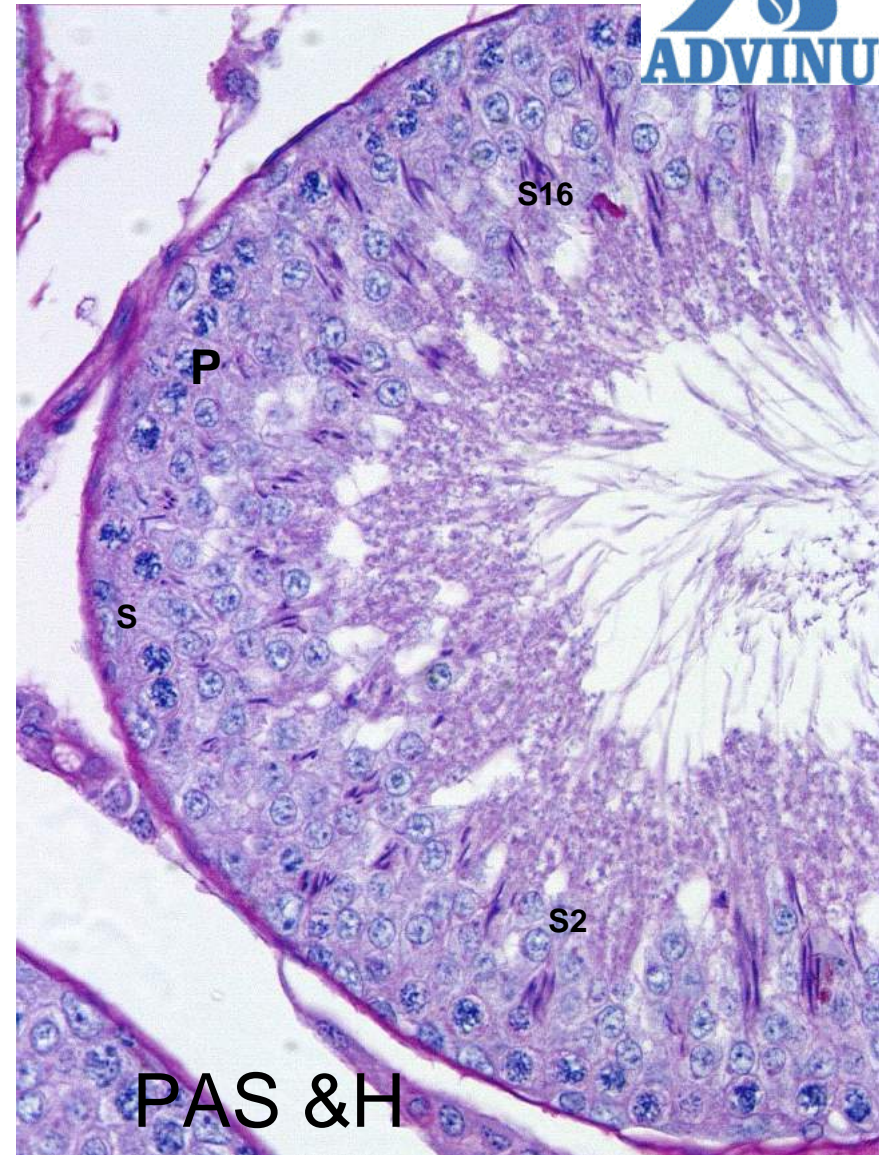
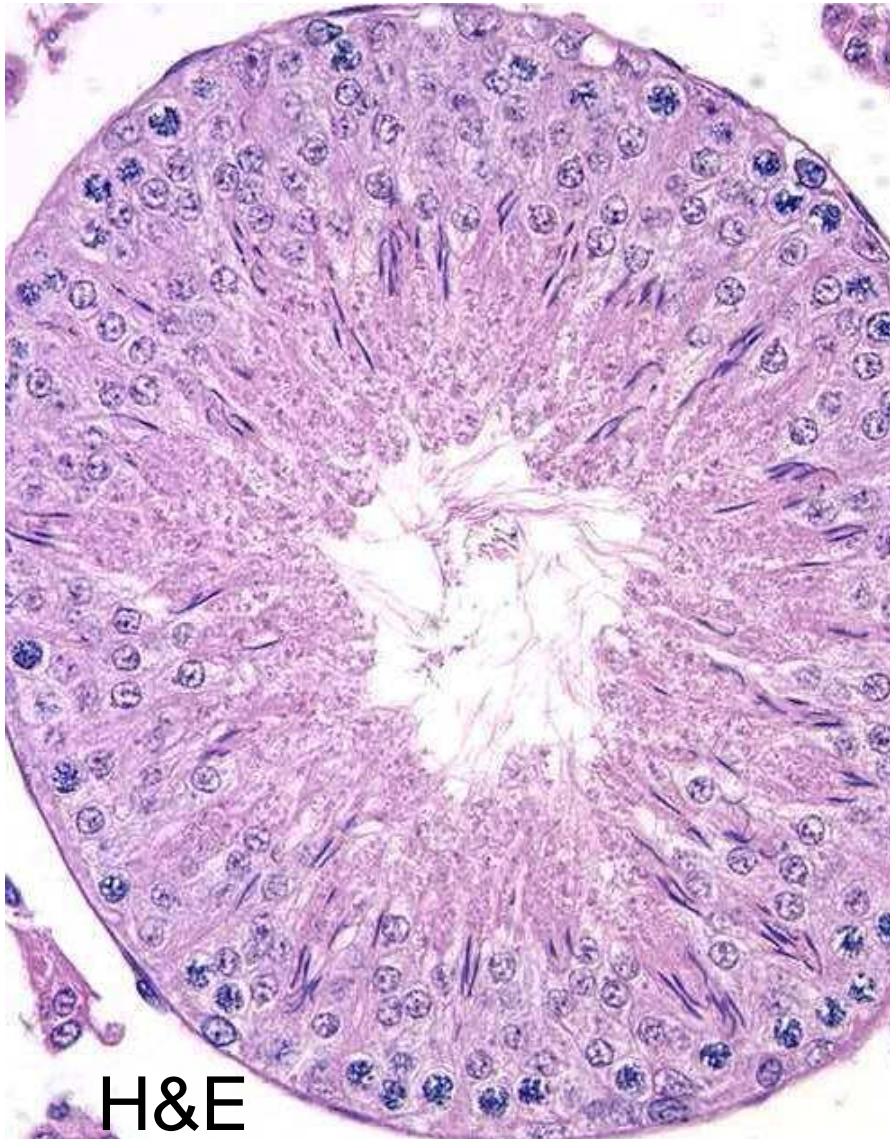
Stage II-III PAS&H



Stages II-III PAS&H



Stages-II&III



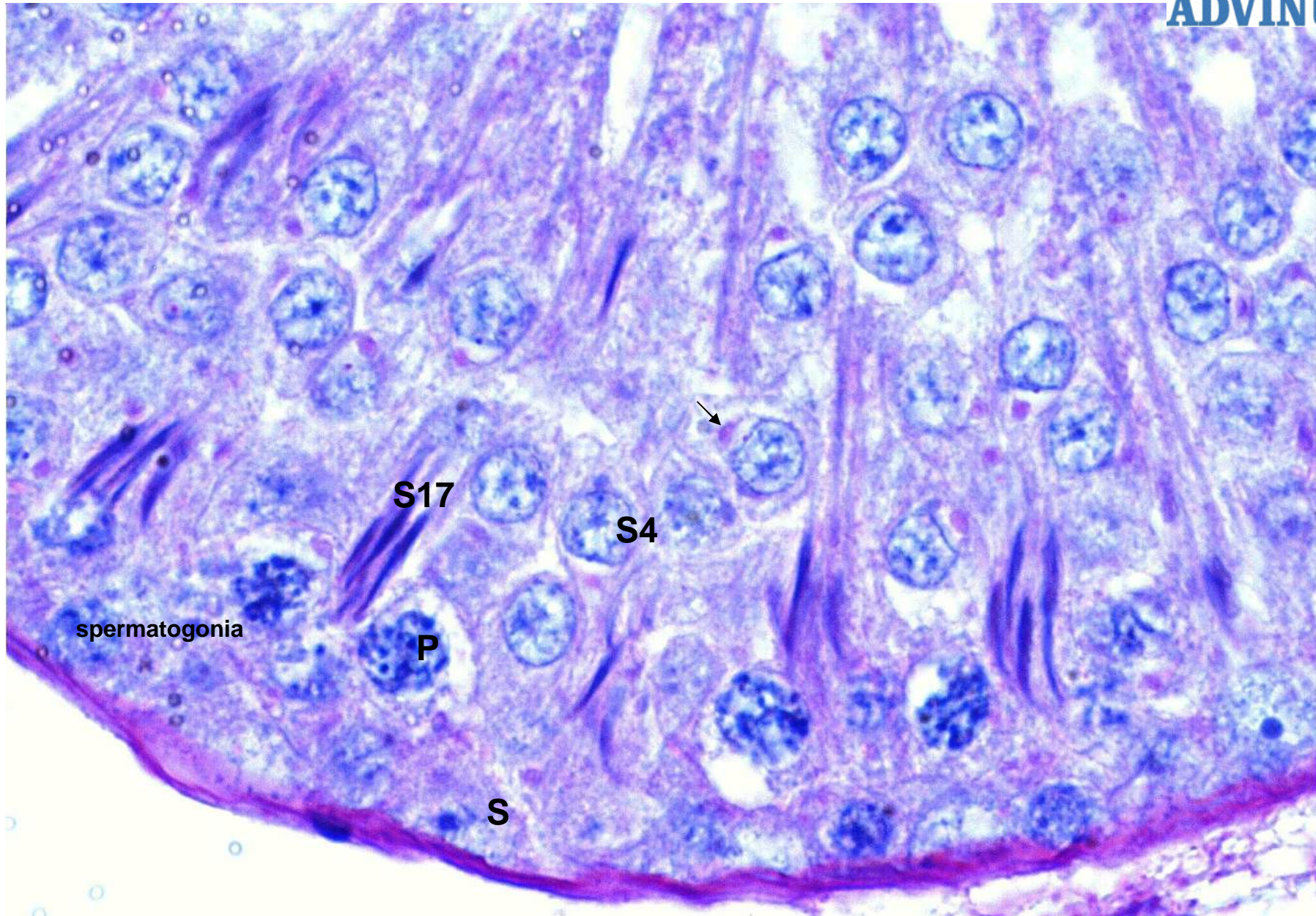
A1 spermatogonia, Sertoli cells, pachytene spermatocytes, S3 and S16 spermatids



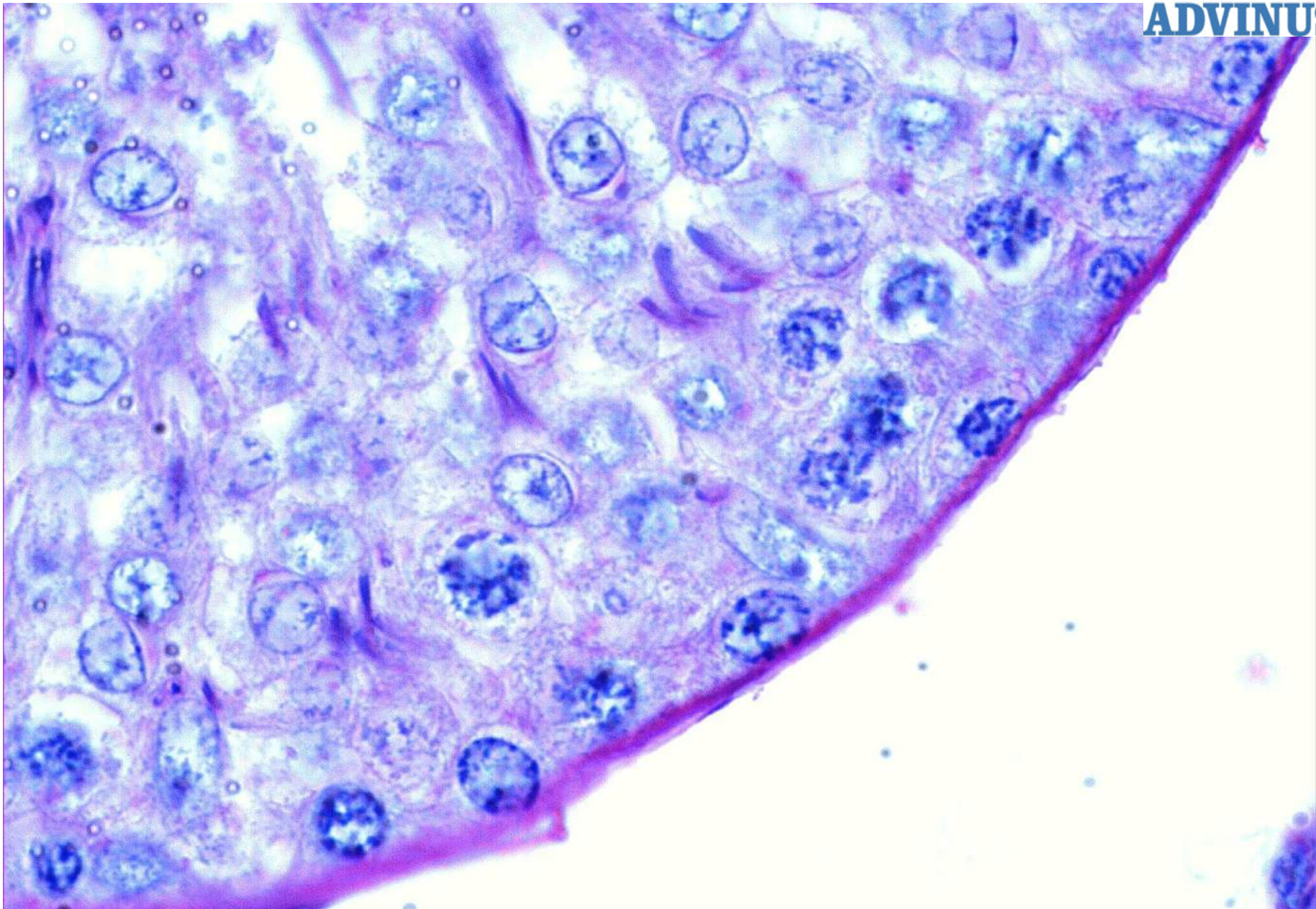
Stage-IV Key features

- Deeply located elongated spermatids
- Acrosome extension
- Pachytene spermatocyte size
- Flagellum development in elongated spermatids

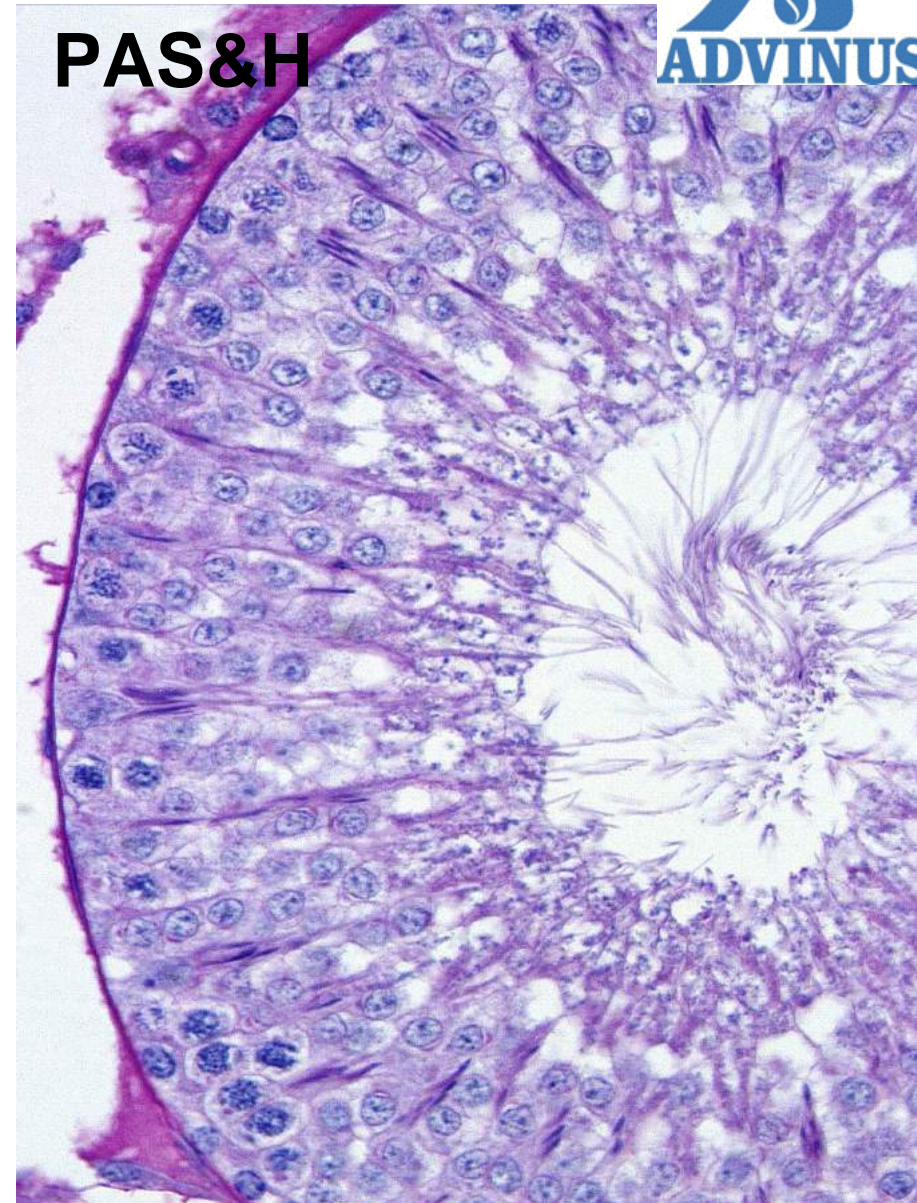
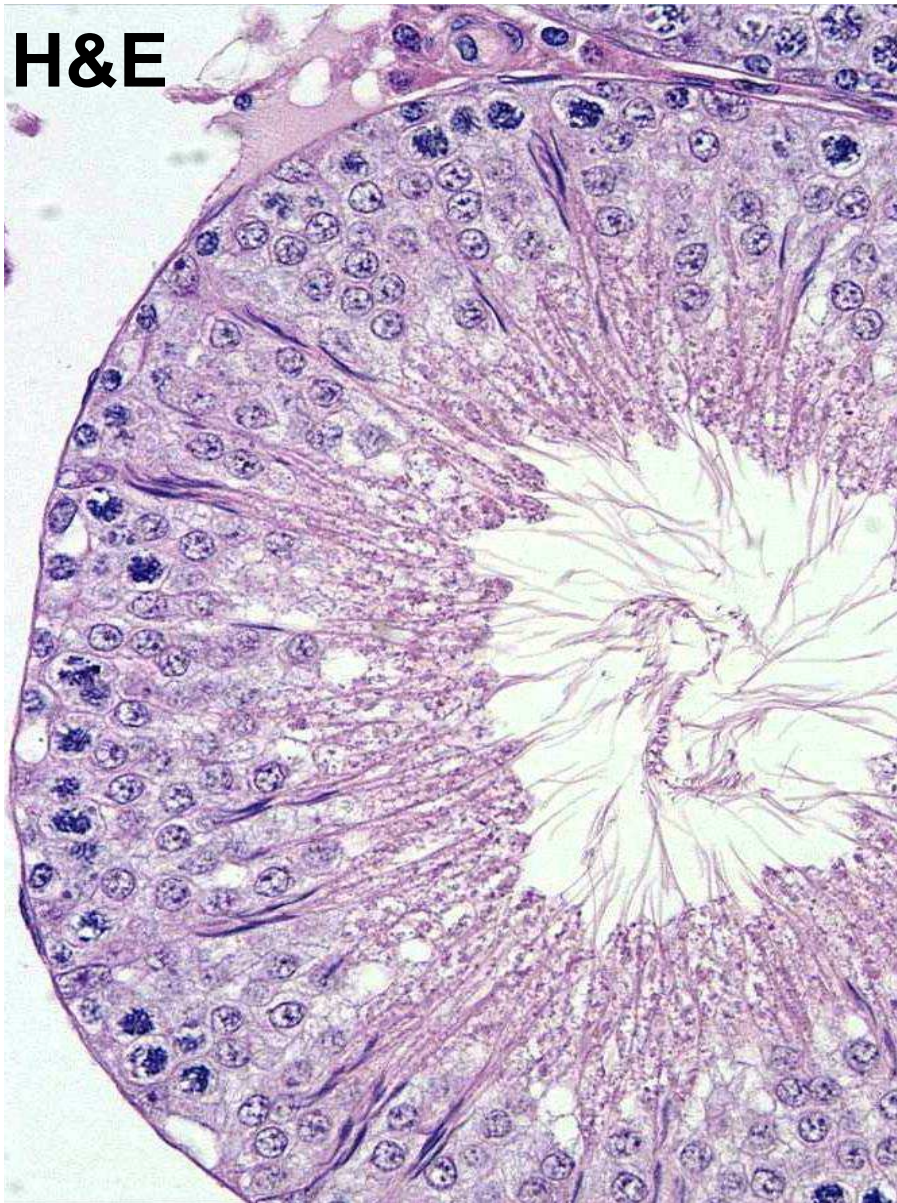
Stage-IV-PAS&H



Stage-IV-PAS&H



Stage-IV



Type B spermatogonia, Sertoli cells, pachytene spermatocytes, S4 and S17 spermatids



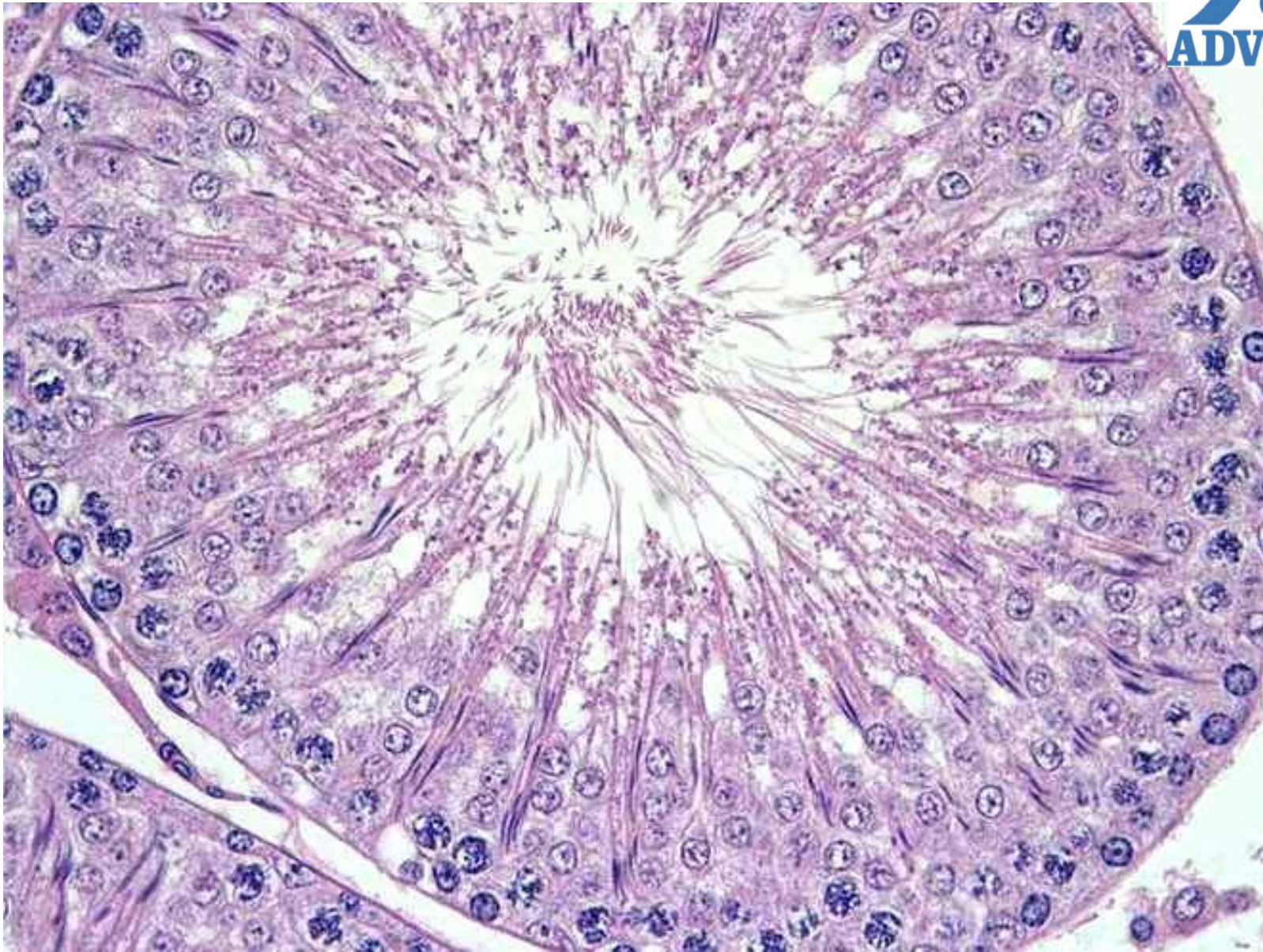
Stage V Key features

- Elongated spermatids in sertoli cells
- Acrosome development
- Pachytene spermatocyte size
- Similar stages- IV and V

Stage- V- PAS&H



Stage-V- H&E



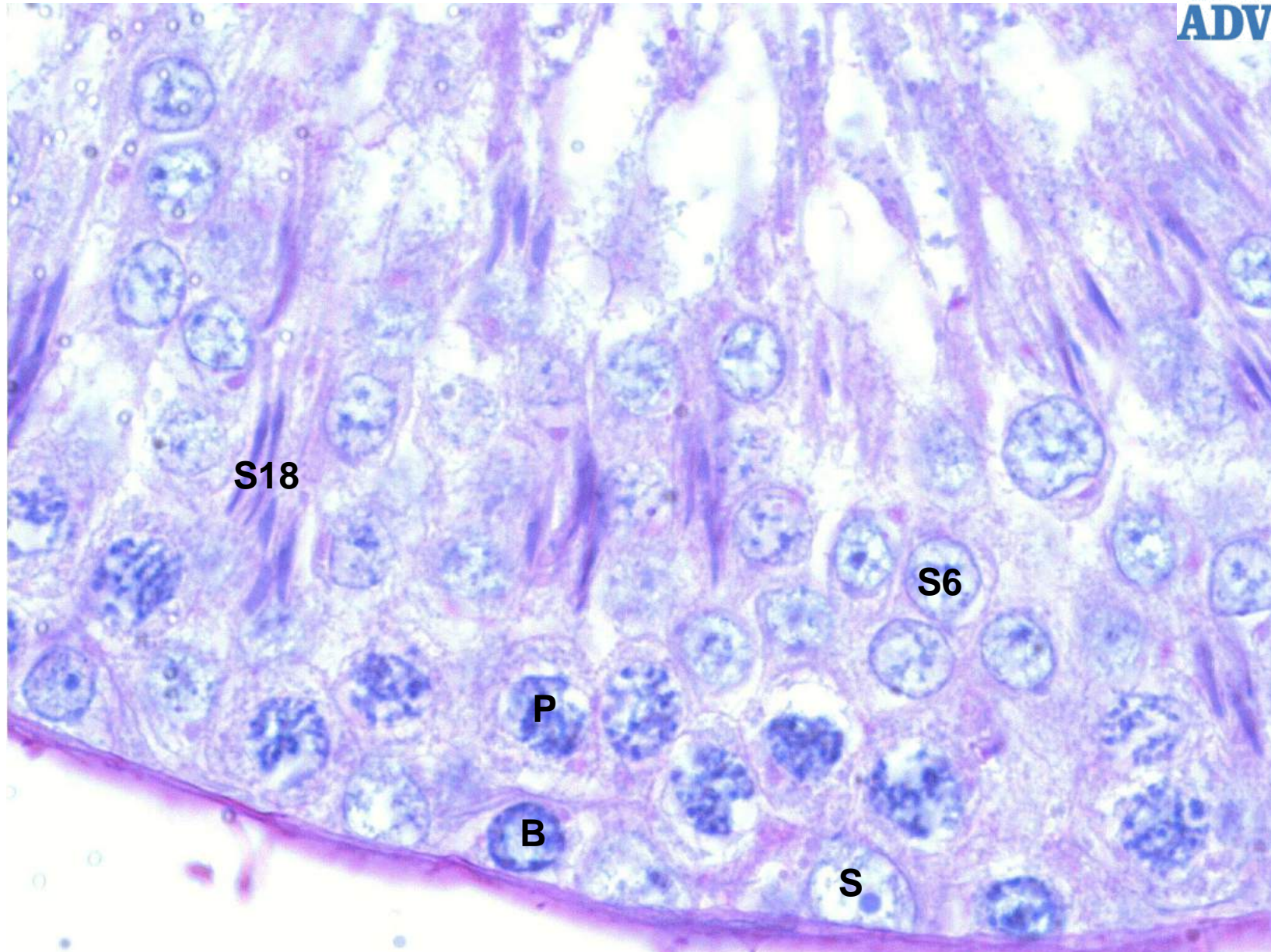
Type B spermatogonia, Sertoli cells, pachytene spermatocytes, S5 and S17 spermatids

Stage-VI Key features

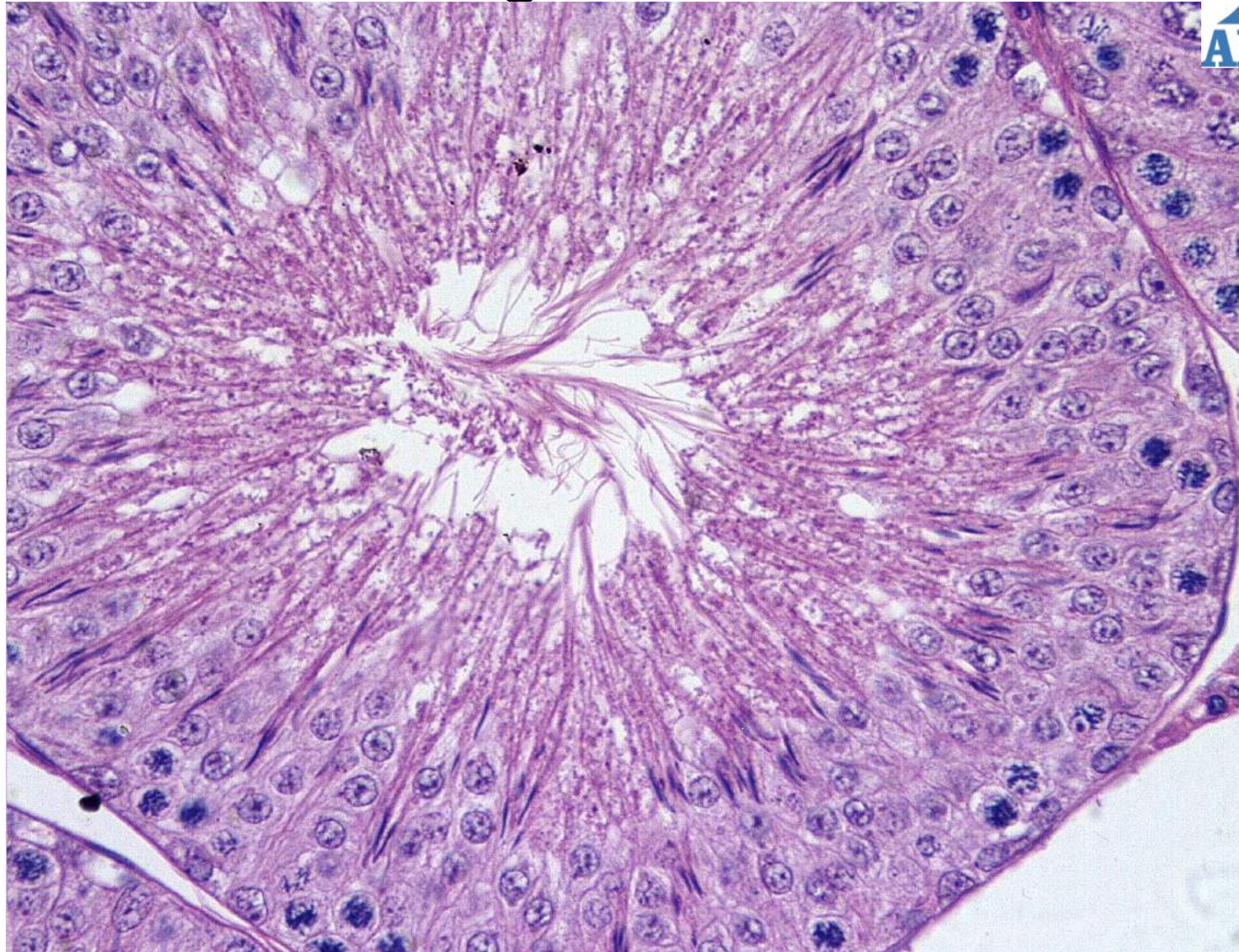


- Movement of elongated spermatids towards lumen
- Bigger pachytene spermatocytes
- Acrosome development
- Acrosome tilt towards the base of spermatocyte

Stage VI-PAS&H



Stage-VI H&E



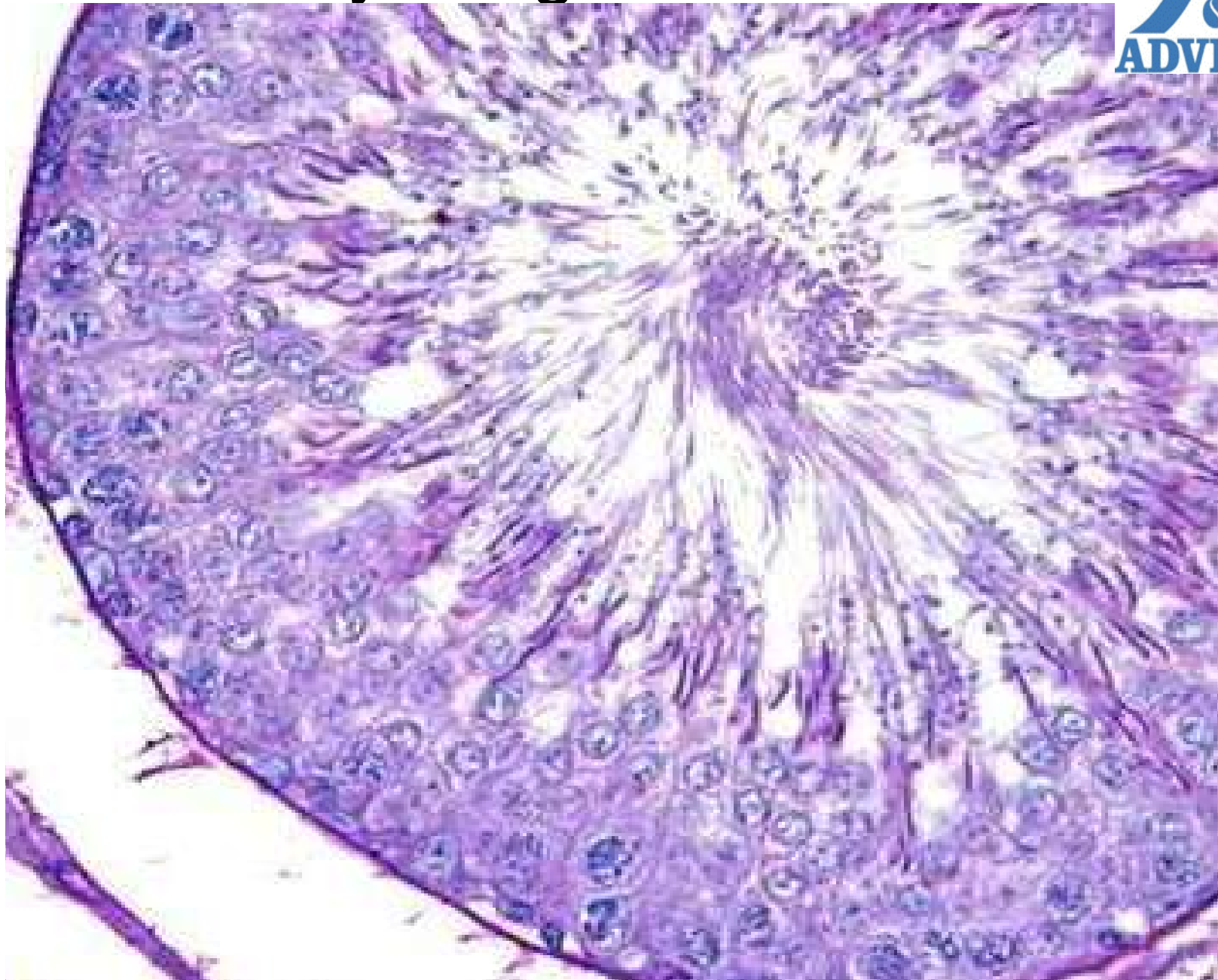
A,B spermatogonia, Sertoli cells, pachytene spermatocytes, S6 and S18 spermatids

Stage-VII Key features

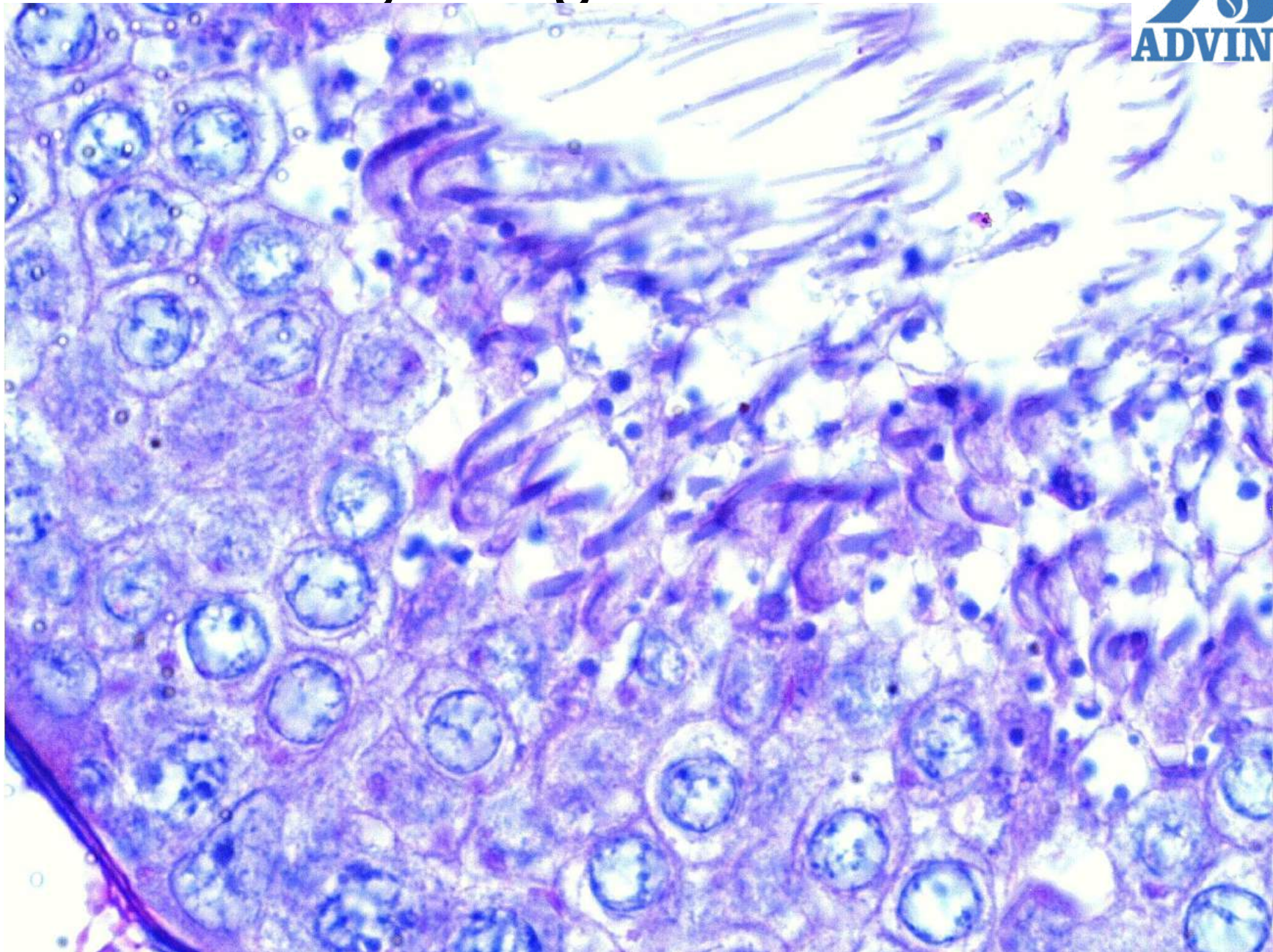


- **Early-** elongated spermatids near lumen
Cytoplasmic droplets near the lumen
- **Late-** spermatid arrangement, cytoplasmic droplets at the base of arranged spermatids,
Contact of acrosome in the round spermatid
and Pachytene spermatocyte size

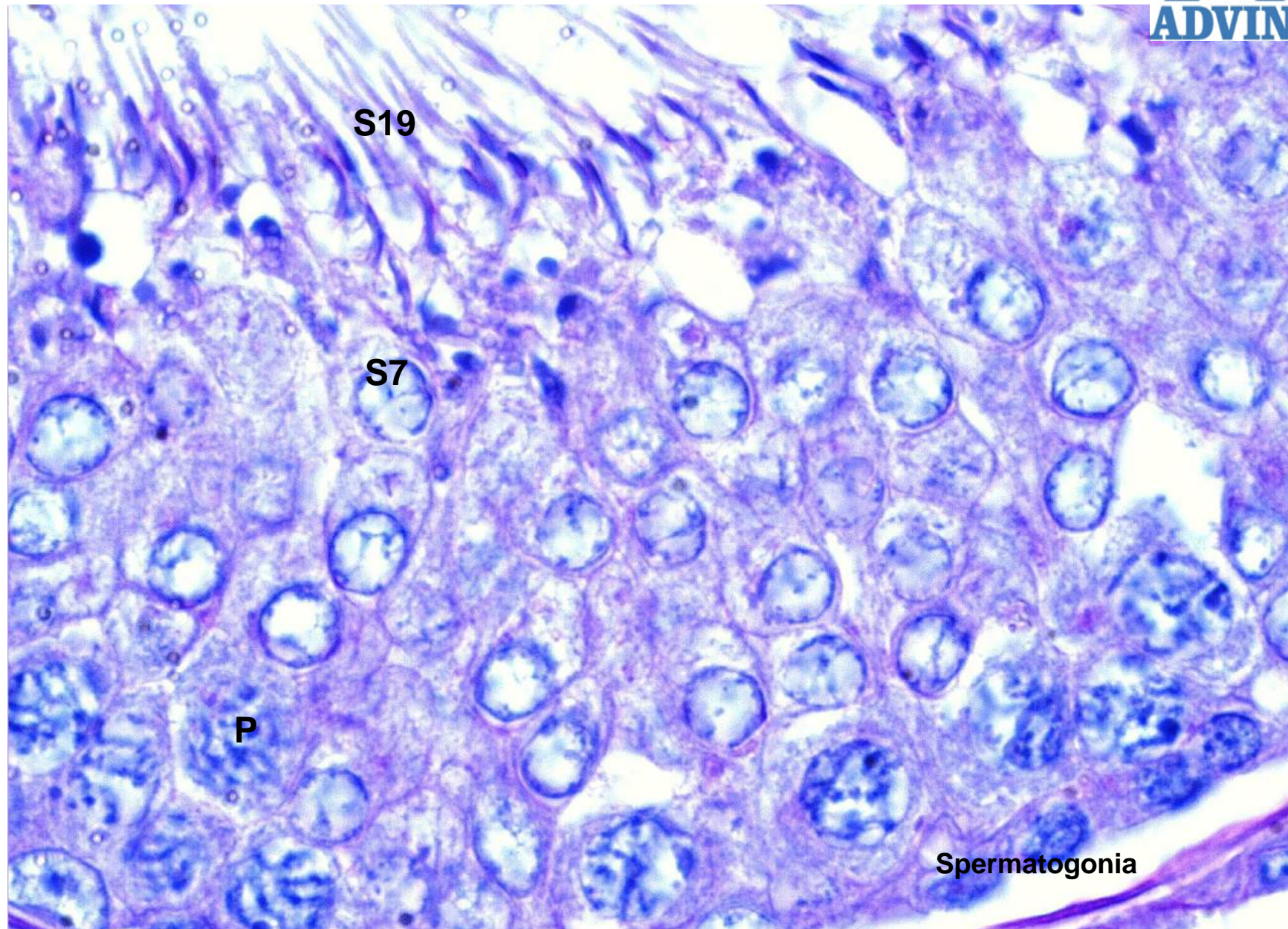
Early Stage VII PAS&H



Early Stage VII PAS&H



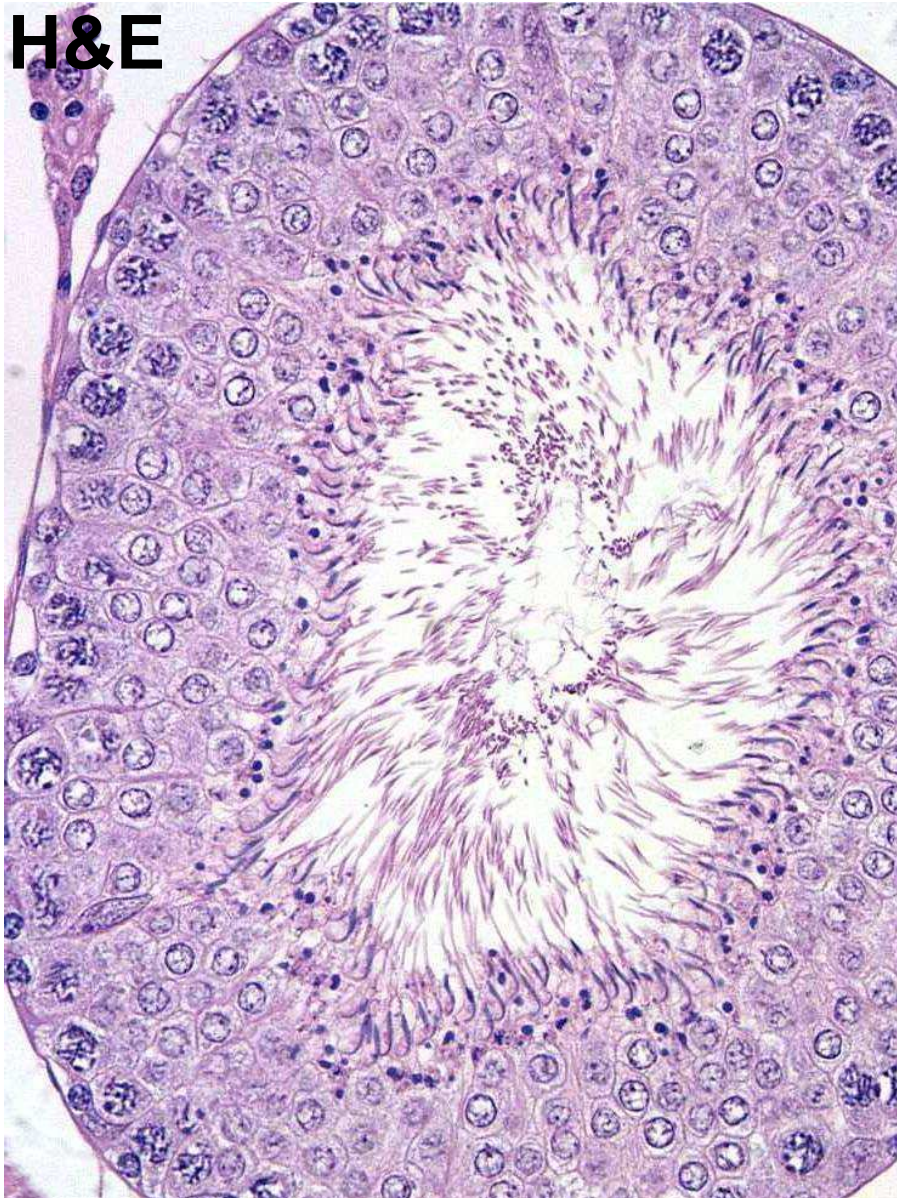
Late Stage VII-PAS&H



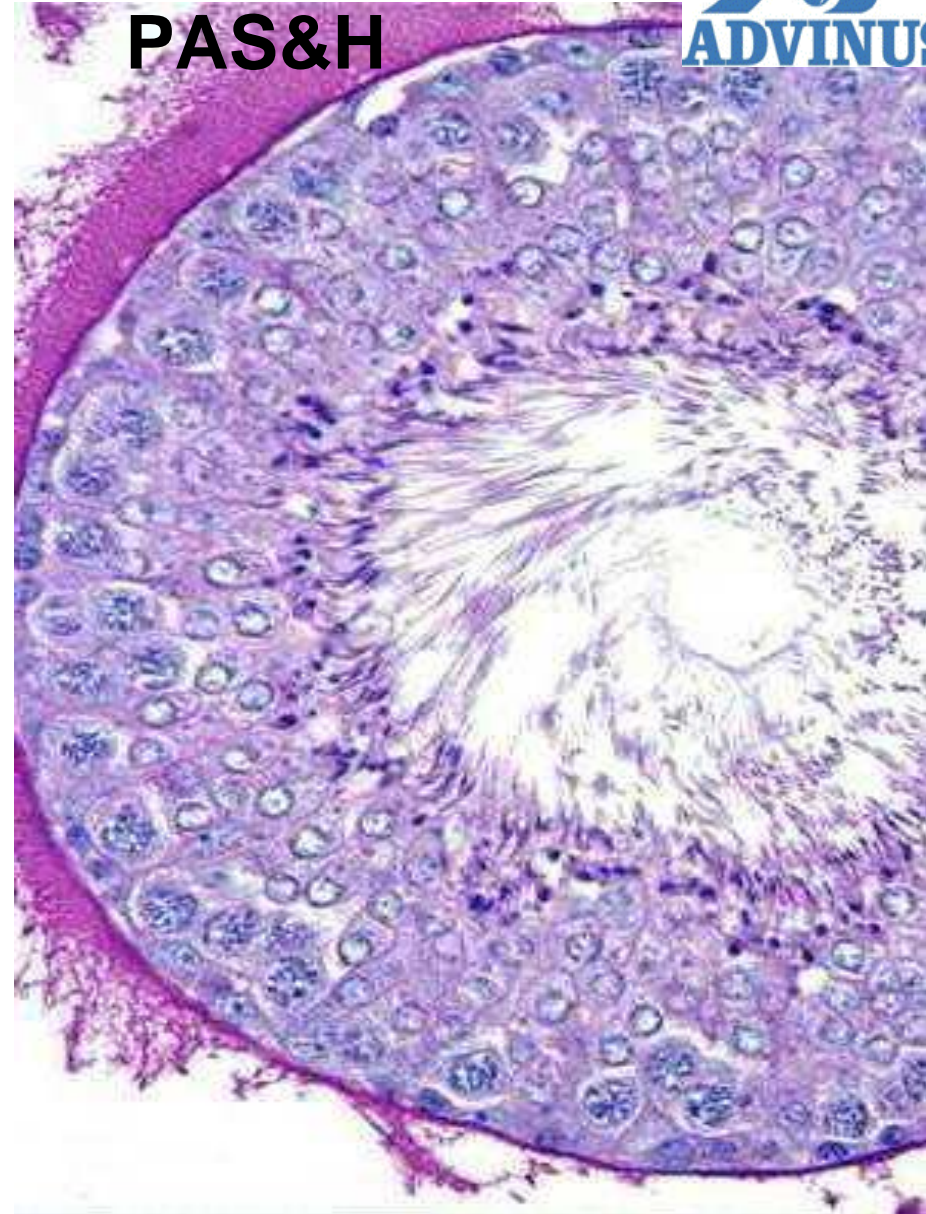
Stage-VII H&E



H&E



PAS&H



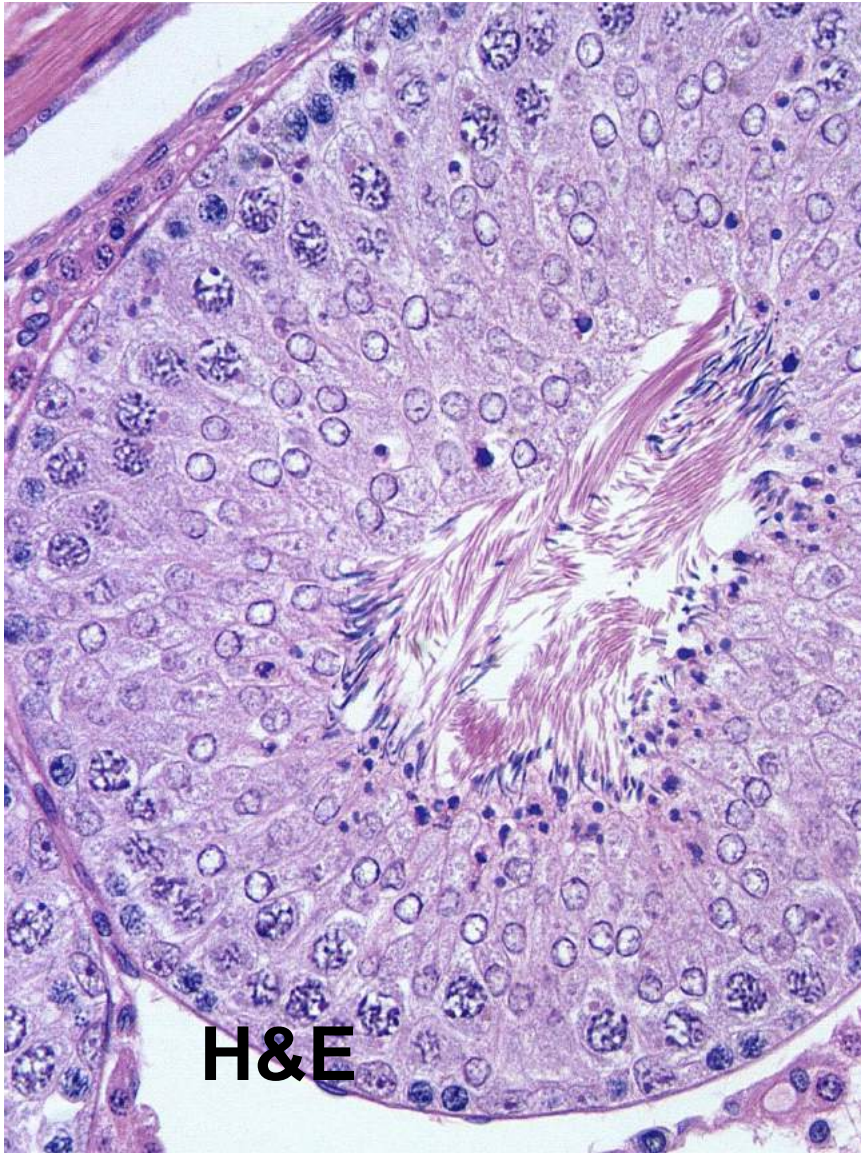
A1 spermatogonia, Sertoli cells, Pachytene spermatocytes, S7 and S19 spermatids

Stage-VIII Key features



- Spermiation in process
- Round spermatids start to elongate
- Pachytene spermatocyte size
- Cytoplasmic droplets in lumen as well as near Sertoli cells

Stage-VIII



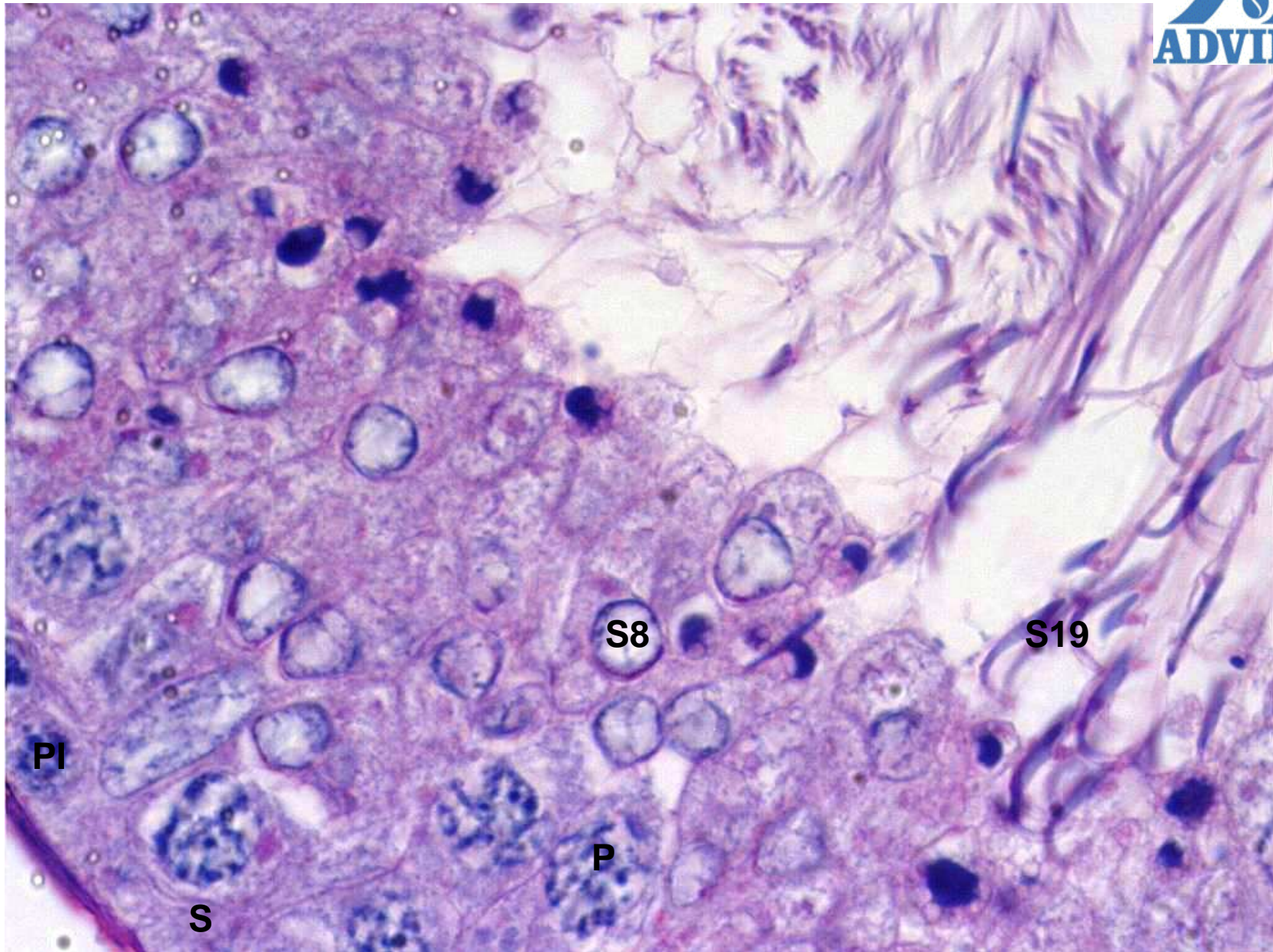
H&E



PAS&H

A1 spermatogonia, Preleptotene and Pachytene spermatocytes, S8 and S19 spermatids

Stage VIII PAS&H

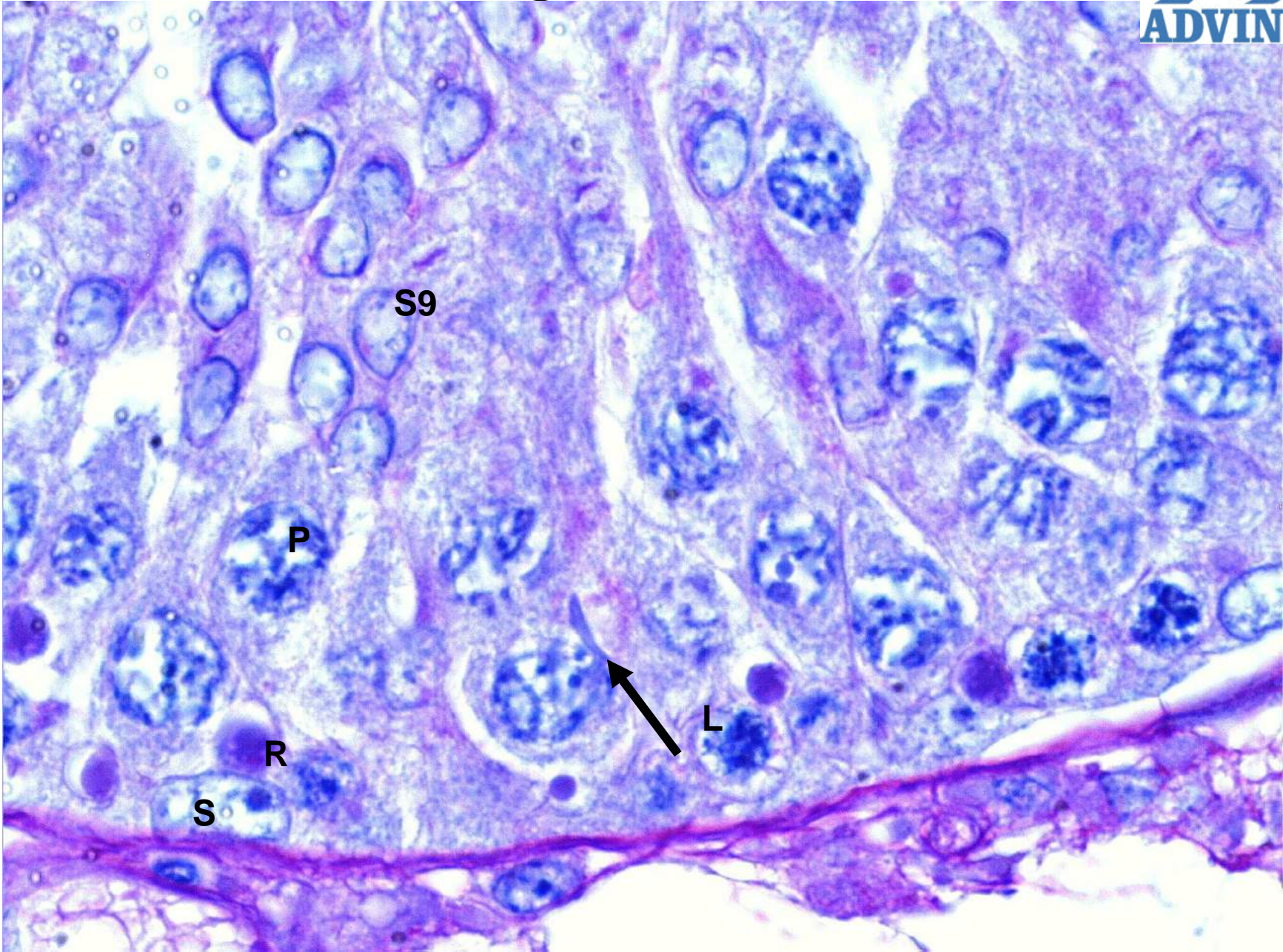


Stage IX Key features

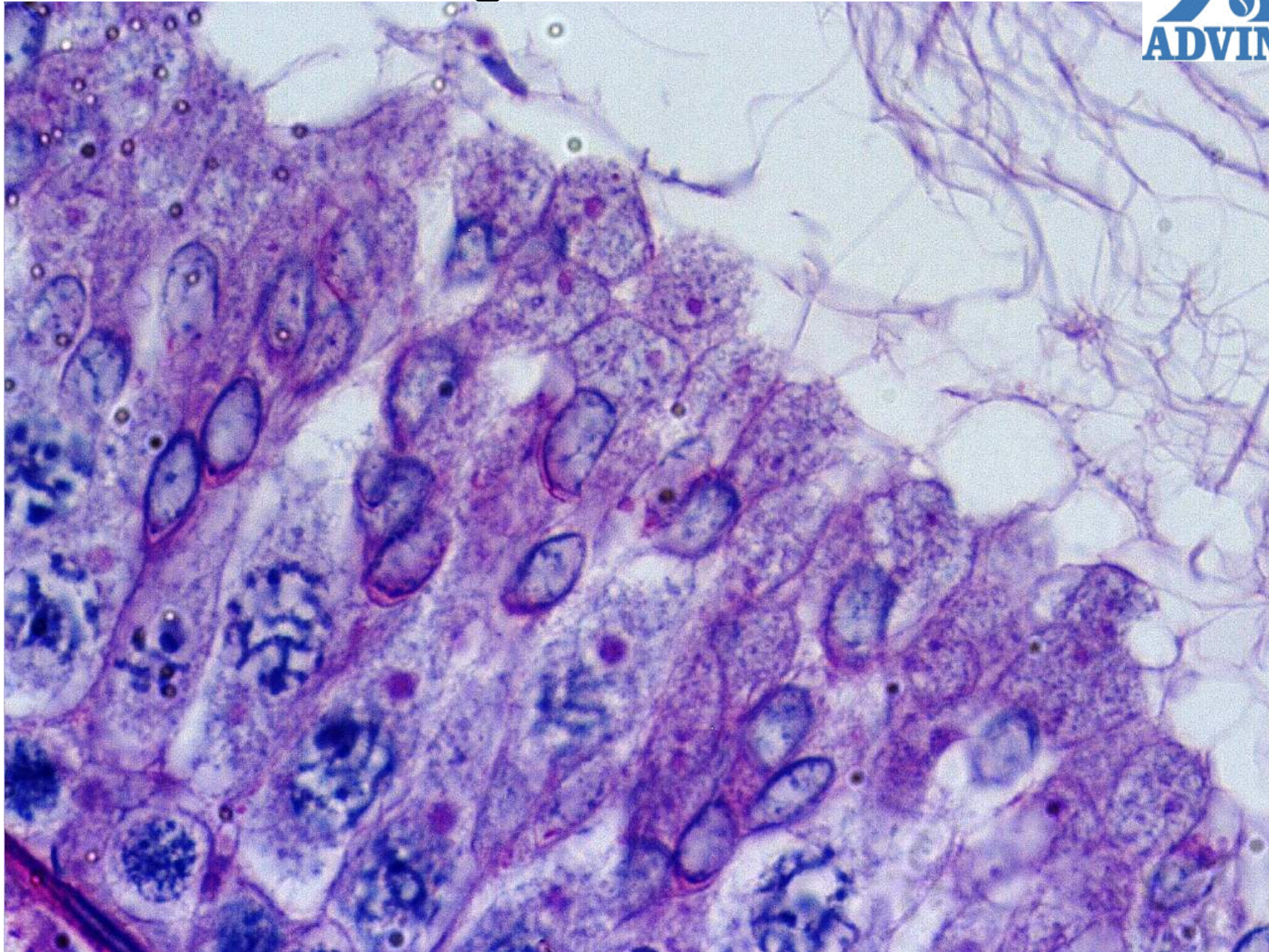


- Absence of elongated spermatids
- Round spermatids- oval
- Spermatocyte size increase
- Cytoplasmic droplets in Sertoli cells

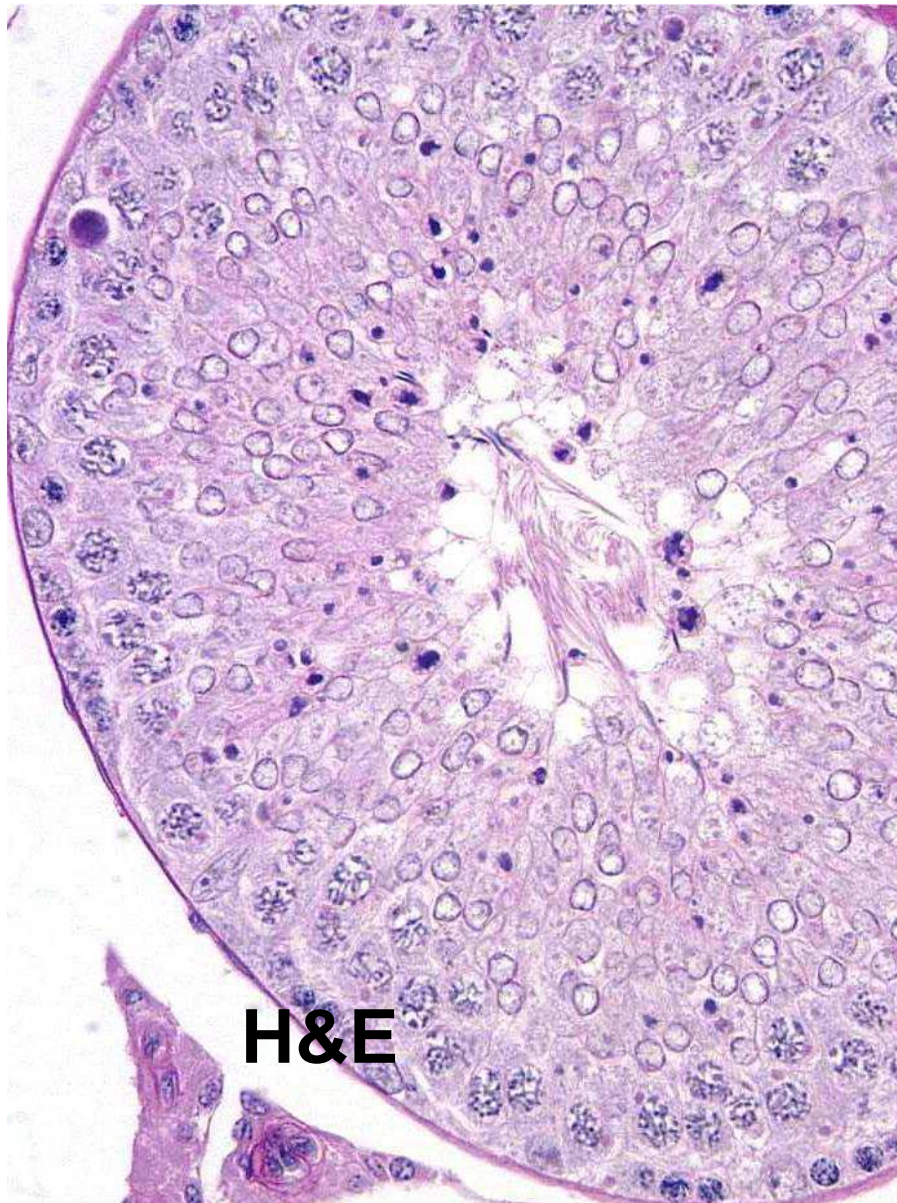
Stage IX PAS



Stage IX PAS&H



Stage IX



H&E



PAS&H

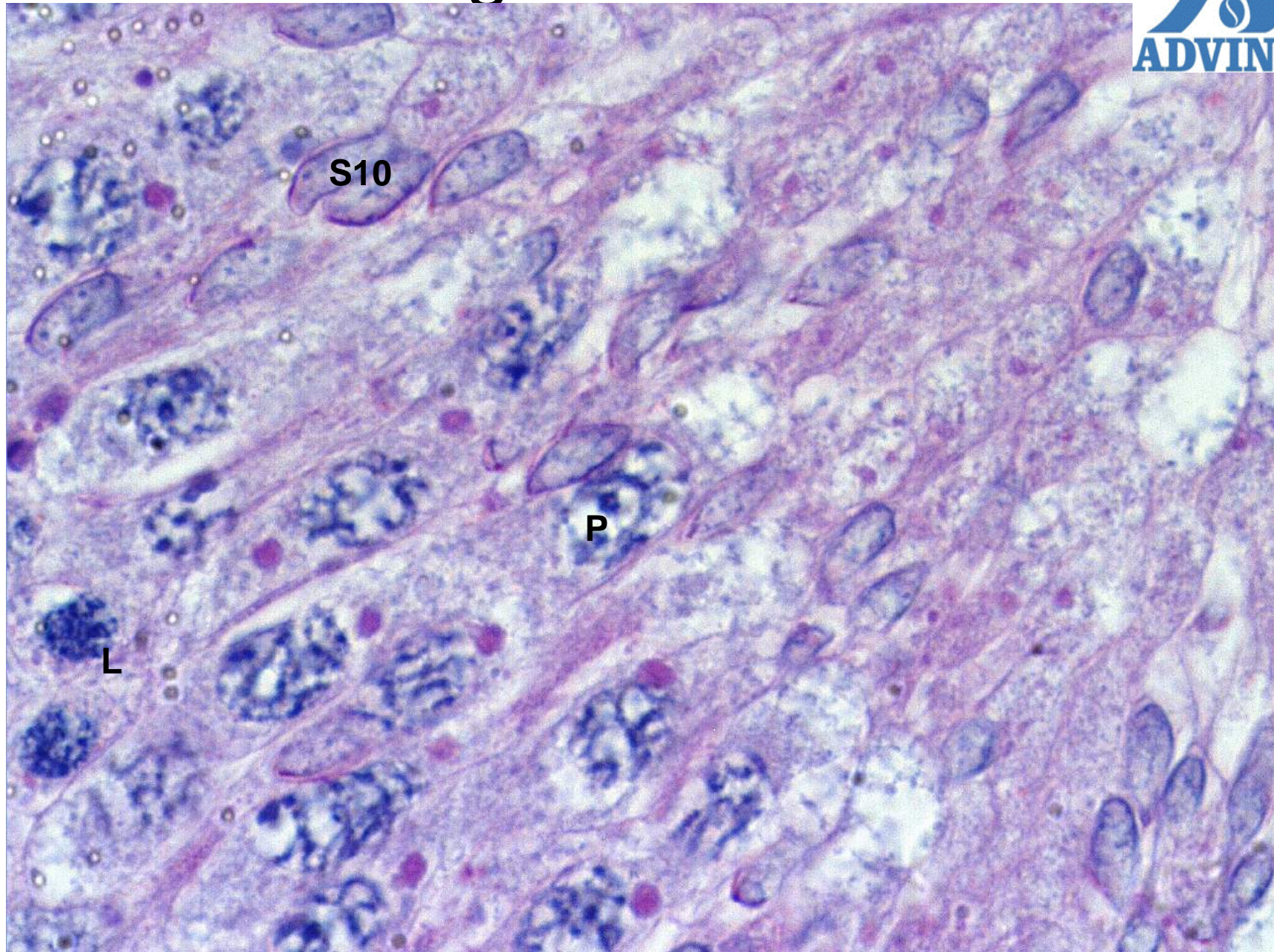
A1 spermatogonia, leptotene, pachytene spermatocytes, S9 spermatids

Stage X Key features

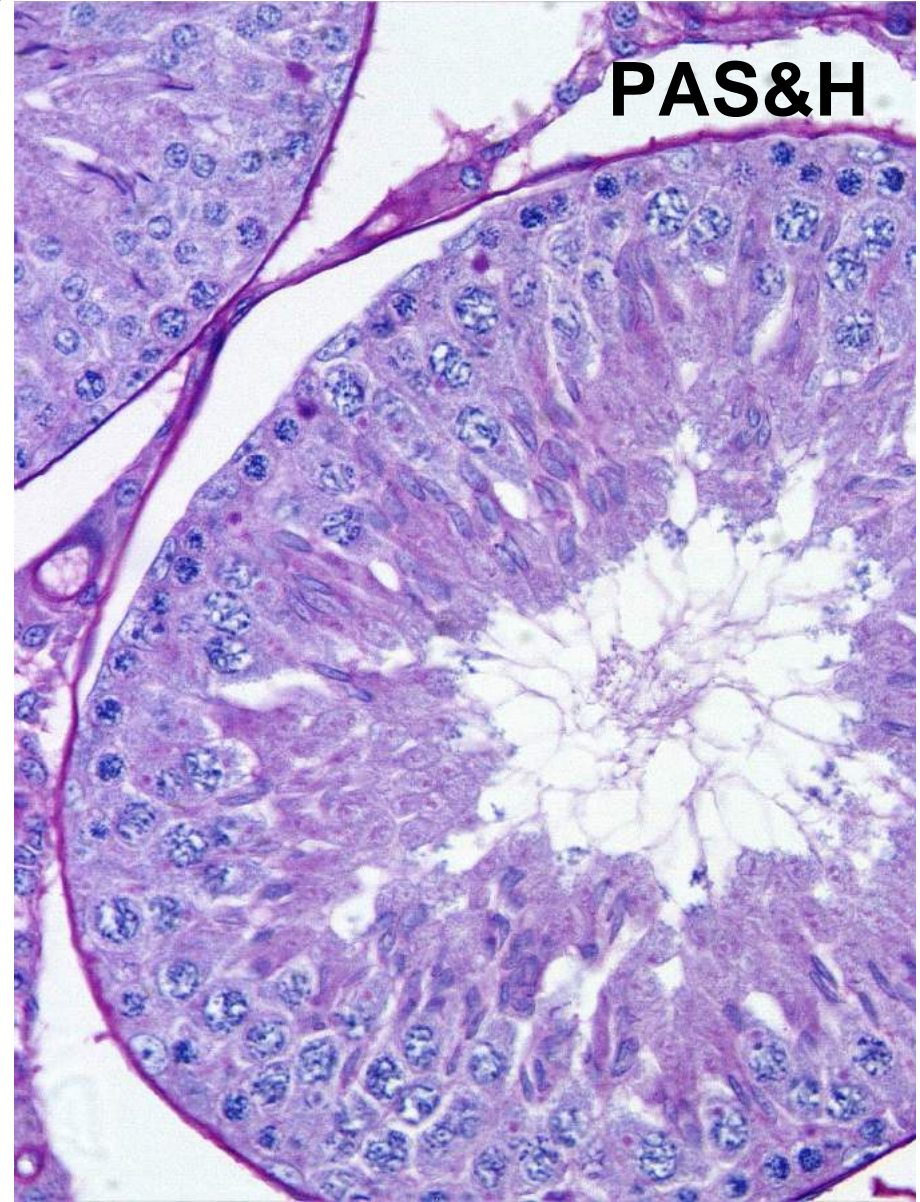
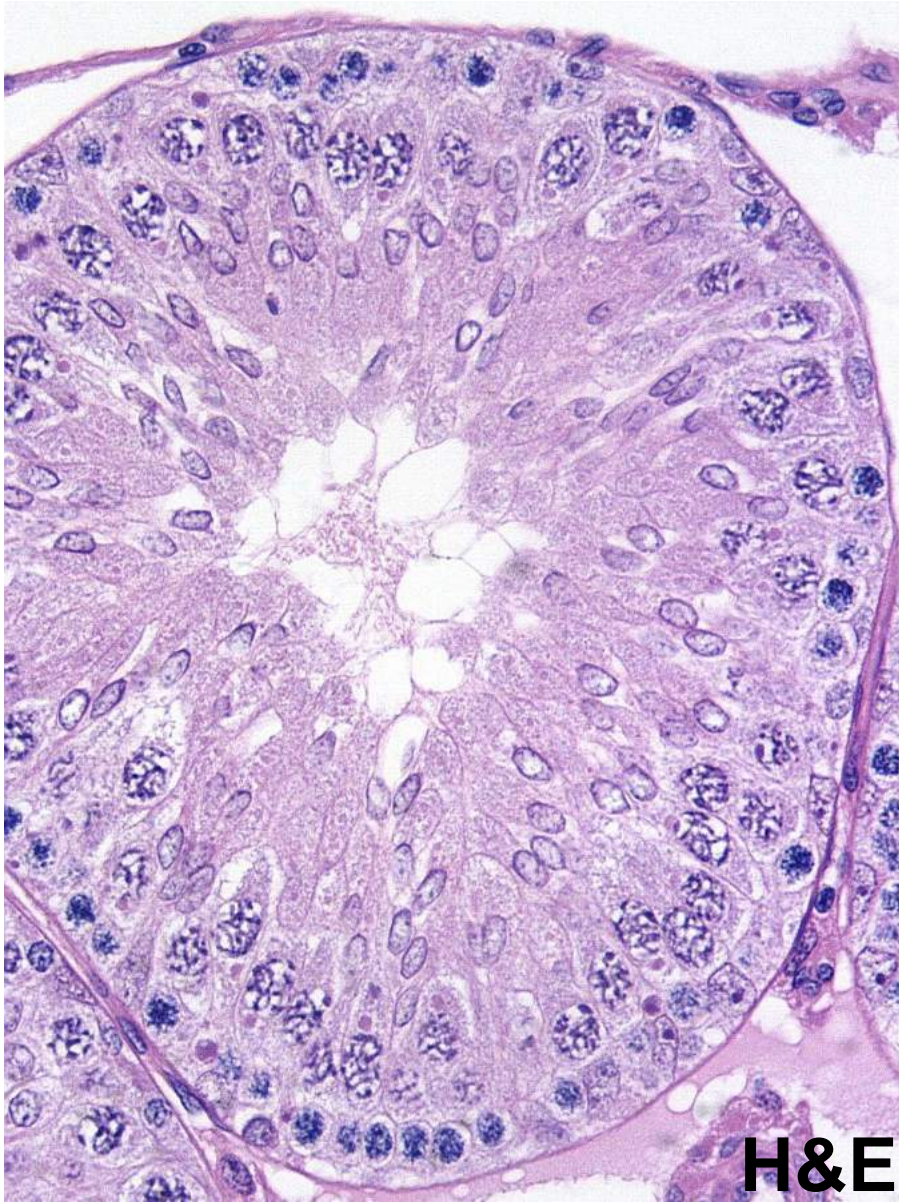


- Continued elongation of spermatids
- Spermatocyte size increase

Stage X-PAS&H



Stage X



A2 spermatogonia, leptotene and pachytene spermatocytes, S10 spermatids

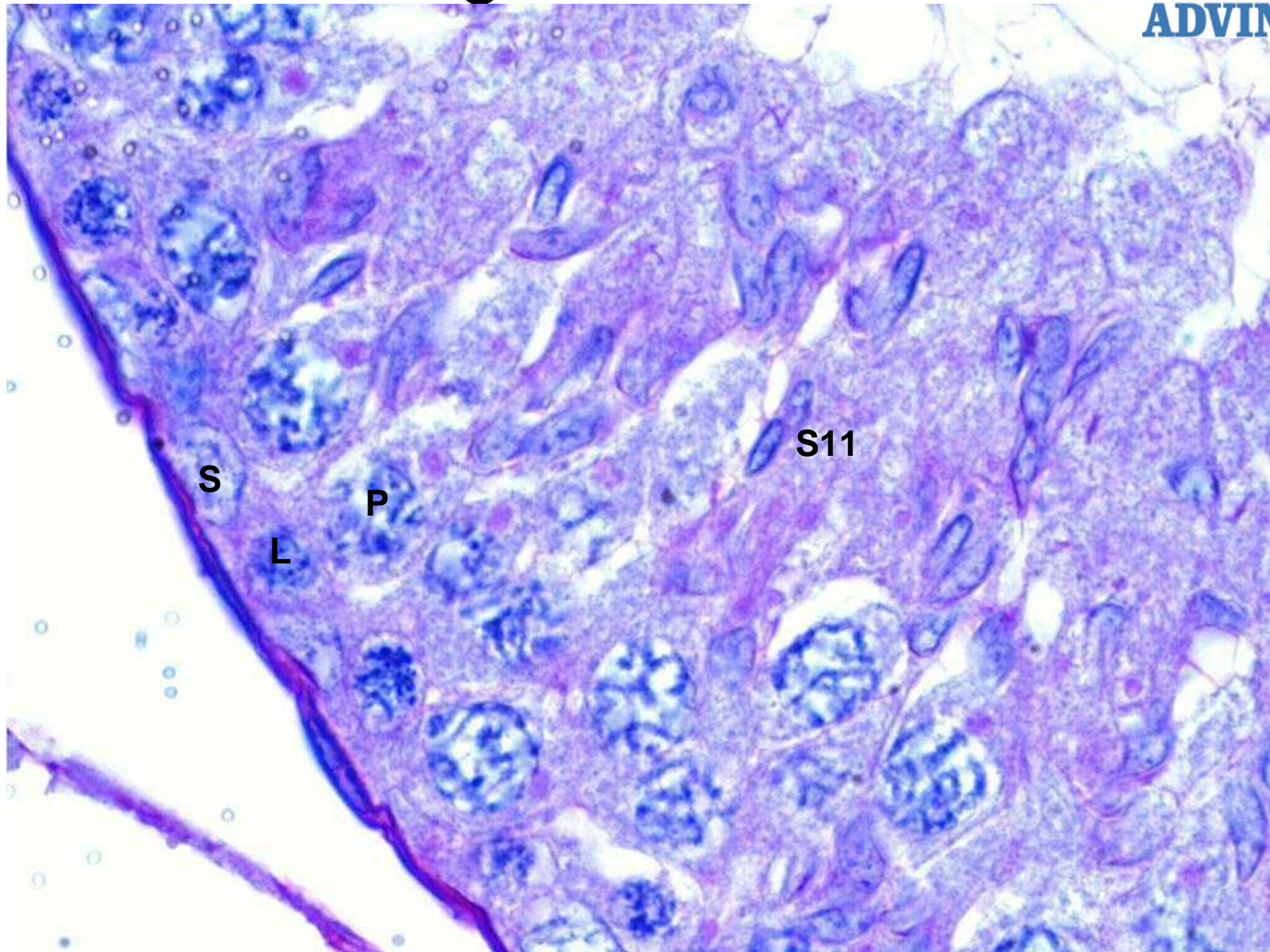
Stage-XI Key features



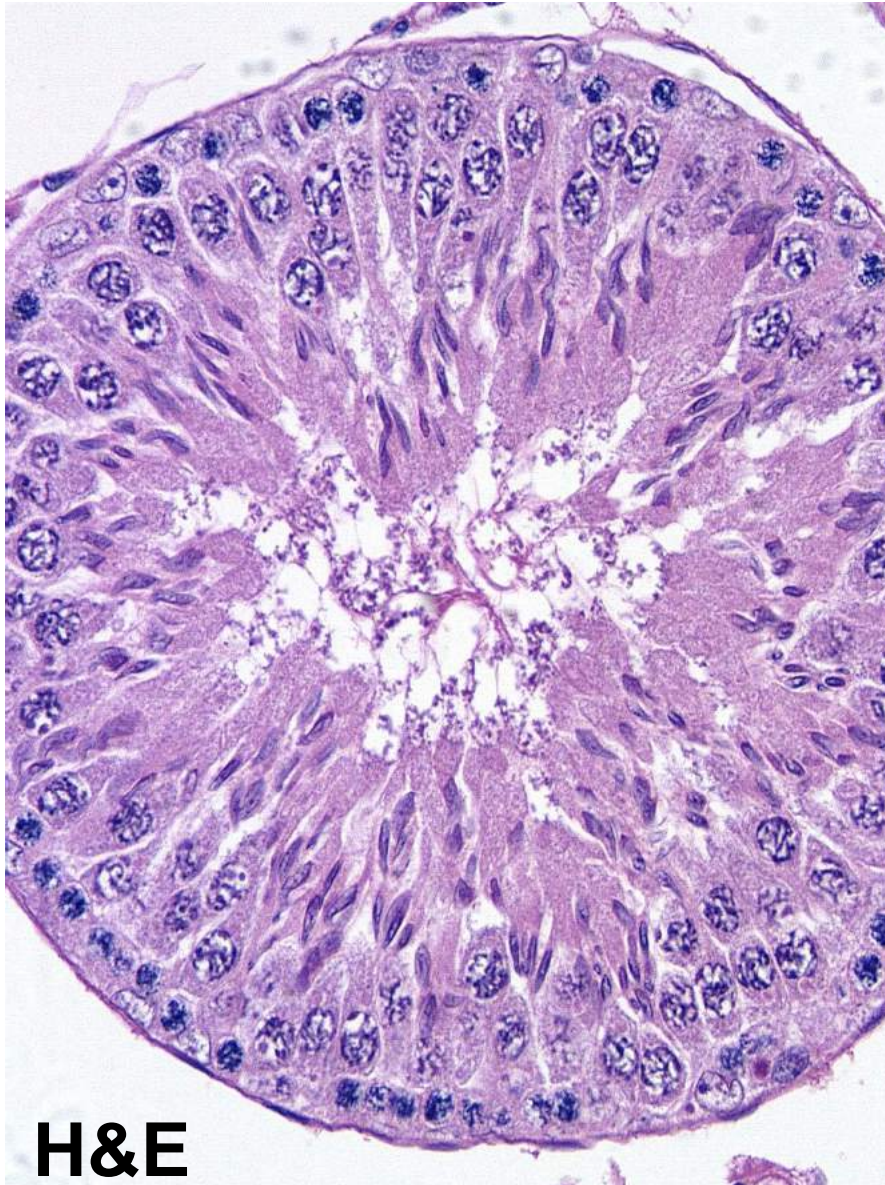
Elongating spermatids

Spermatocyte size

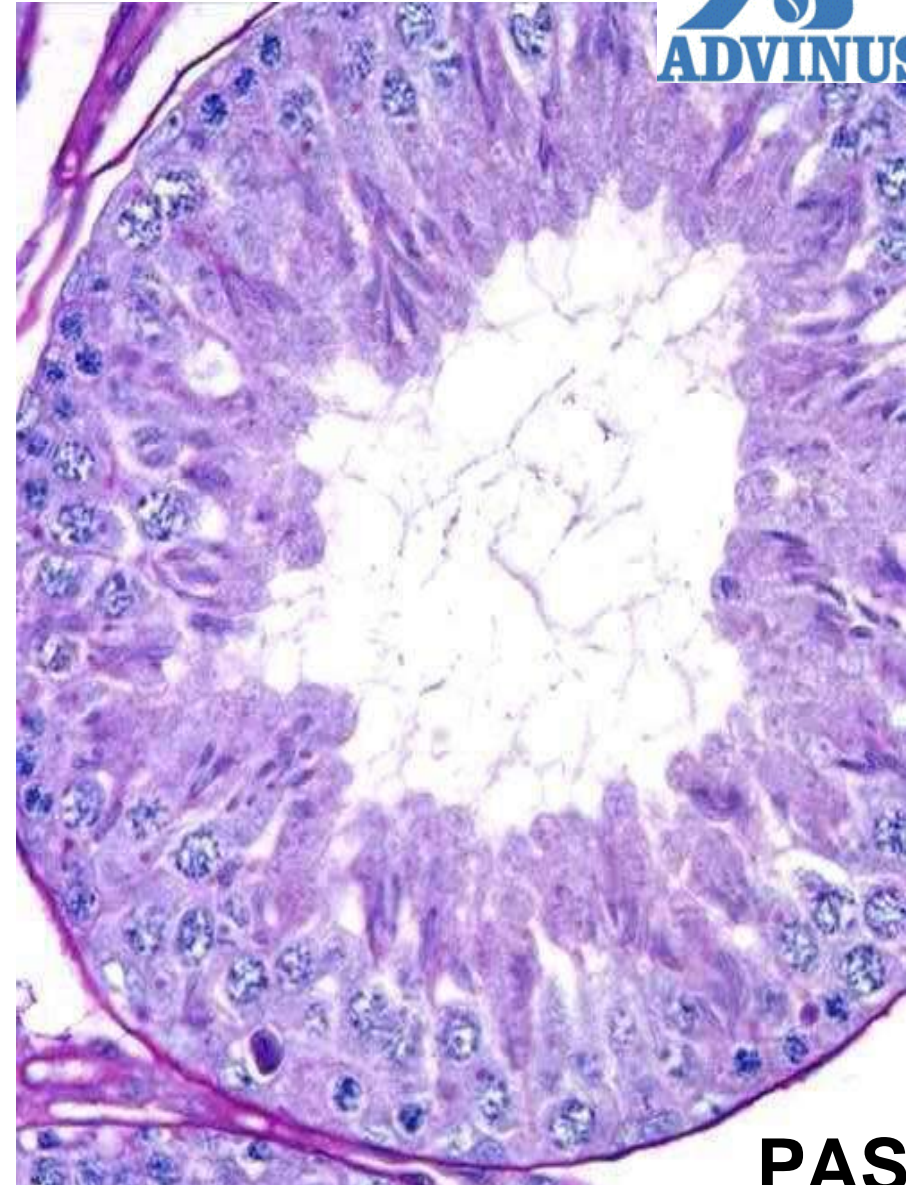
Stage XI-PAS&H



Stage-XI



H&E



PAS

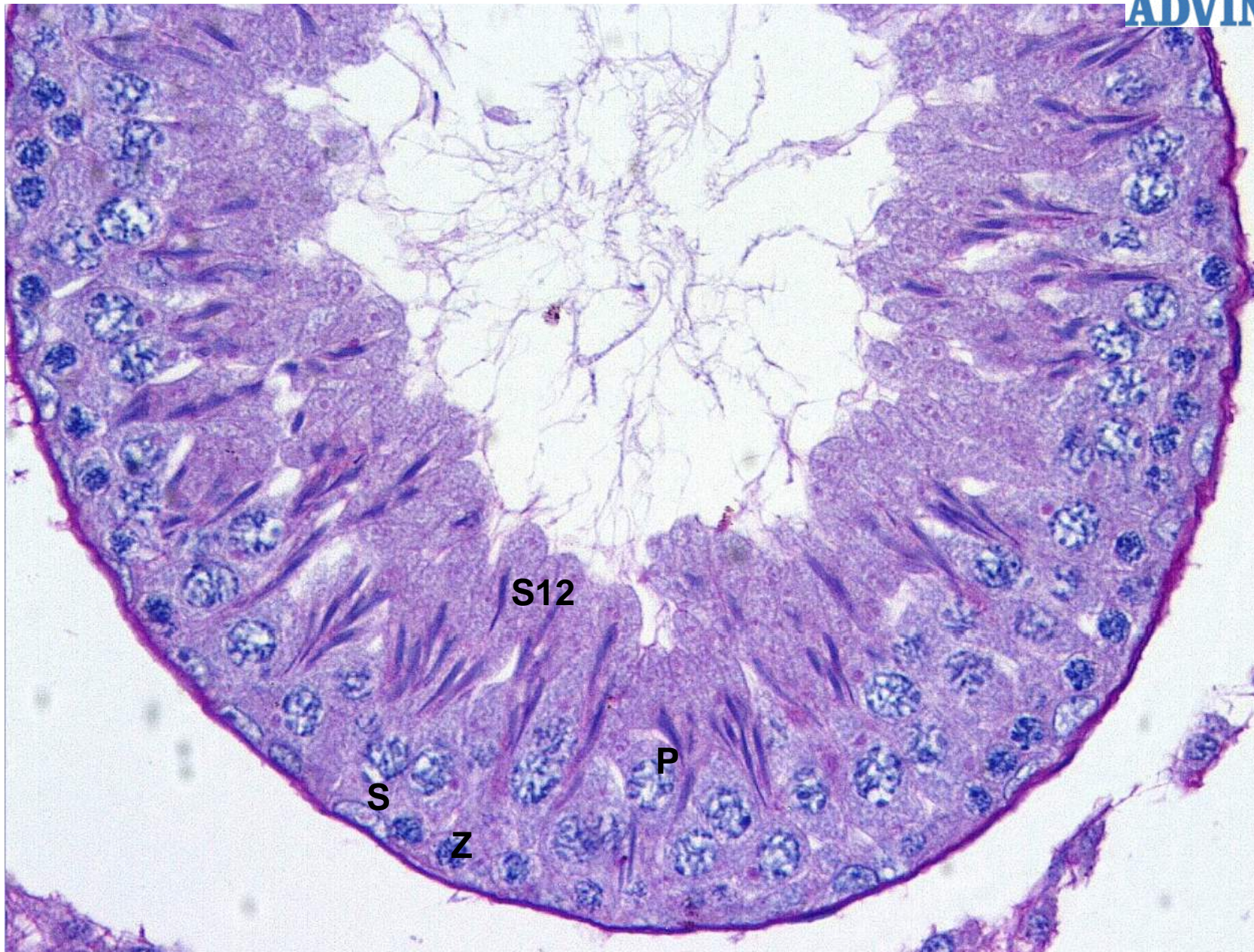
A2 spermatogonia, leptotene and pachytene spermatocytes, S11 spermatids

Stage-XII Key features

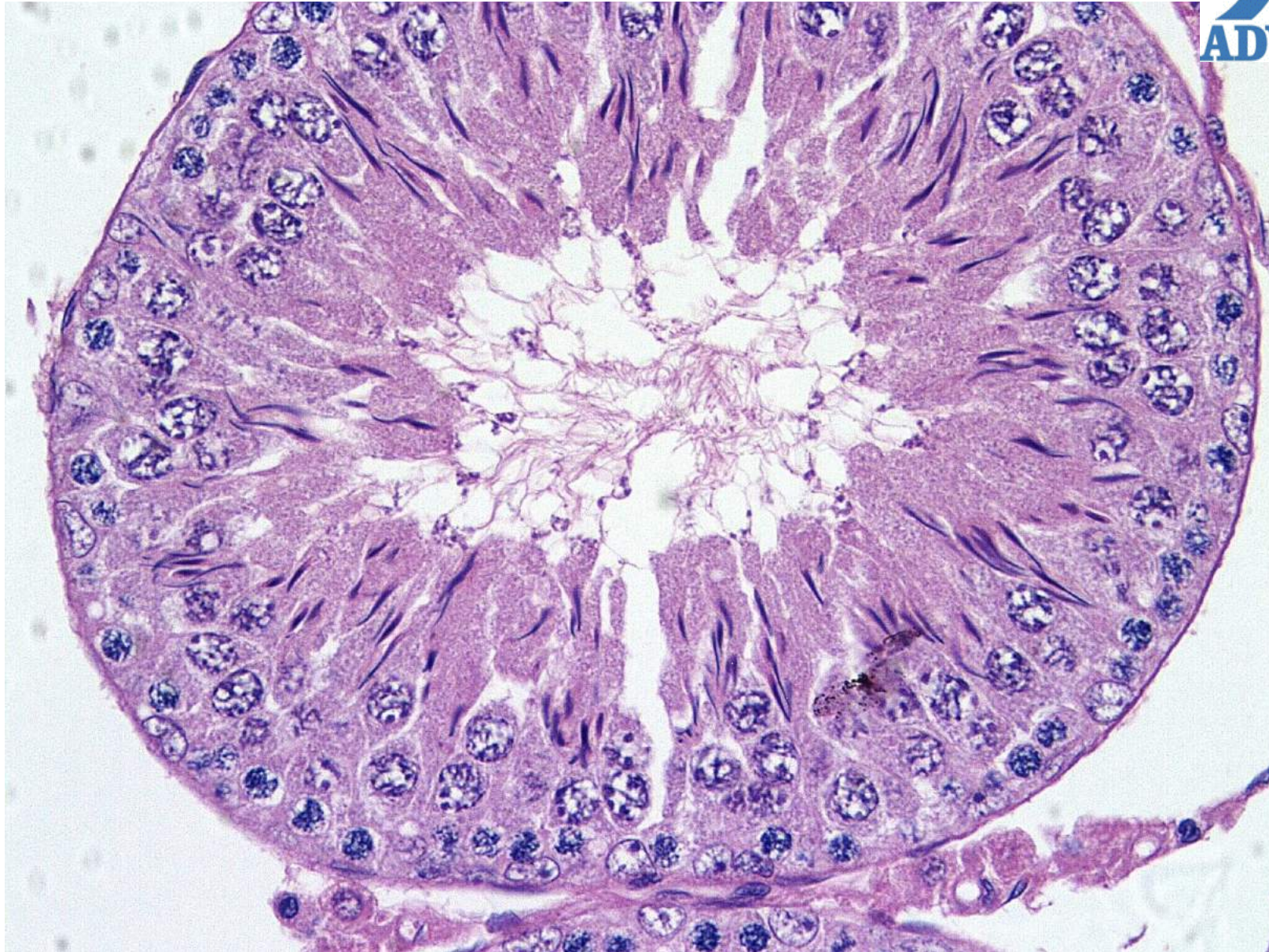


- Presence of elongating spermatids
- Spermatocyte size

Stage XII PAS&H



Stage-XII H&E



A2 spermatogonia, zygotene and pachytene spermatocytes, S12 spermatids

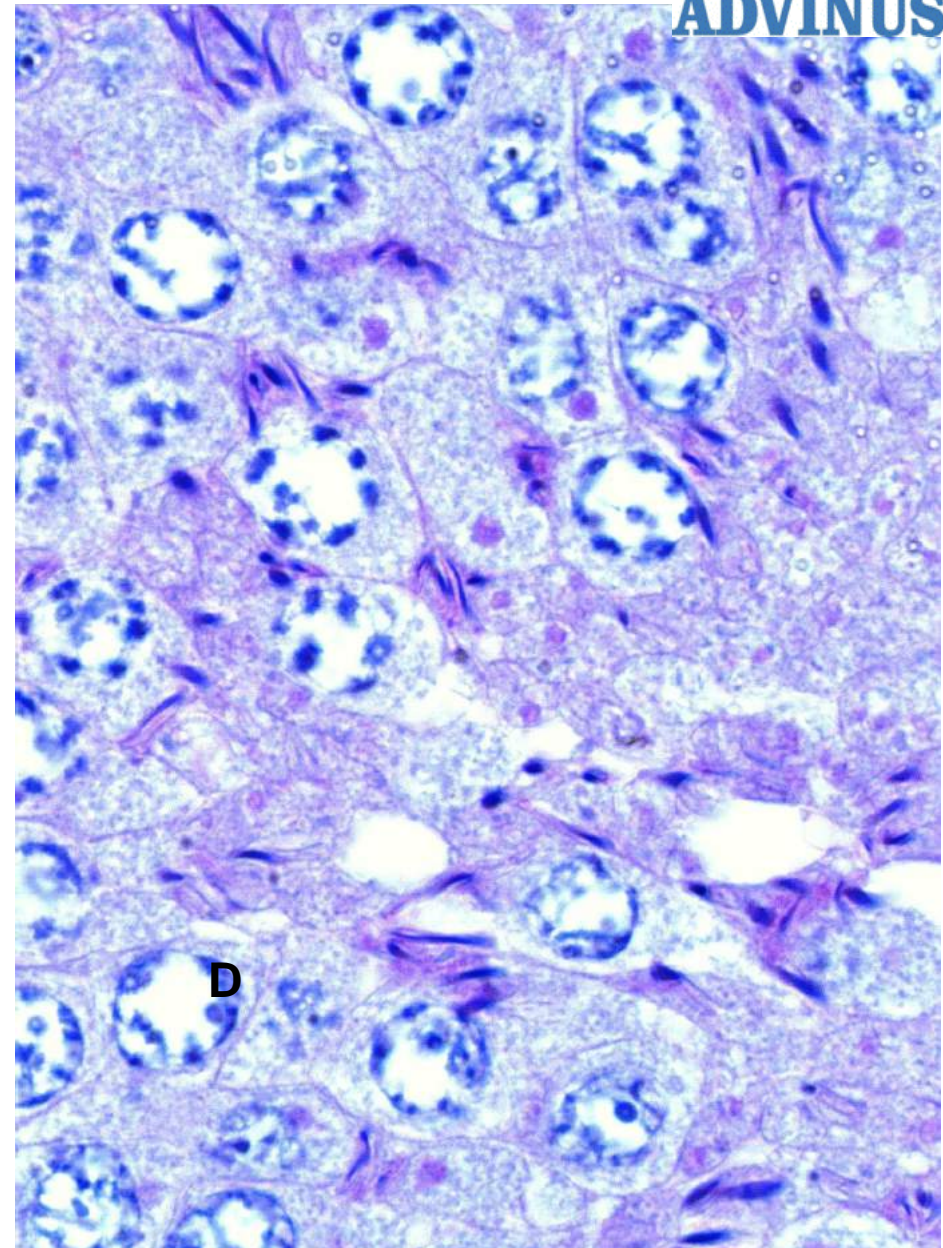
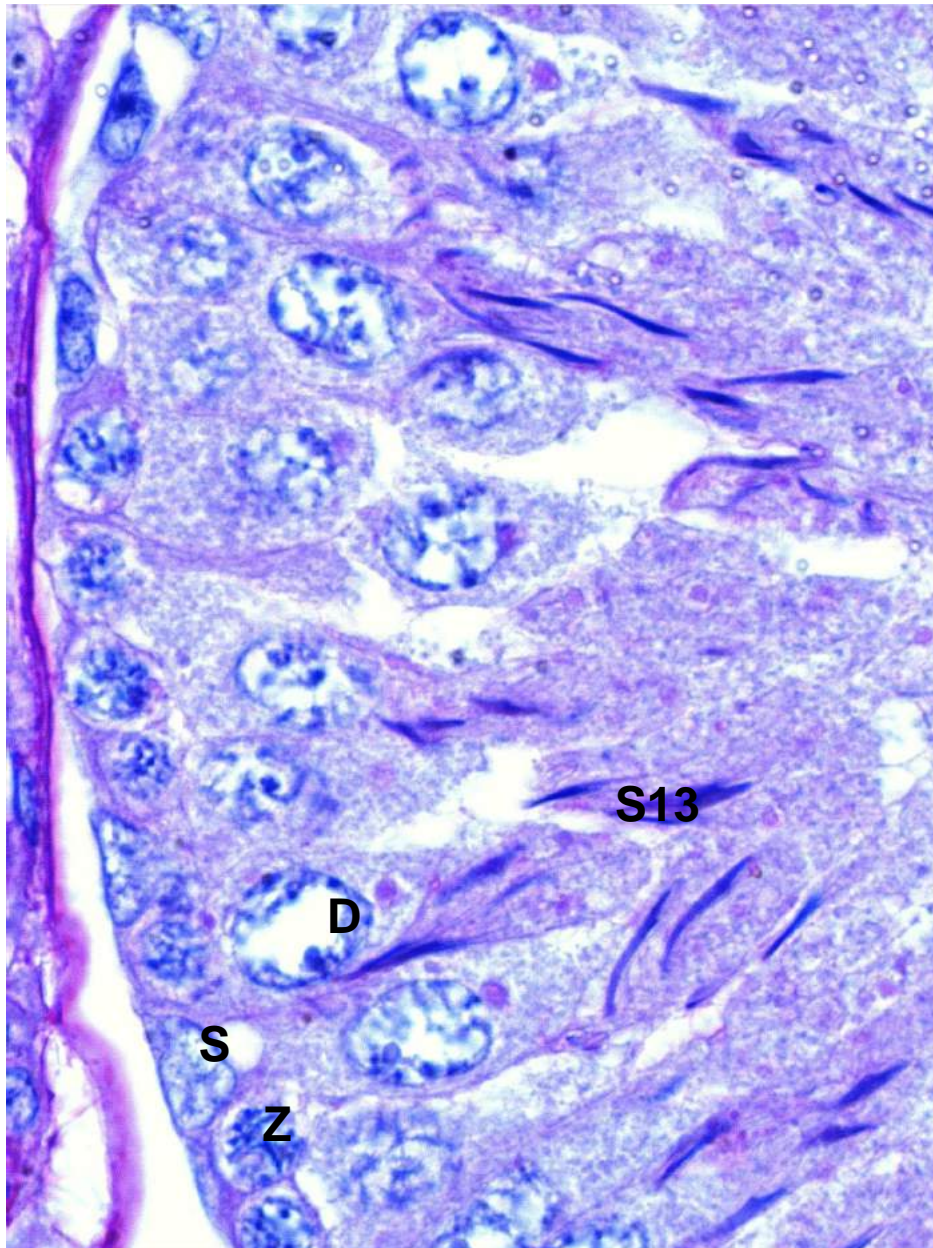
Stage-XIII Key features



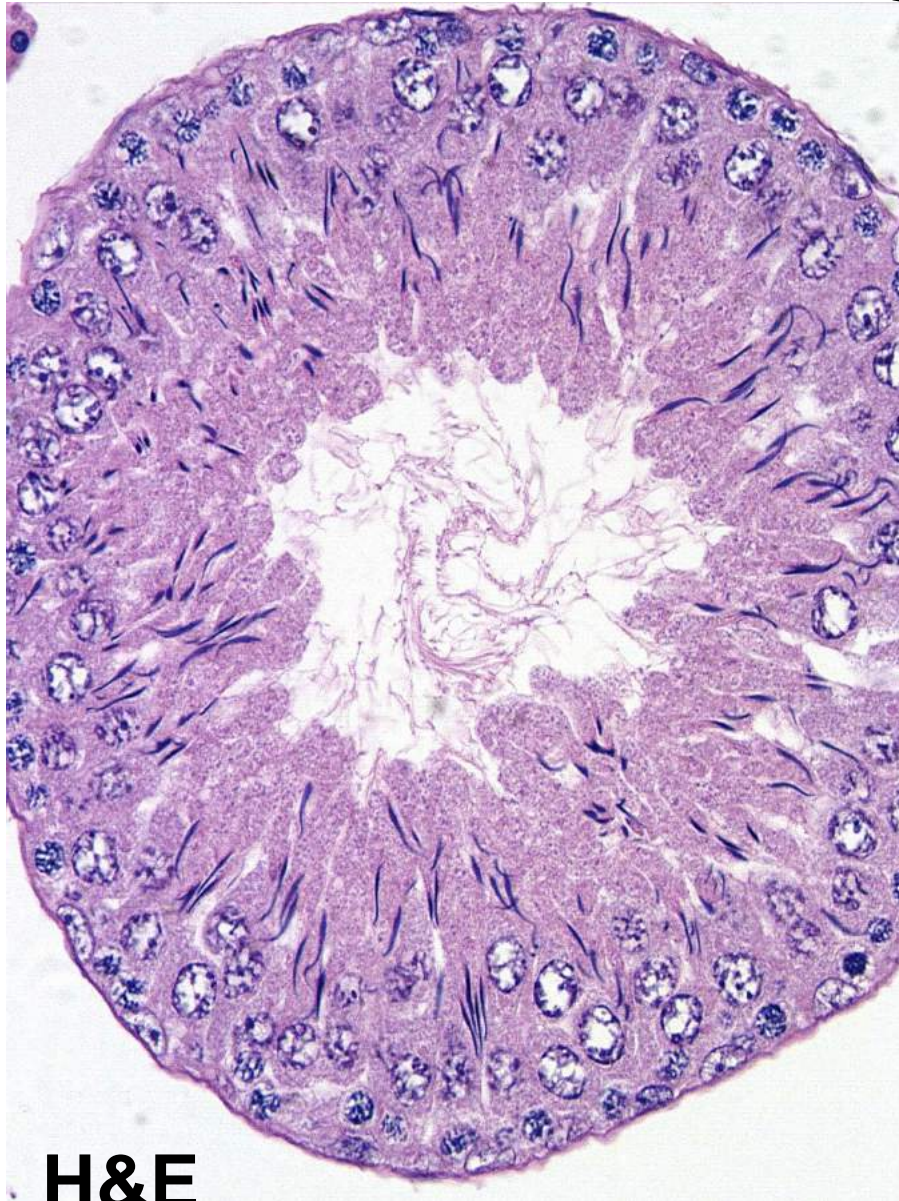
Diplotene spermatocyte nucleus

Elongation of step 13 spermatids

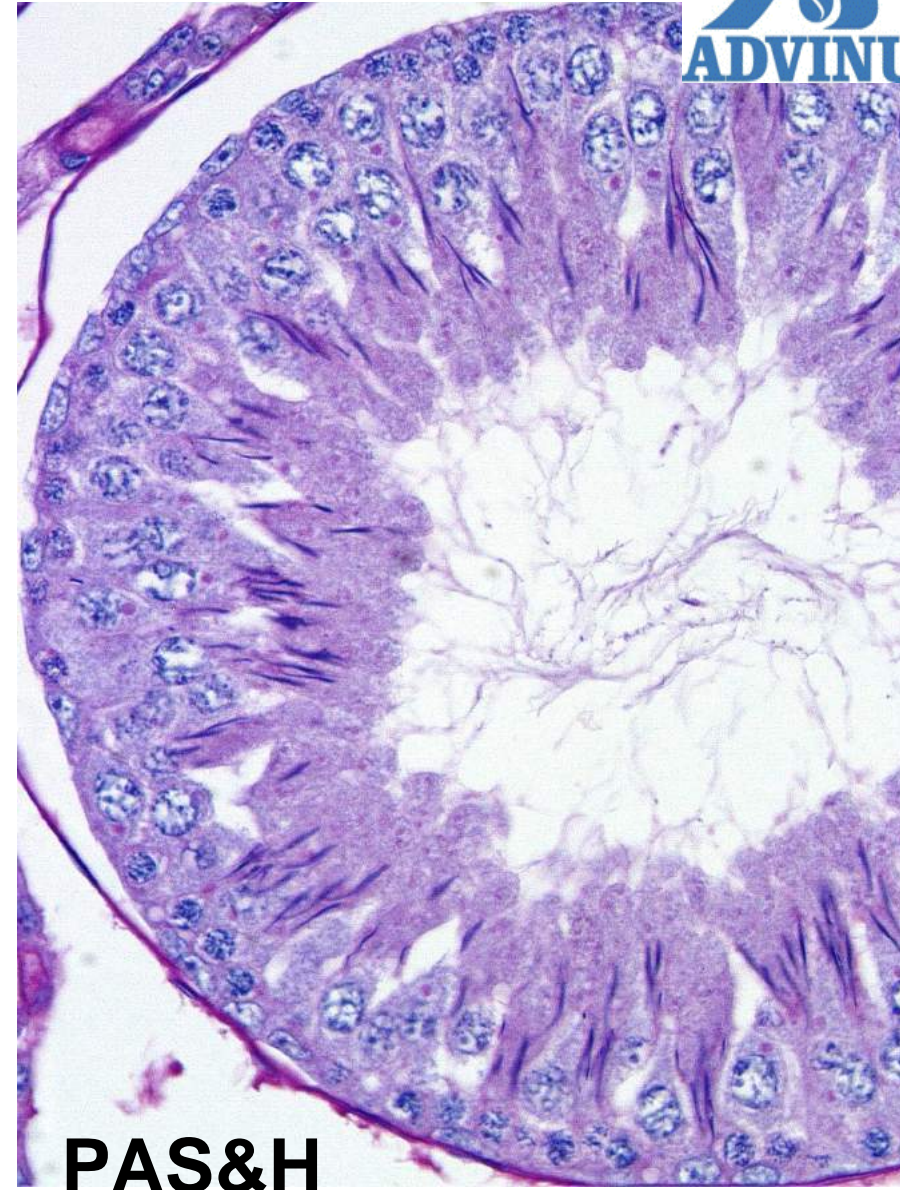
Stage XIII PAS&H



Stage-XIII



H&E



PAS&H

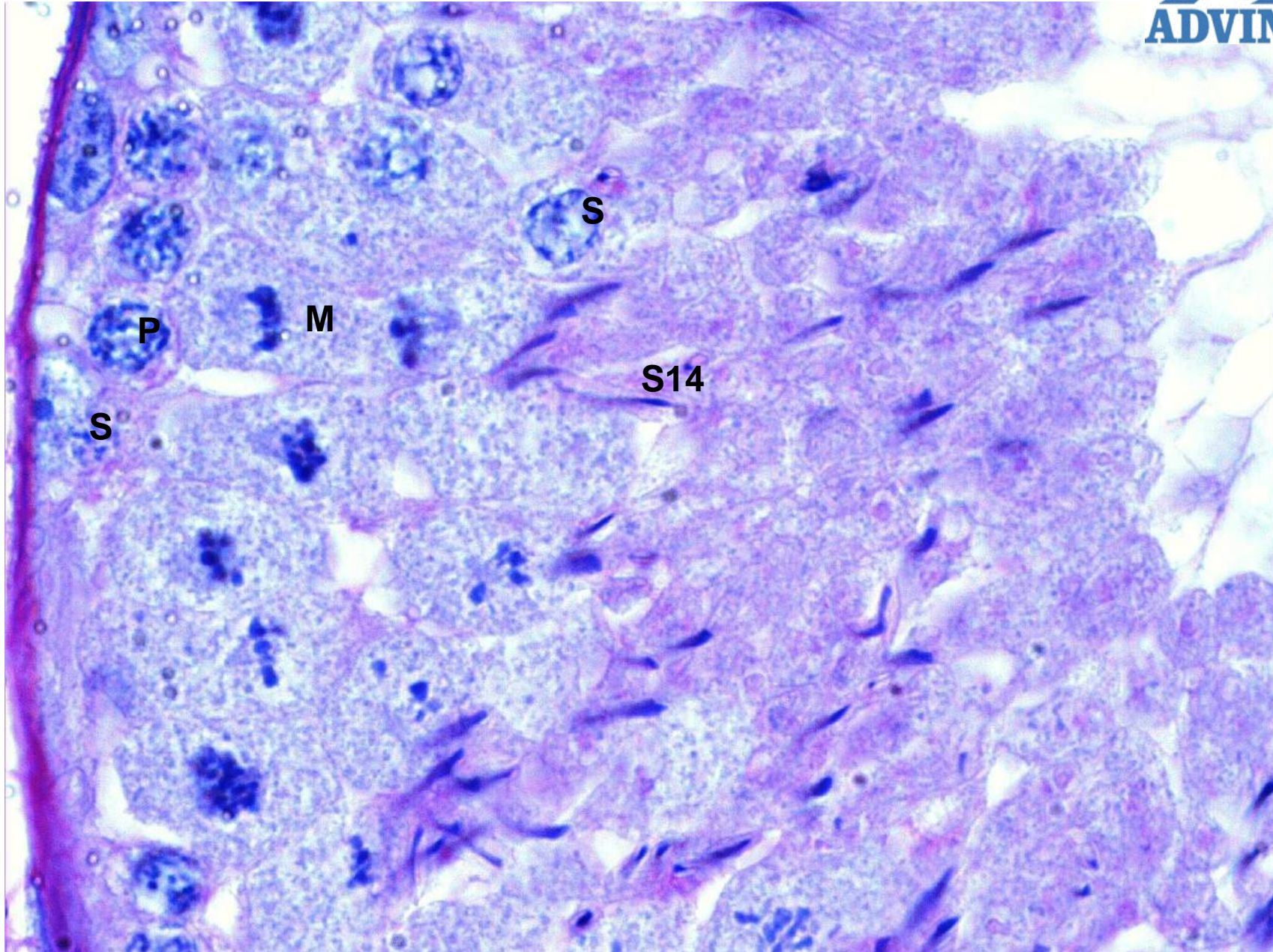
A3 spermatogonia, zygotene and diplotene spermatocytes, S13 spermatids



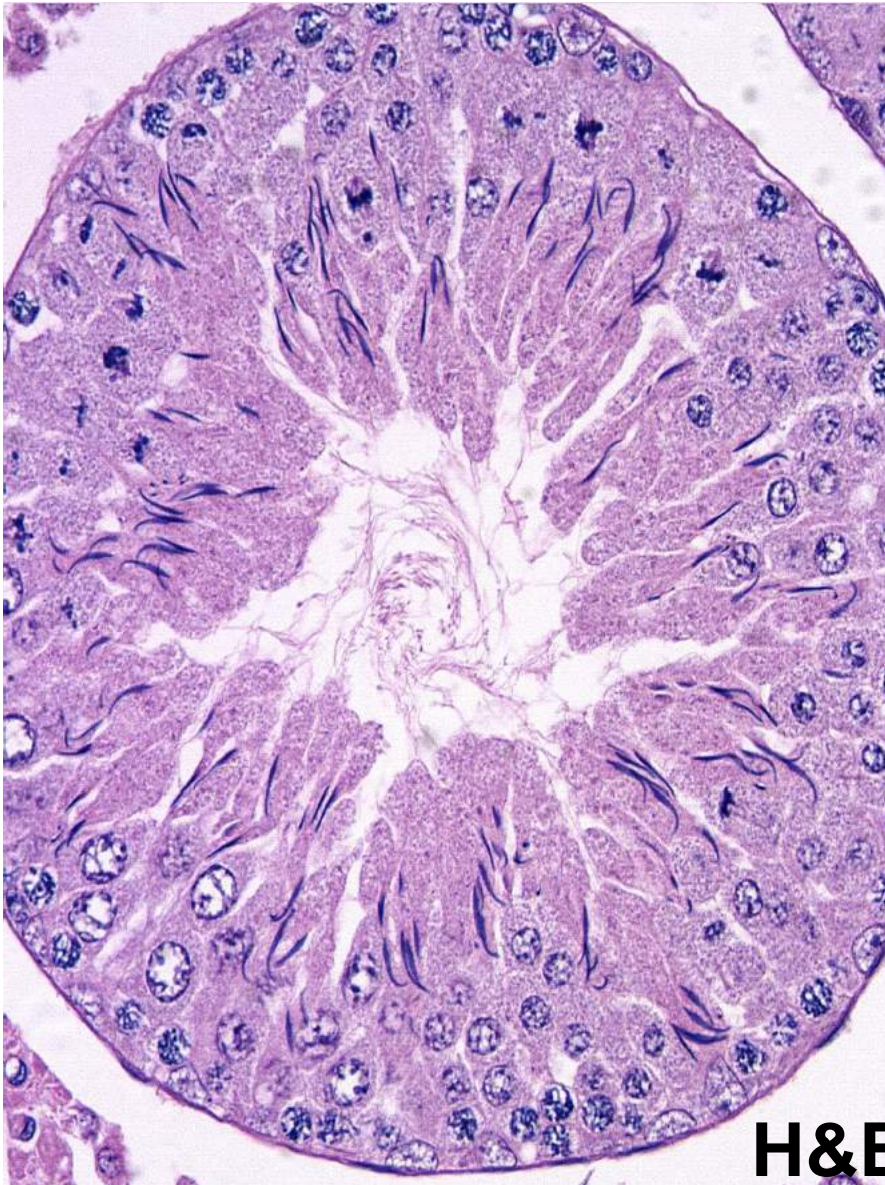
Stage-XIV

- Presence of mitotic figures
- Early stage XIV with stage XIII
- Late Stage XIV with stage I

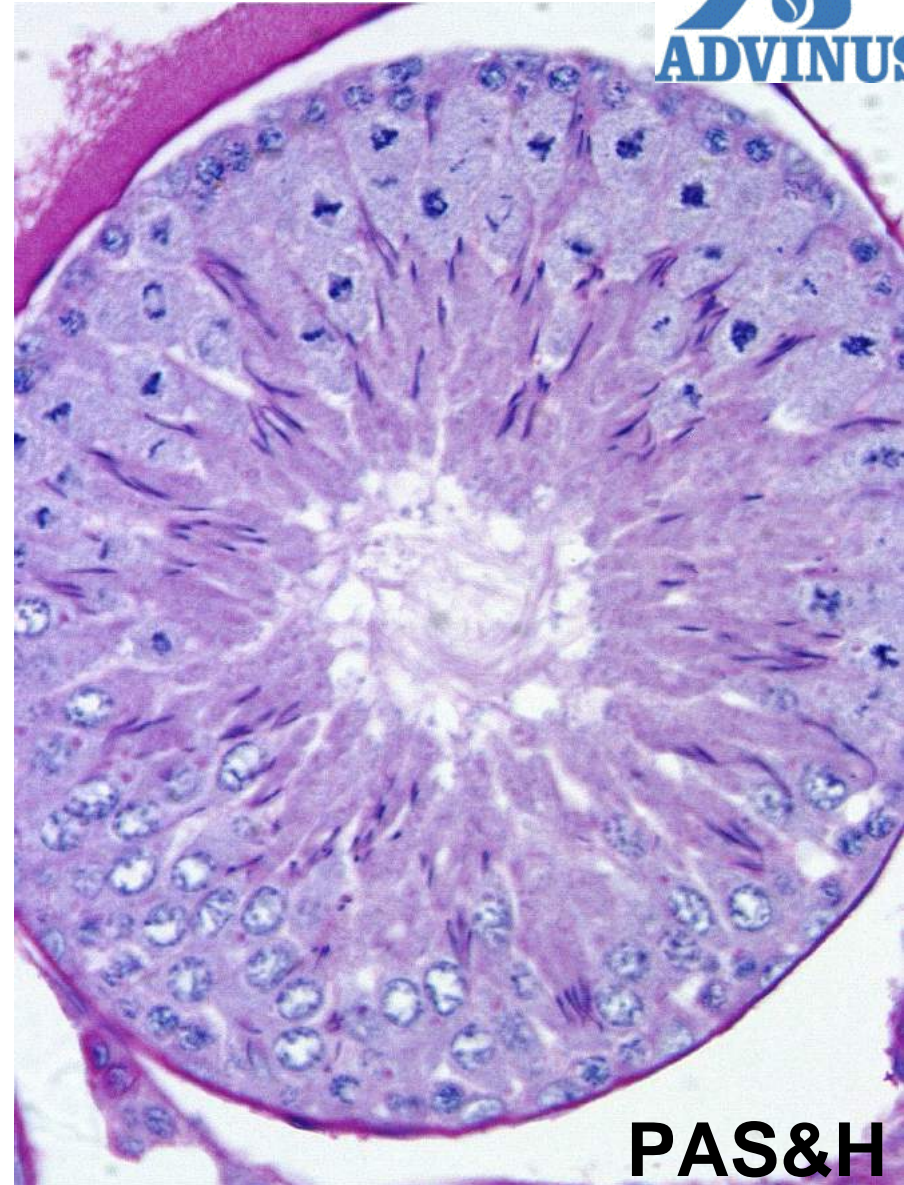
Stage XIV PAS&H



Stage-XIV



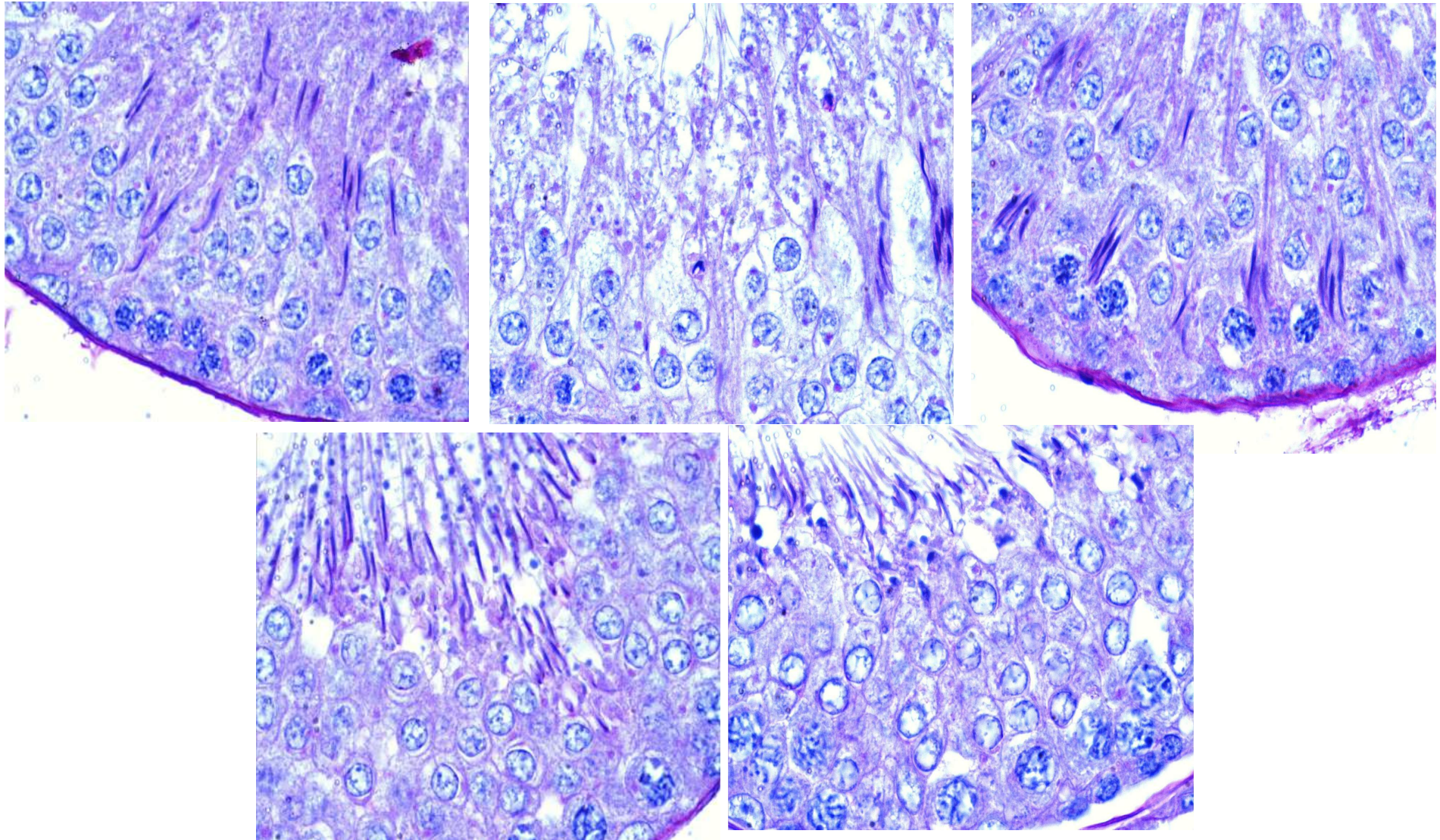
H&E



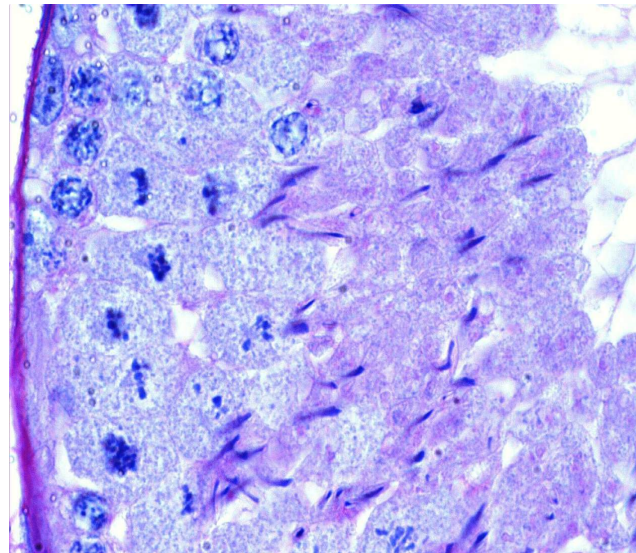
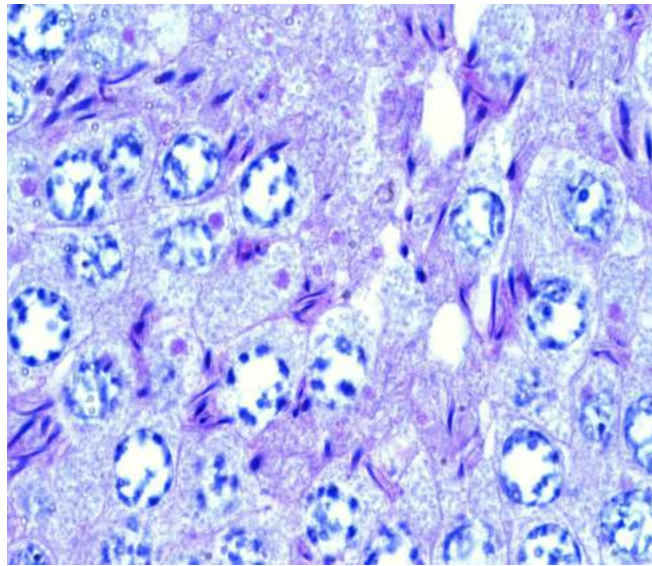
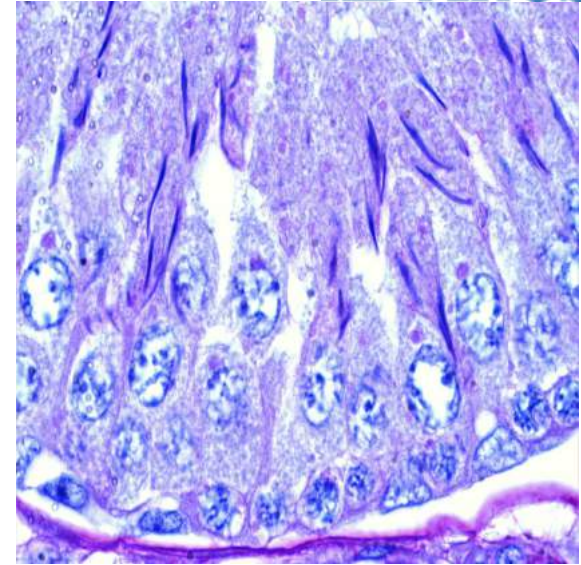
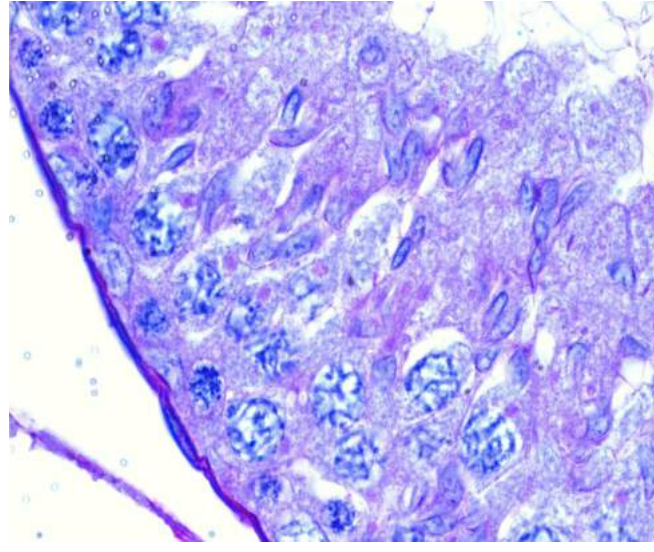
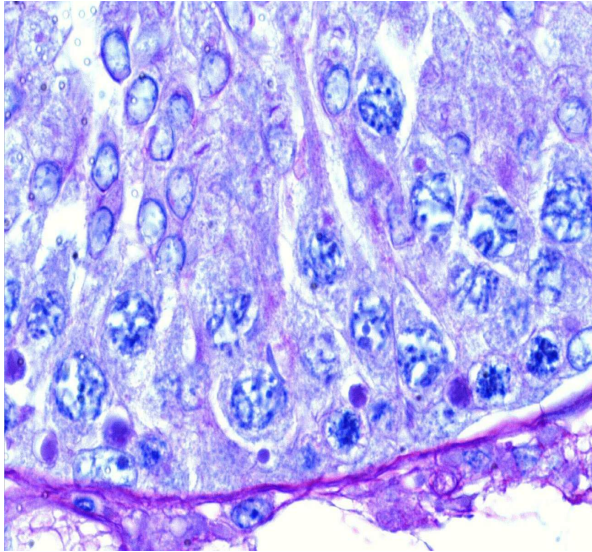
PAS&H

A3 spermatogonia, pachytene spermatocytes, round spermatids, S14 spermatids

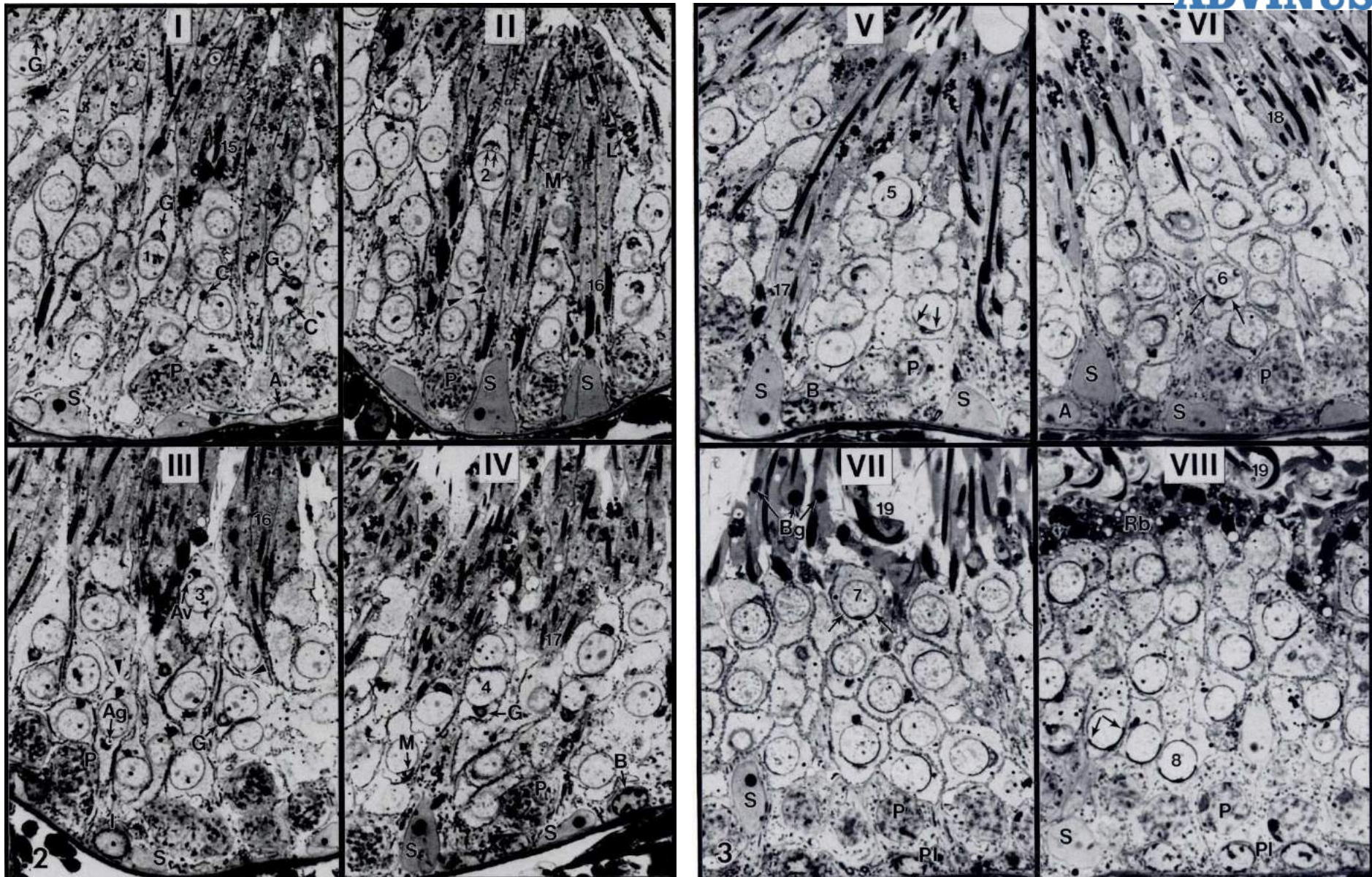
Early stages –I to VII



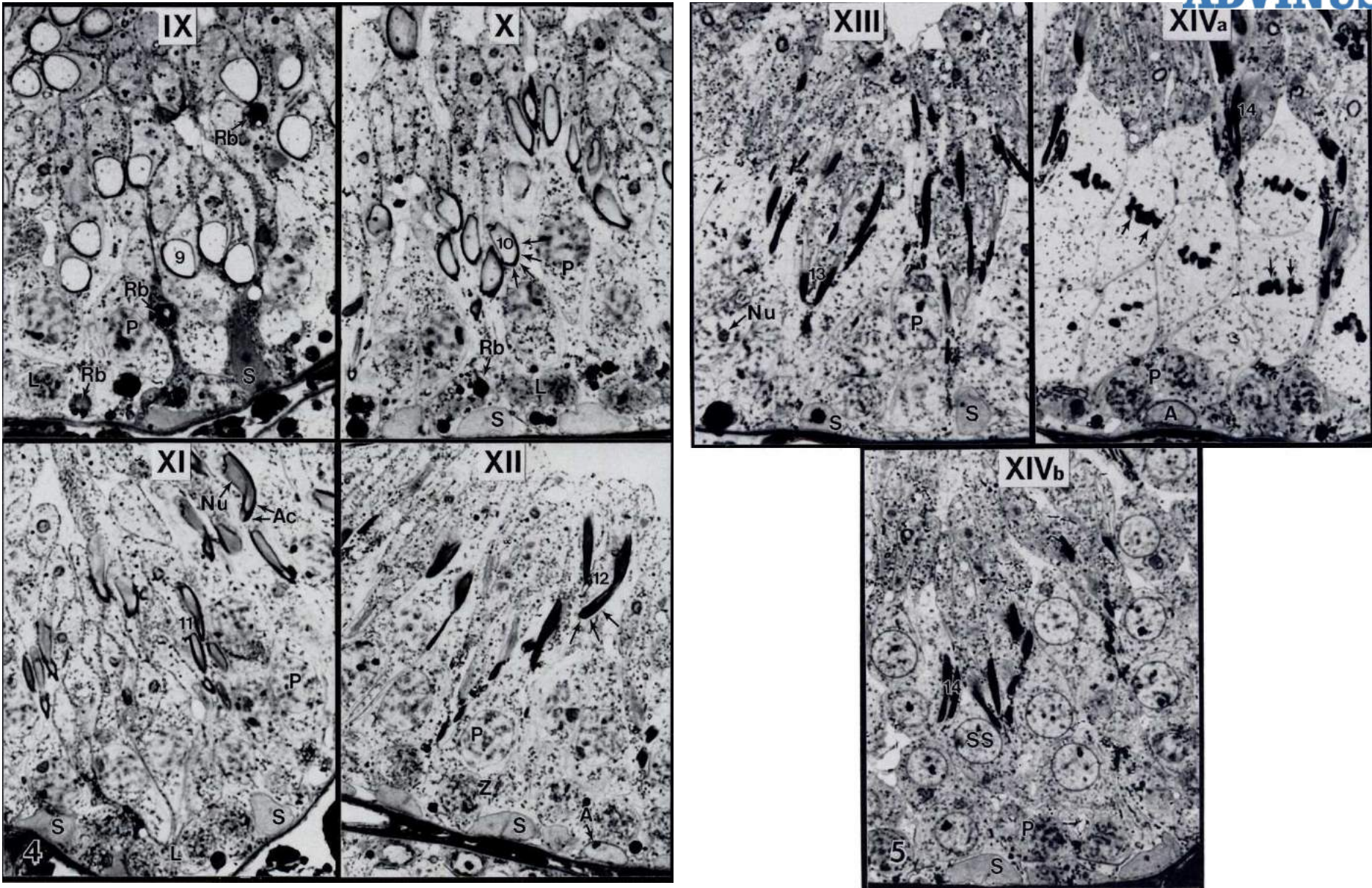
Late stages VIII to XIV



Stages I to VIII



Stages IX to XIV



REX A. H(1990). *Biol Reprod* 43, 525-542 (1990)

What is your diagnosis ?

