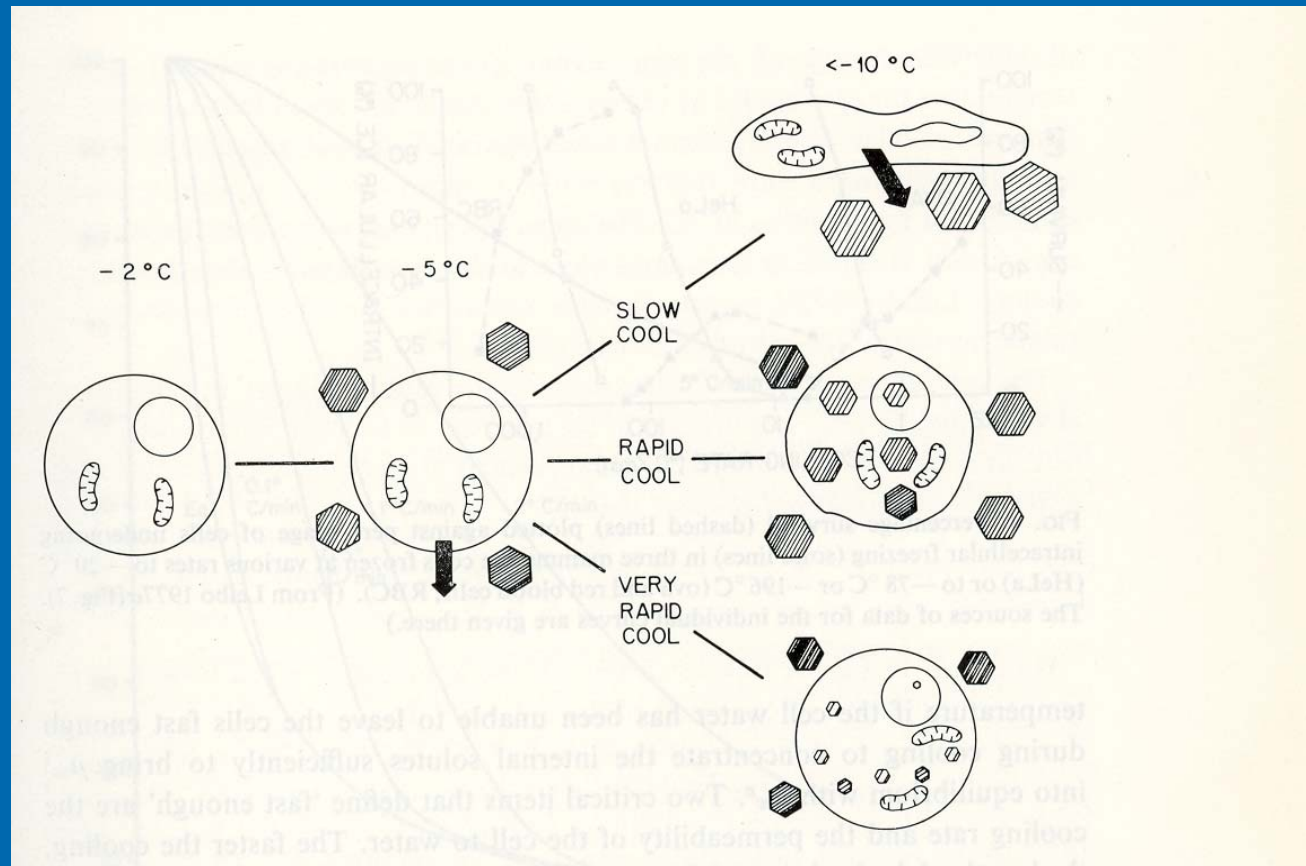


Cryopreserving whole organs

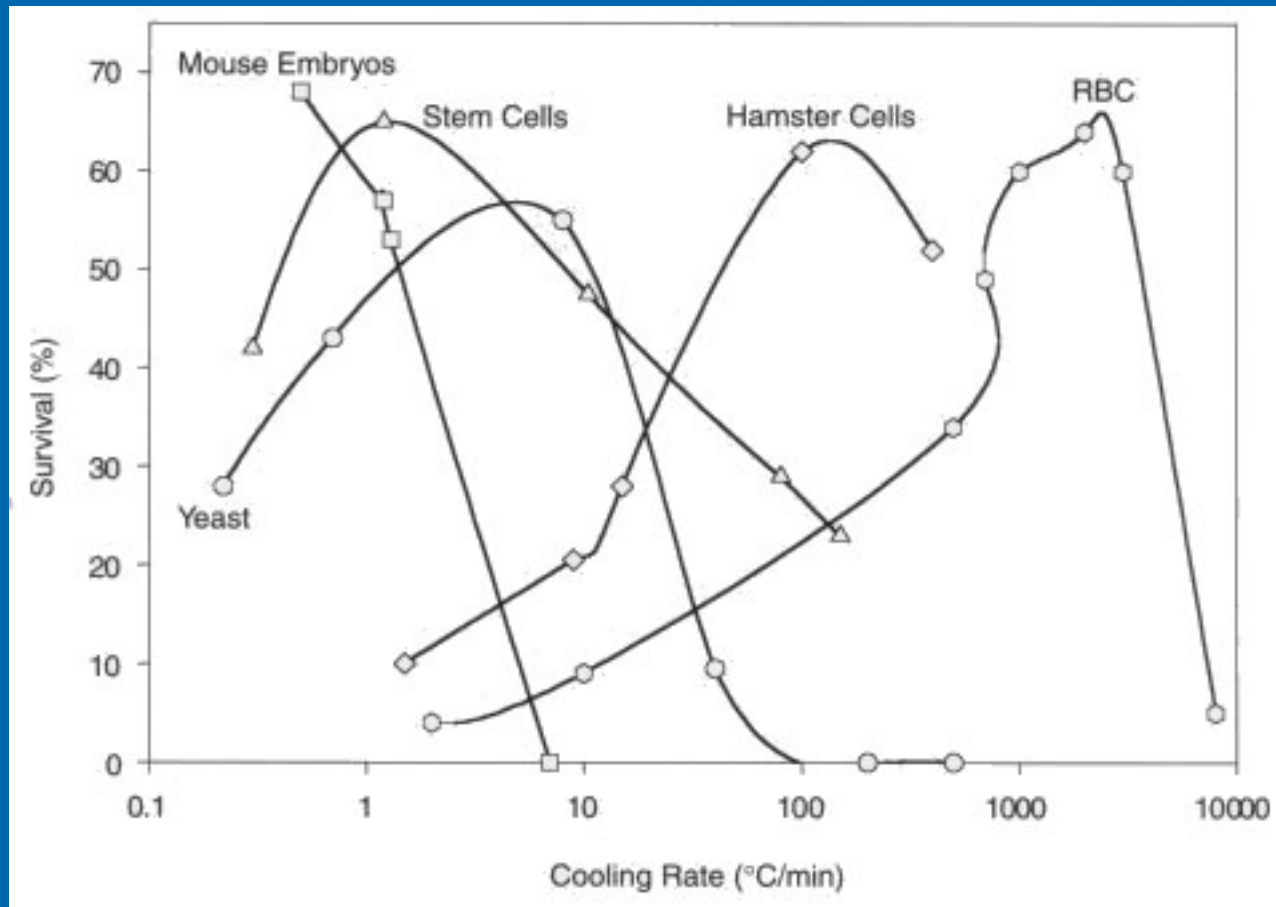
Jorge Sztejn, DVM PhD
ARTiCS Unit
Comparative Medicine Branch
NIAID - NIH

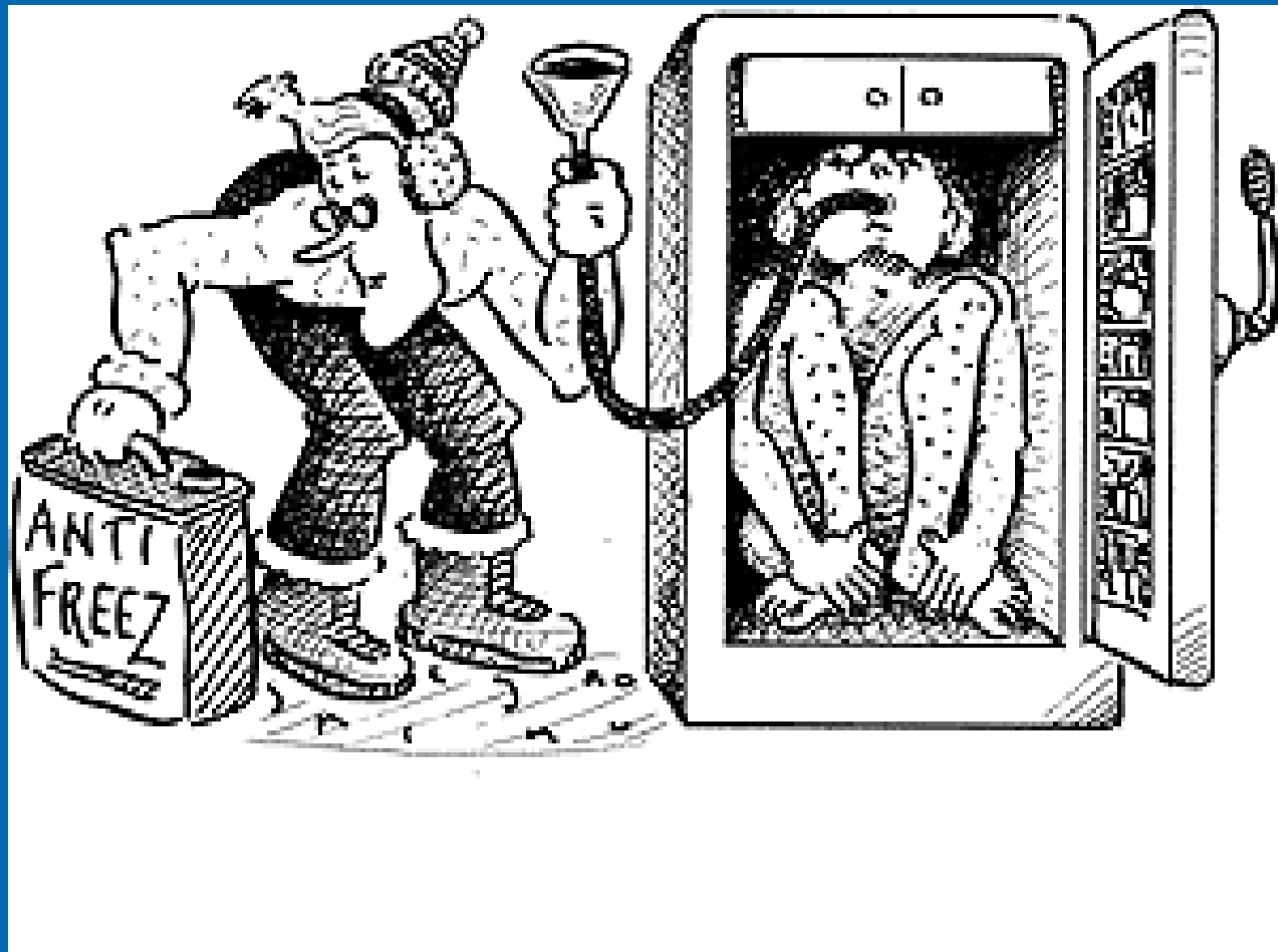


Peter's Principle



Stanley's Principle





Frozen Bodies



Frozen Bodies



Production of healthy cloned mice from bodies frozen at -20°C for 16 years



Sayaka Wakayamaa, Hiroshi Ohtaa, Takafusa Hikichia, Eiji Mizutania, Takamasa Iwakib, Osami Kanagawac, and Teruhiko Wakayama
17318–17322 PNAS November 11, 2008 vol. 105 no. 45

Fertile offspring derived from mouse spermatogonial stem cells cryopreserved for more than 14 years

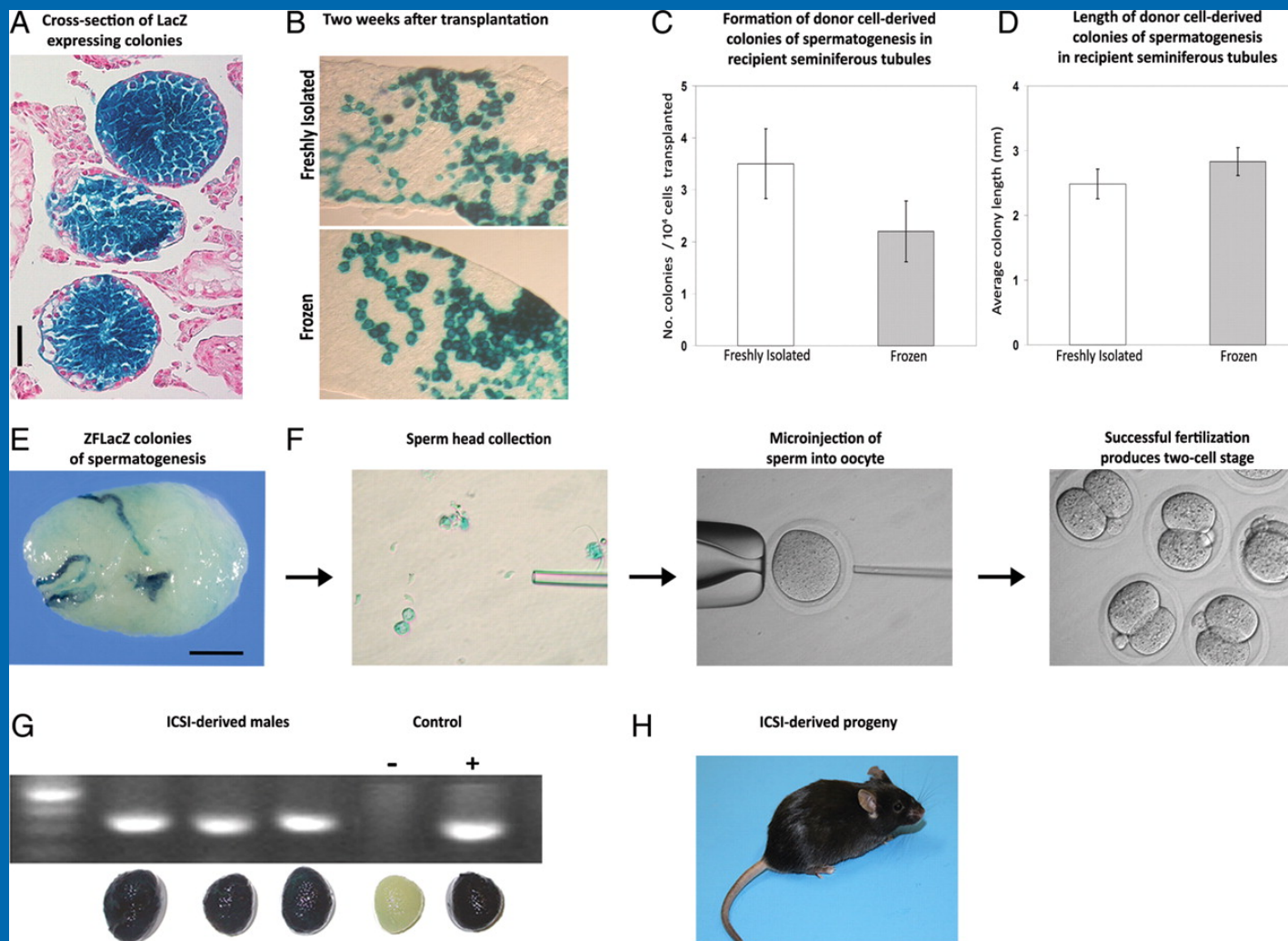
**Xin Wu¹, Shaun M. Goodyear¹, Lara K. Abramowitz²,
Marisa S. Bartolomei², John W. Tobias³, Mary R. Avarbock¹,
and Ralph L. Brinster^{1,*}**

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*Correspondence address. Tel: +1-215-898-8805; Fax: +1-215-898-0667; E-mail: cpope@vet.upenn.edu

Submitted on December 15, 2011; resubmitted on January 18, 2012; accepted on February 14, 2012

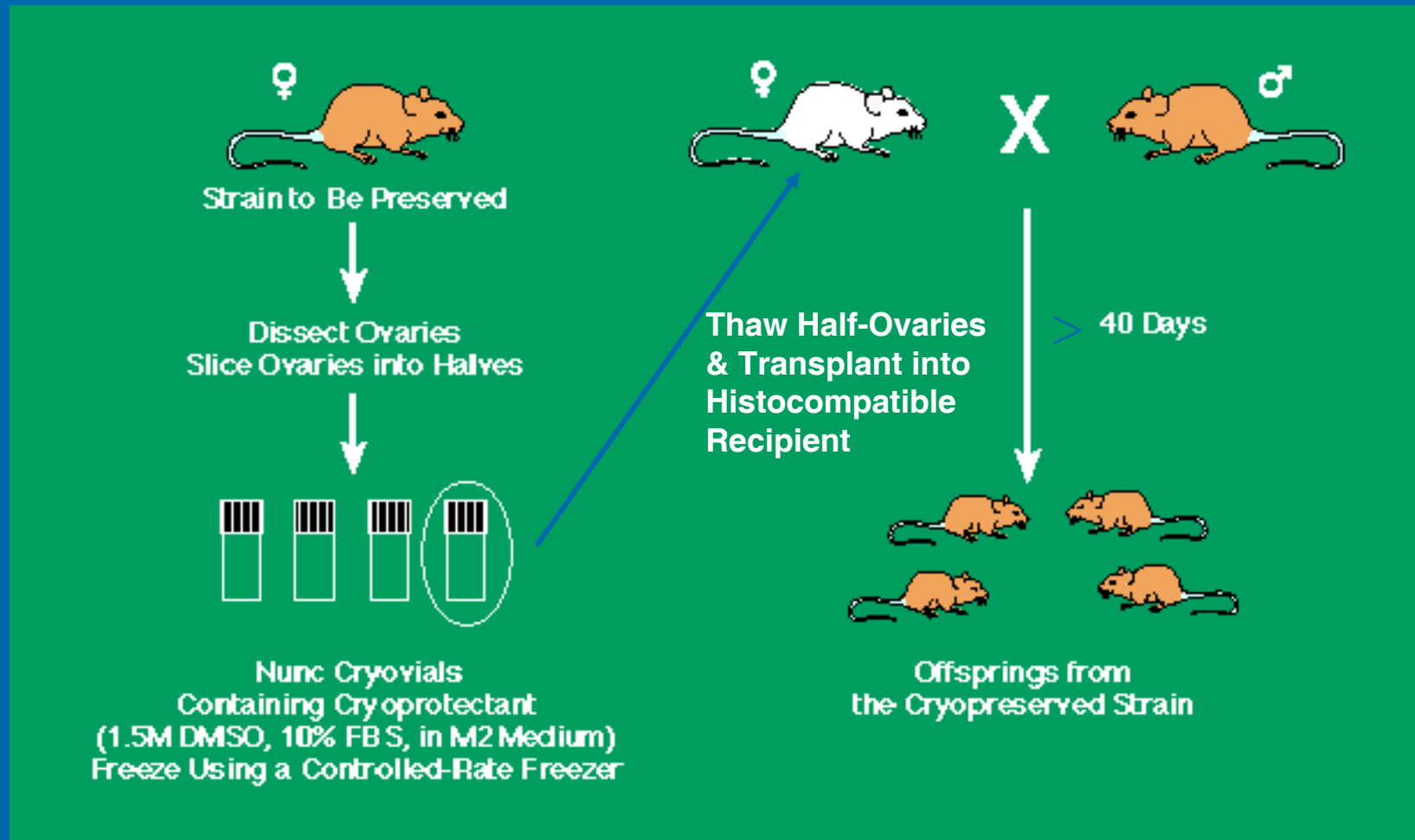
Cryopreserved mouse testis cells re-establish spermatogenesis in recipient testes and produce viable progeny.

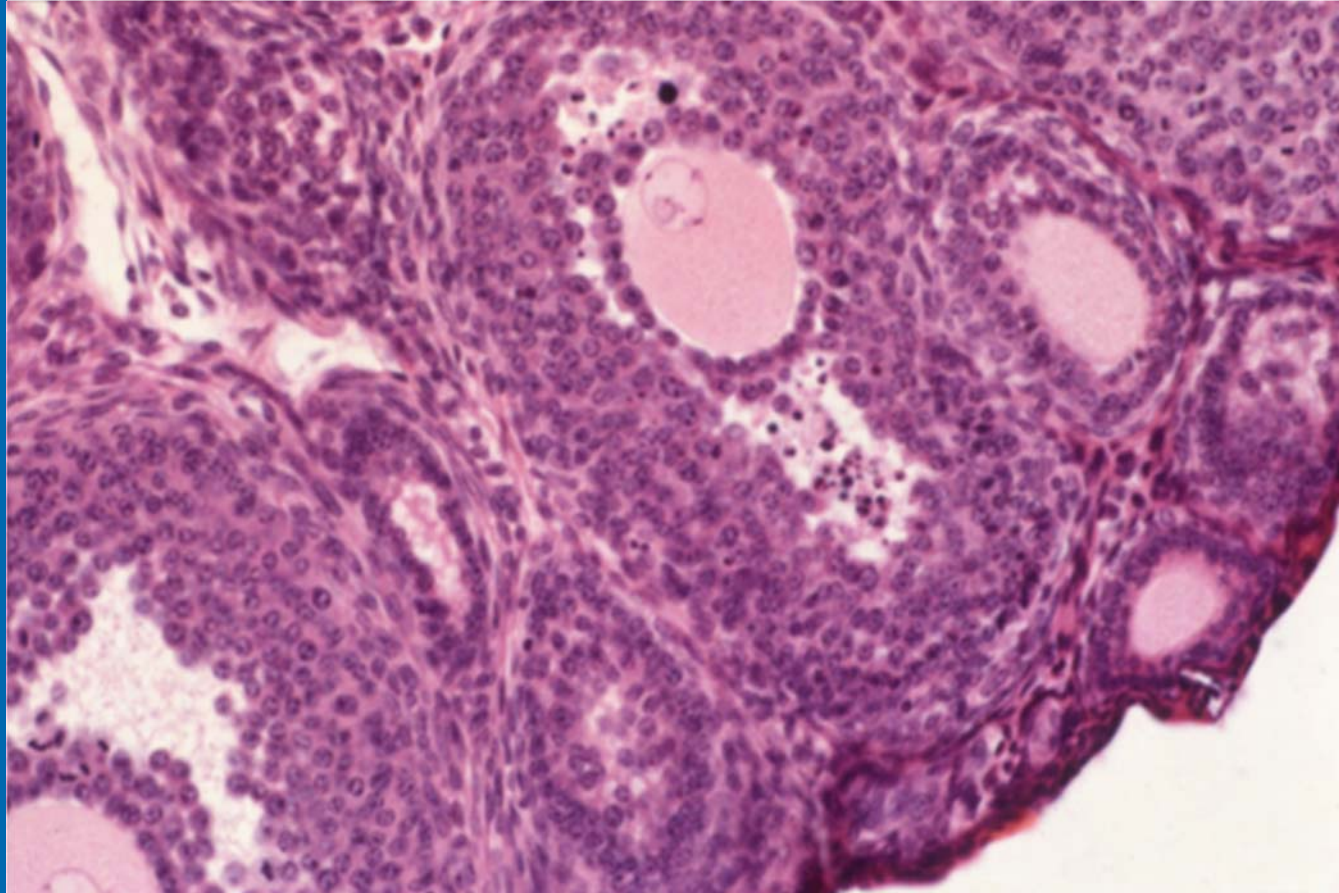


Wu X et al. Hum. Reprod. 2012;humrep.des077



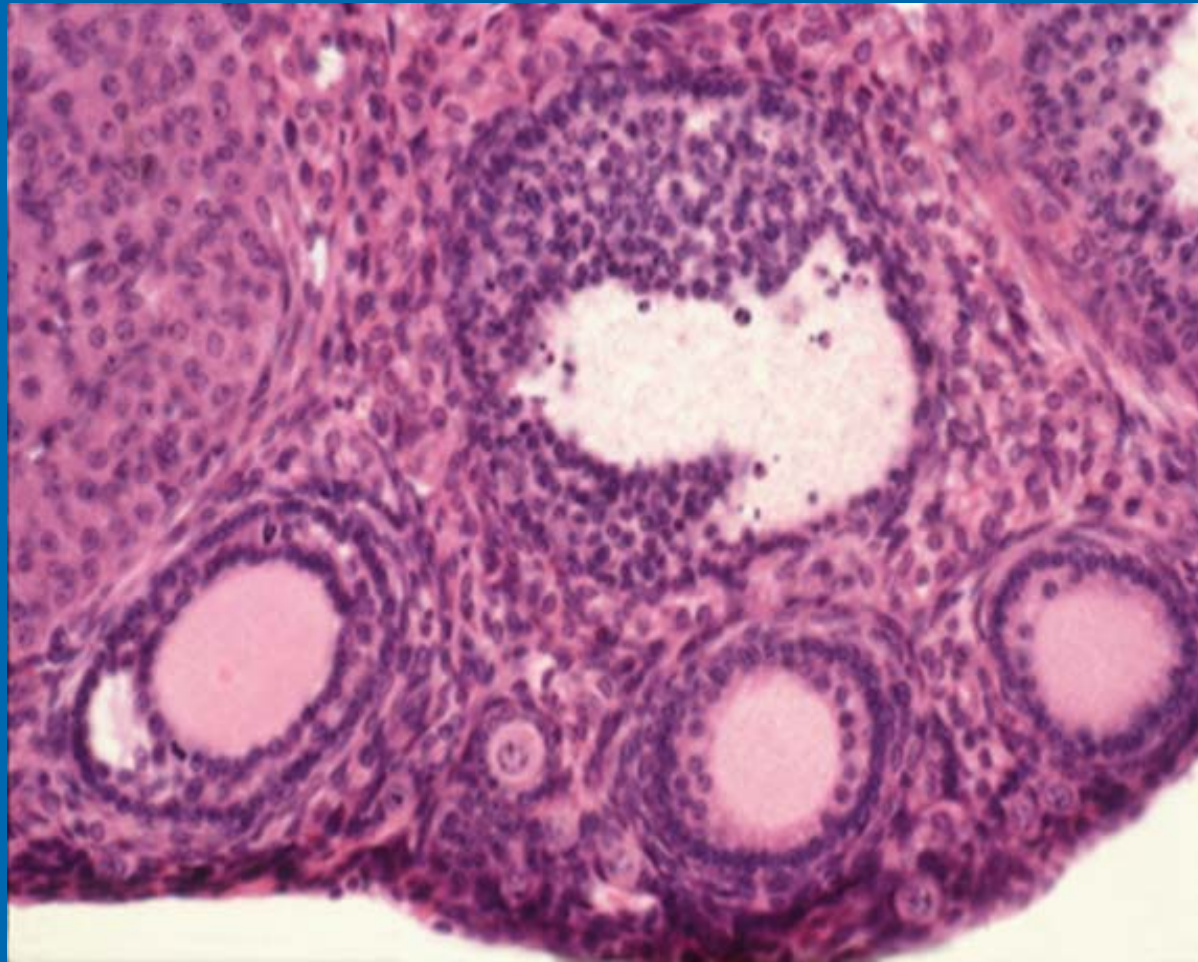
Ovary Cryopreservation





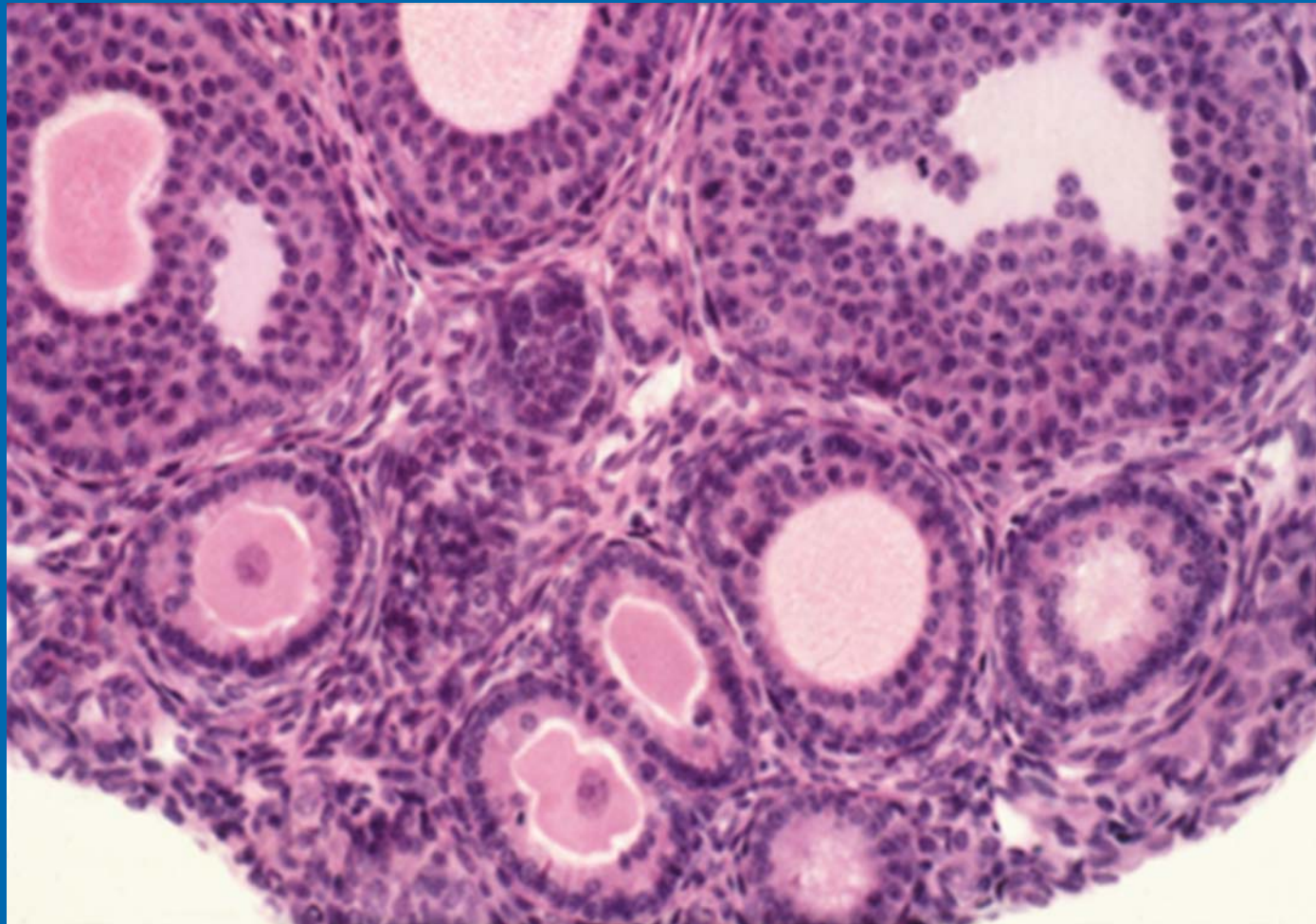
Fresh unprimed

Sztein et al, Biol rep 58,1998



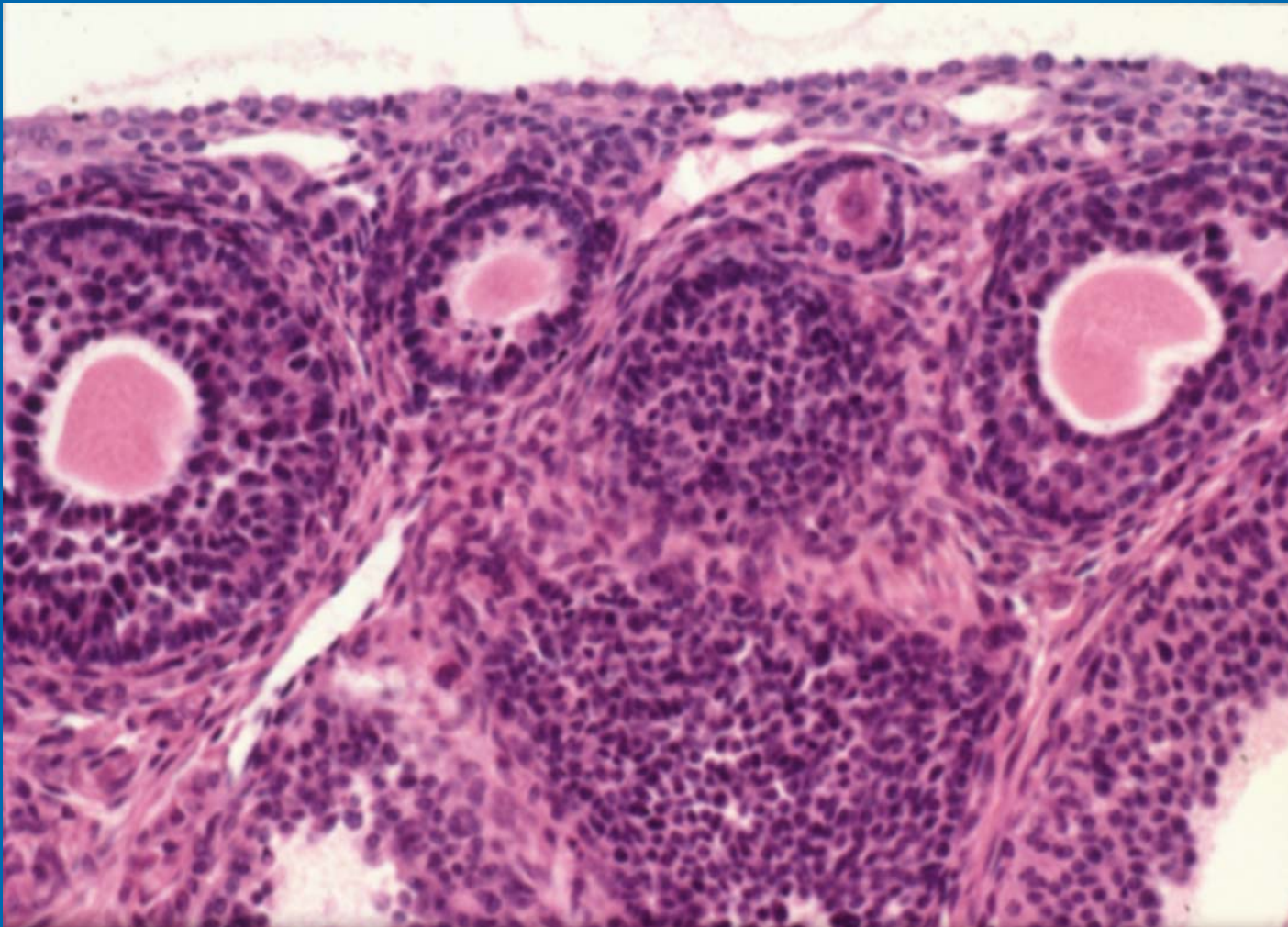
Fresh primed

Sztein et al, Biol rep 58,1998



Frozen non primed

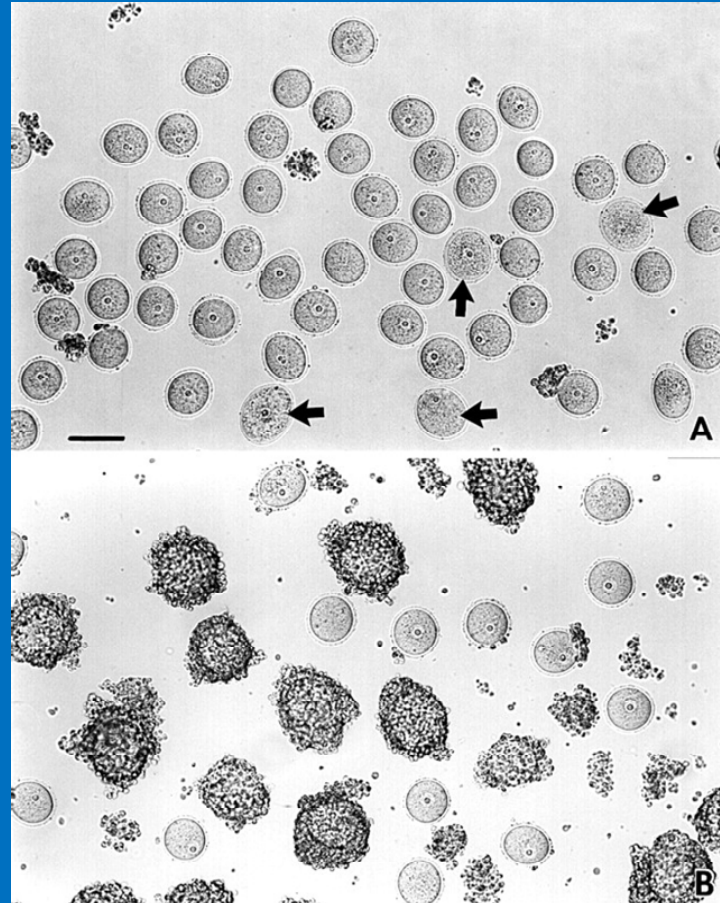
Sztein et al, Biol rep 58,1998



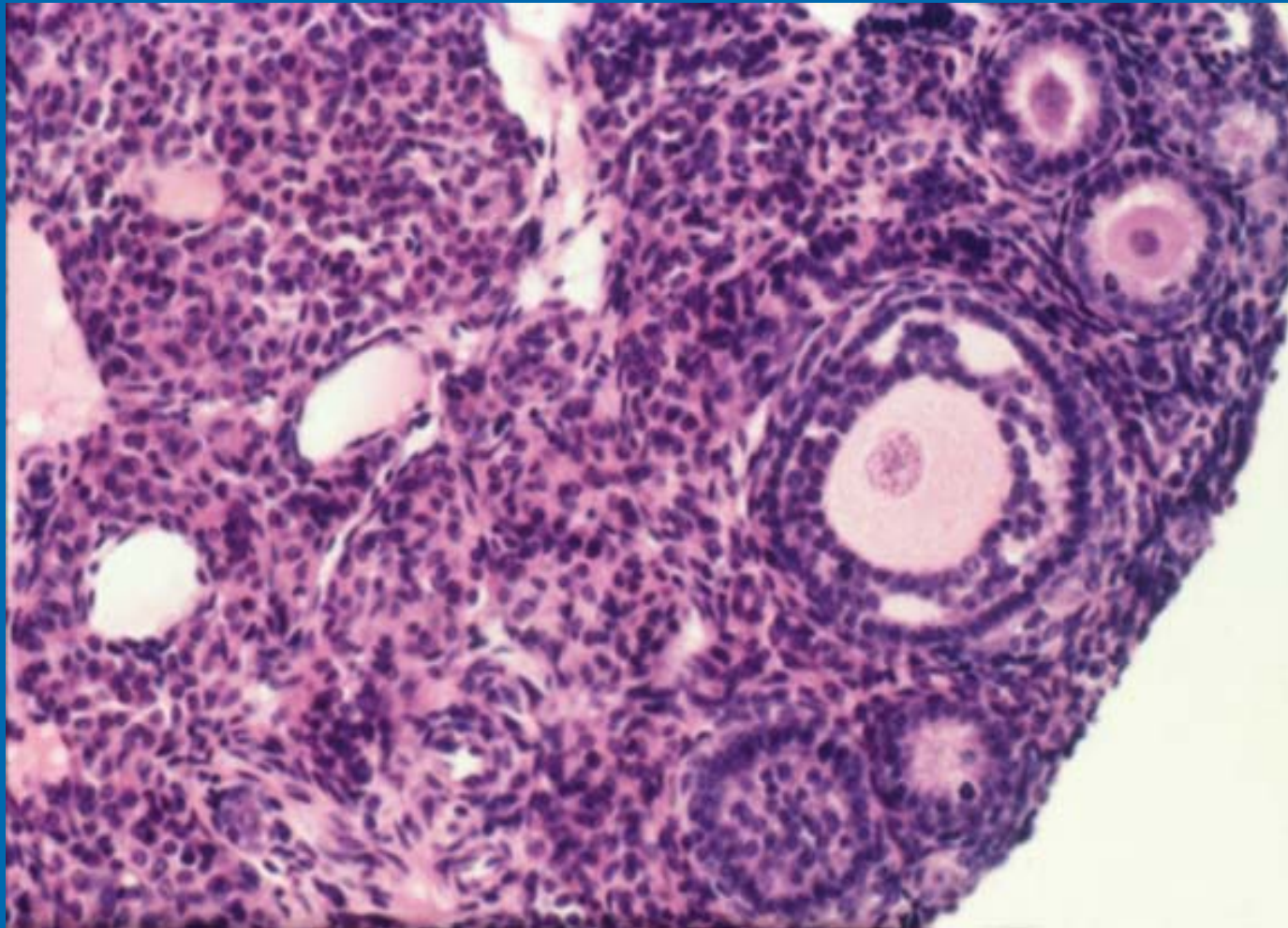
Frozen primed

Sztein et al, Biol rep 58,1998

Representative sample of oocytes isolated from frozen-thawed ovaries.

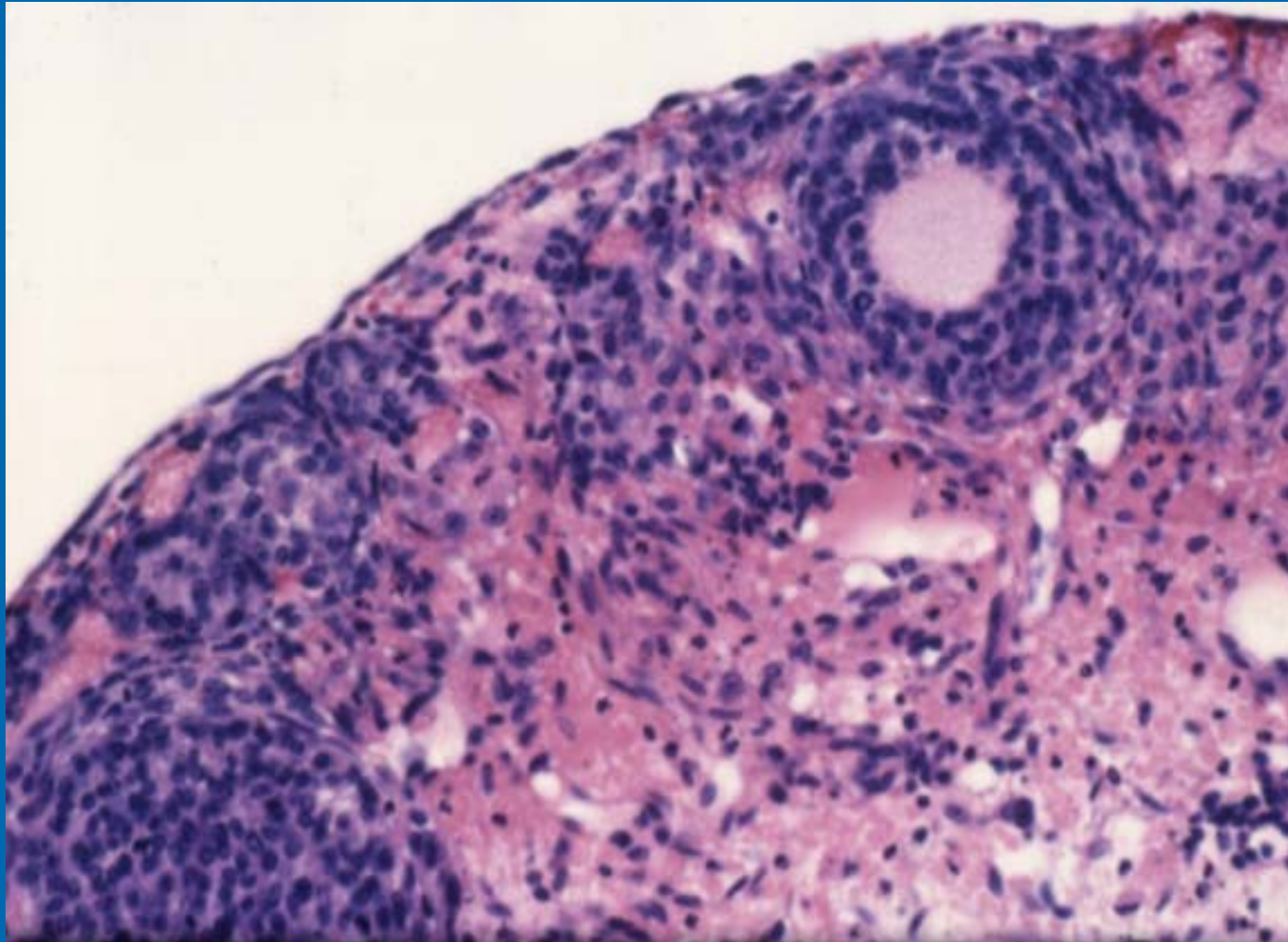


Sztejn J et al. Hum. Reprod. 2000;15:567-571



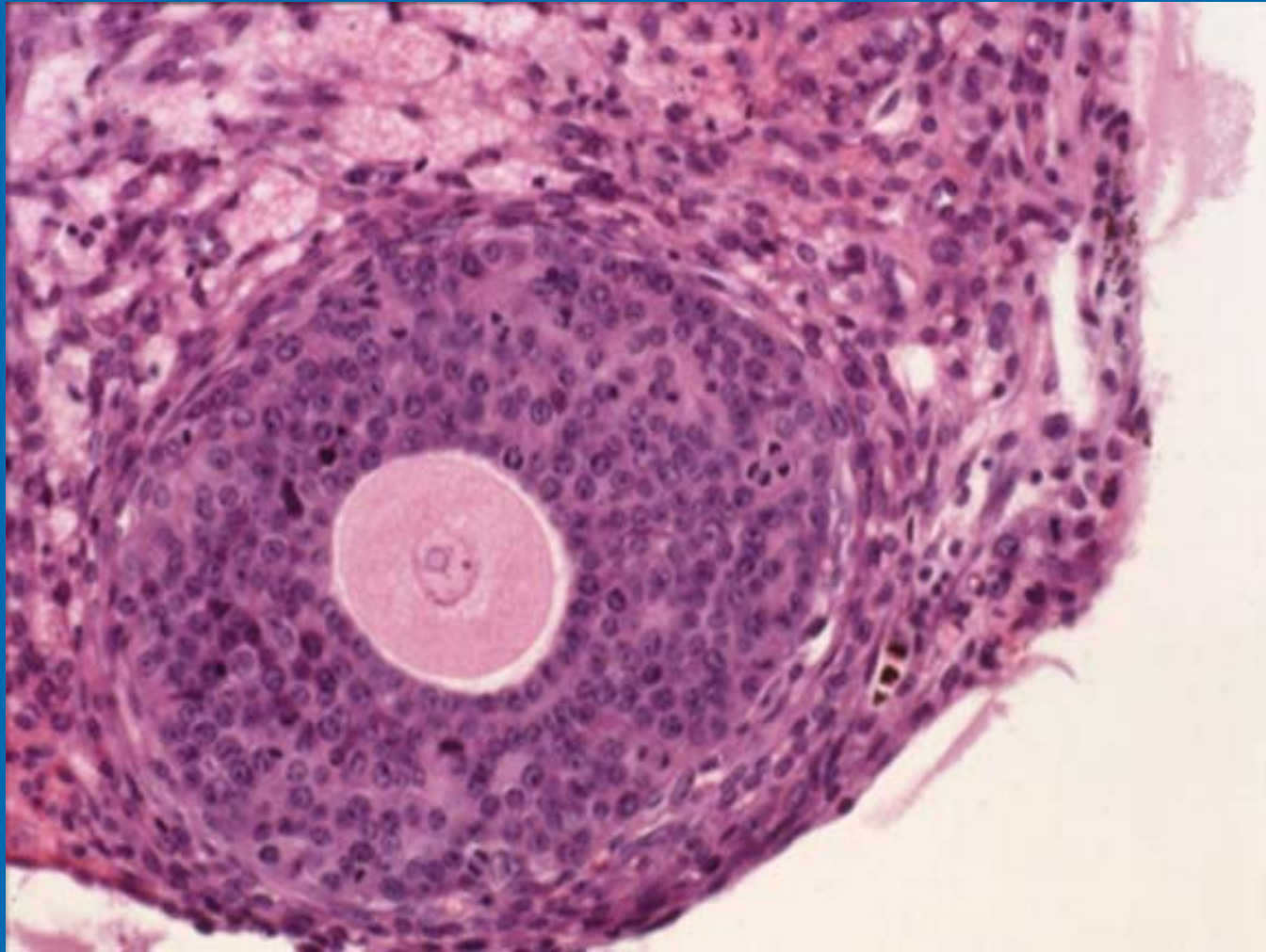
Thawed 10" X40

Sztein et al, Biol rep 58,1998

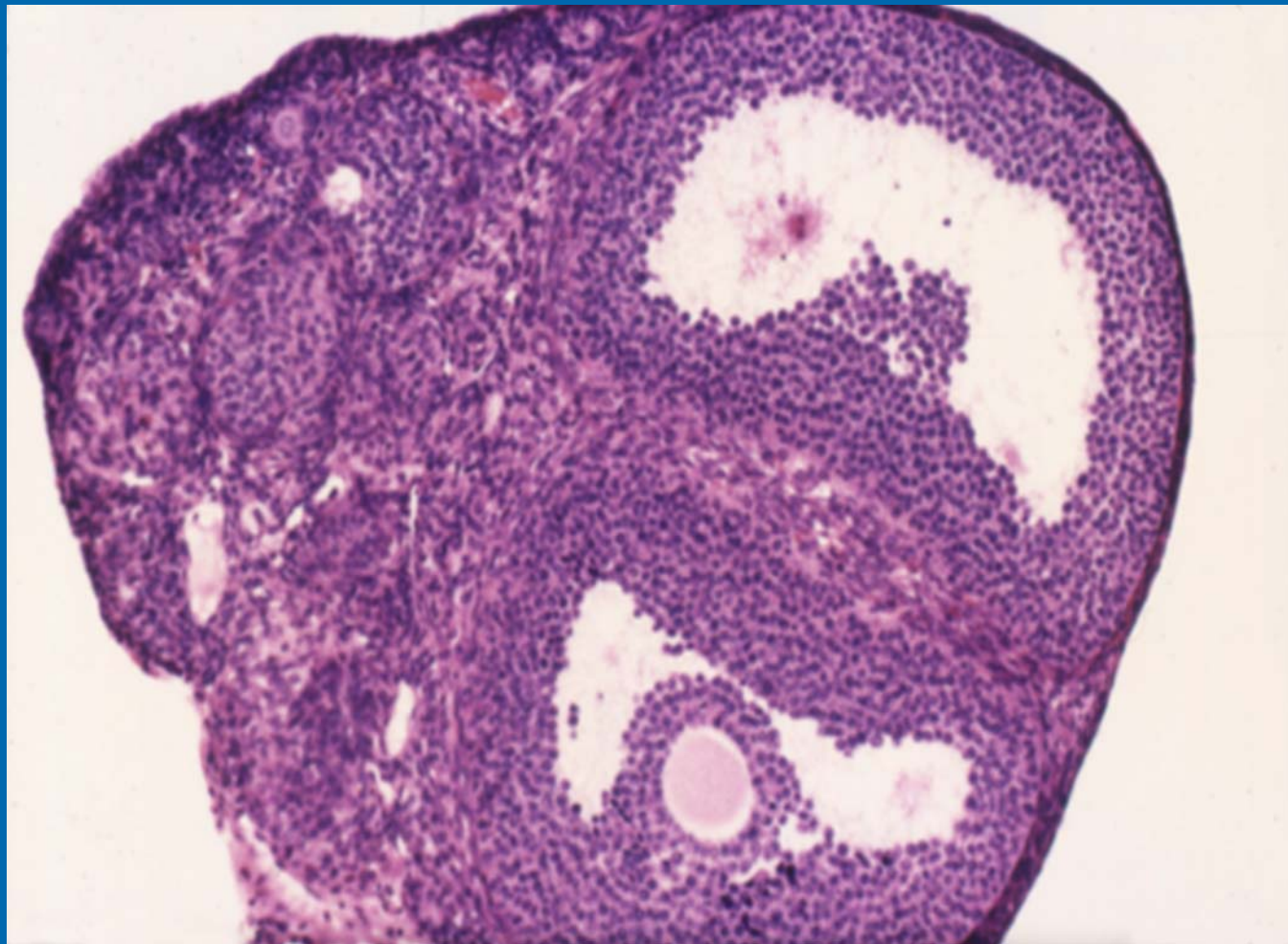


24 hours x40

Sztein et al, Biol rep 58,1998



3 days X40



4 months x20

Sztein et al, Biol rep 58,1998

Ovary Cryopreservation in Straws

- 0.5 cc French straw 100 μ l CPA
(One step dilution)
- CPA 2 M PROH

10% FBS
medium M2
- Female age 21-60 days

Ovary Transfer

	Vial	Straw
Recipients	23	11
Implanted (+)	13 (57%)	7 (63%)
# positives pups	3.2/female	4.7/female
Pups/female	1.5	6.5
Interval first litter	40.1	40

Muchas Gracias!!



Peter Principle

$$\frac{dV}{dT} = -\frac{L_p A_c RT}{B v_w} \left[\ln \frac{(V_o - V_b - n_{cpa} v_{cpa})/v_w}{(V_o - V_b - n_{cpa} v_{cpa})/v_w + (\varphi_s n_s + n_{cpa})} - \frac{\Delta H_f v_w \rho}{R} \left(\frac{1}{T_R} - \frac{1}{T} \right) \right] \quad (1)$$

