

Puberty in boys with a history of cryptorchidism

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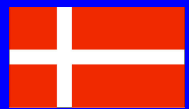
2025



Disclosure

- Nothing to disclose

1997-2001



4957 families
2562 boys



2006-2007

2008 -

Katharina Main

Material (Cohort study)

- All newborn boys of volunteer mothers (born 1.1.1997 -31.12.1999)
 - Questionnaire during pregnancy
 - Clinical examinations
 - All boys: At birth and at 3 months of age
 - Cases and controls: Also at 18 months of age
 - Biological samples
 - Blood sample around 10 - 15 gestational weeks
 - Placenta
 - Breast milk (4-8 weeks after birth)
 - Blood sample at 3 months of age

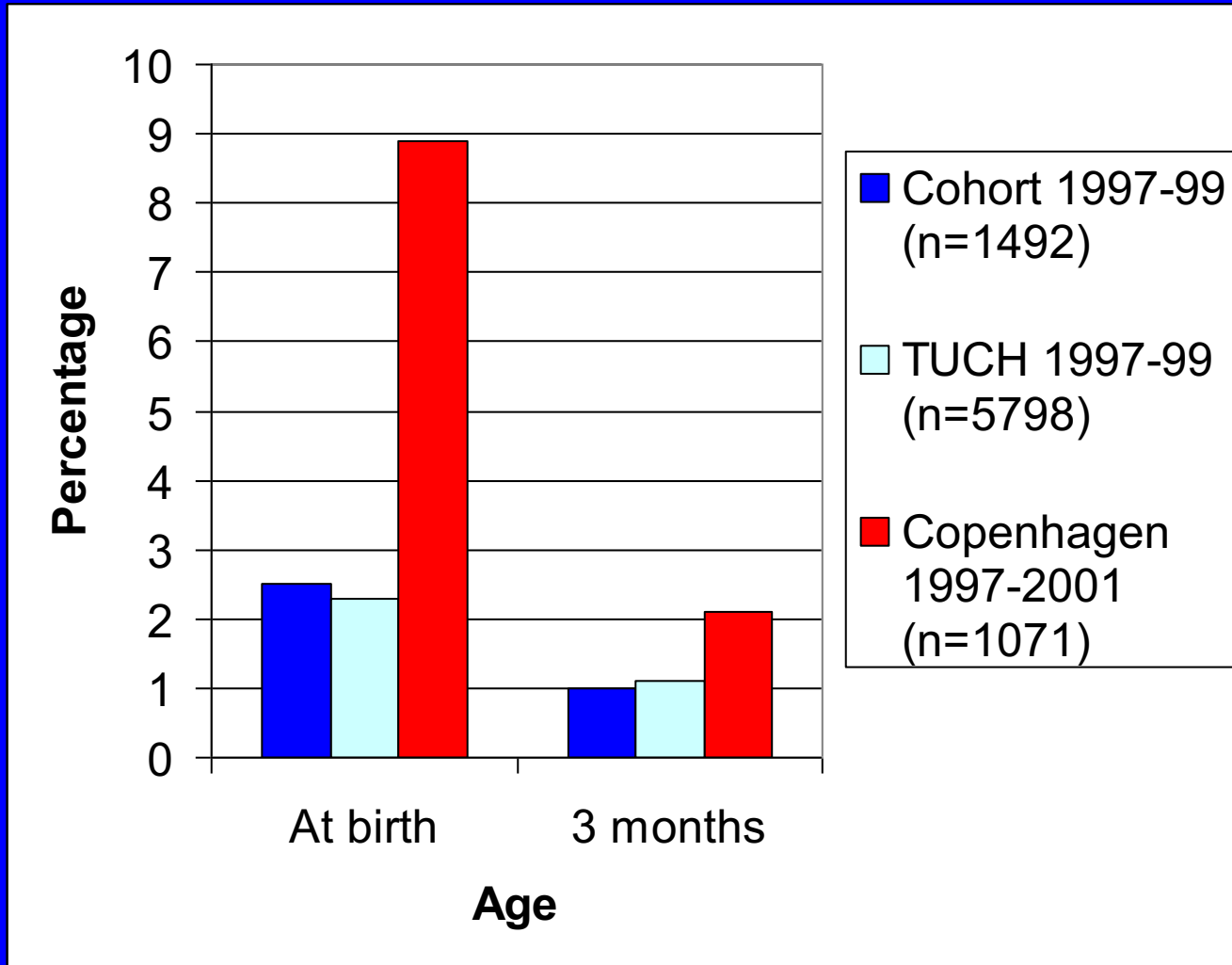
Case-control -study

- All boys with genital malformations and healthy control boys of volunteer mothers (born in TUCH 1.1.1997 - 28.2.2002)
 - Questionnaire after birth
 - Clinical examinations
 - At birth, at 3 months of age and at 18 months of age
 - Biological samples
 - Blood sample around 10 - 15 gestational weeks
 - Placenta
 - Breast milk (4-8 weeks after birth)
 - Blood sample at 3 months of age

Incidence of cryptorchidism

- Congenital cryptorchidism
 - Increasing trends in some countries
 - Diagnostic controversies
- Acquired cryptorchidism (ascending testis)
- Orchiopexy rate

Prevalence of cryptorchidism

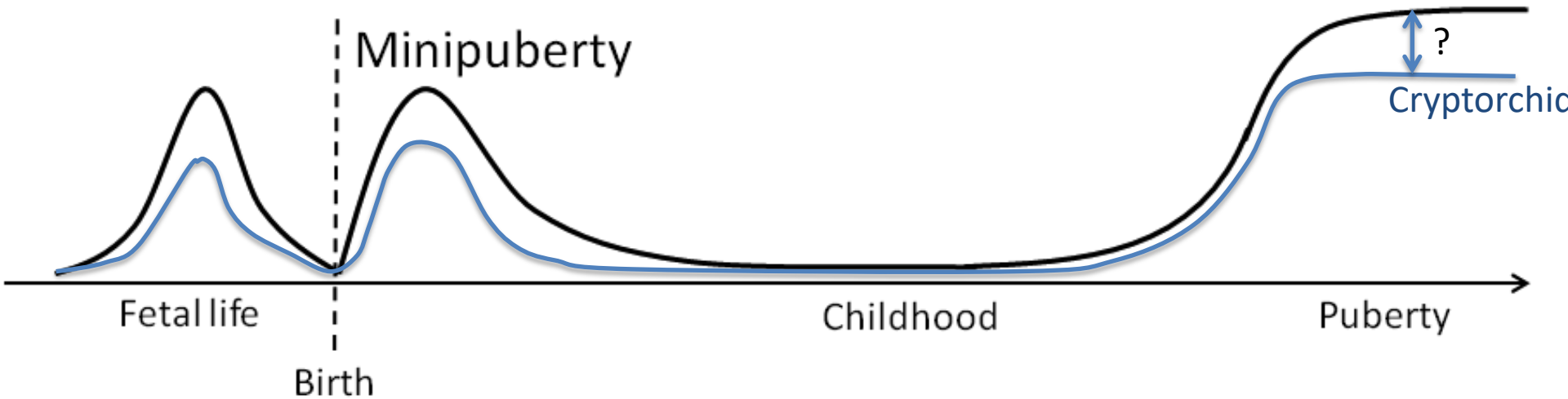


Incidence of acquired cryptorchidism

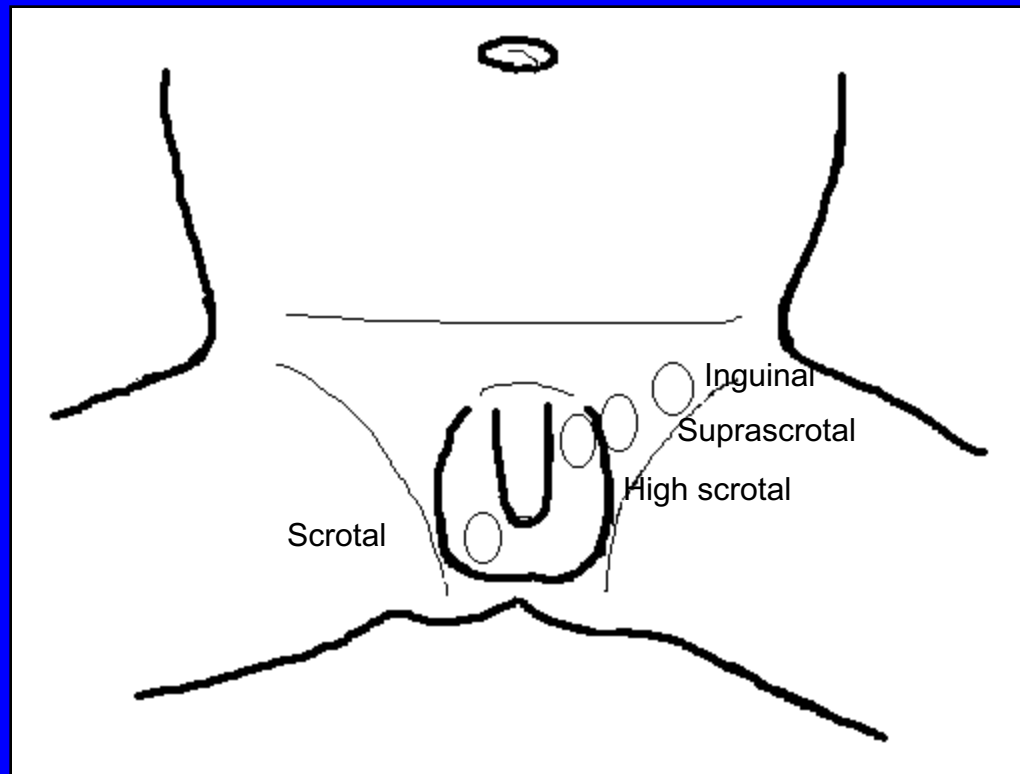
- 1.1 – 2.2 % between 6-13 years; Hack et al. Arch Dis Child 2007; Sijstermans et al. Int J Androl 2008
- 0.3 - 0.6 % between ½ - 3 years; Wohlfahrt Veje et al. Int J Androl 2009
- Cumulative 7 % at 2 years; Acerini et al. Environ Health Perspect 2009

Suomi et al. 2006

Sadov, Koskenniemi et al. 2016

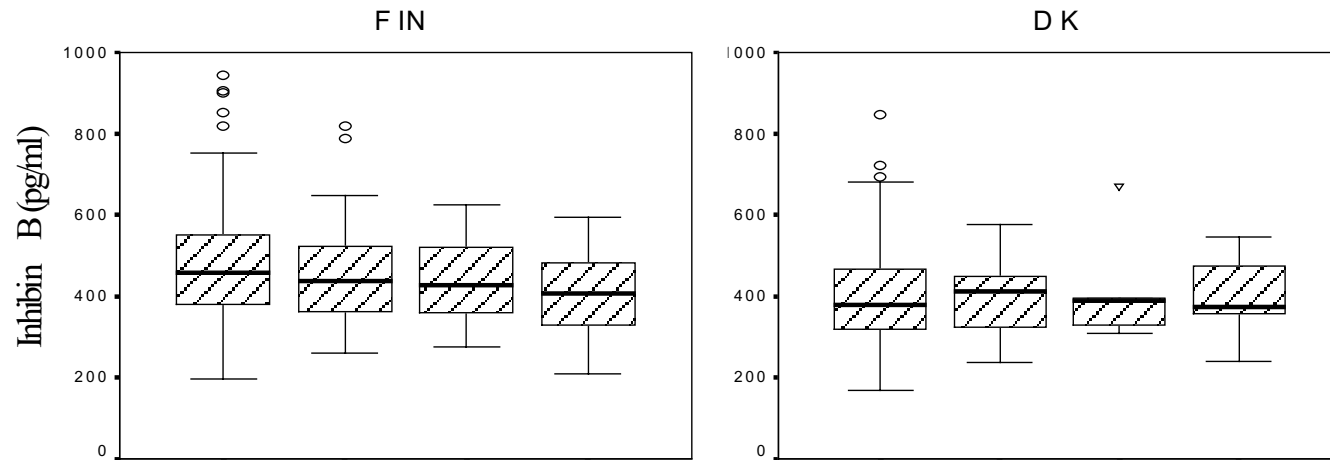


Cryptorchidism: classification

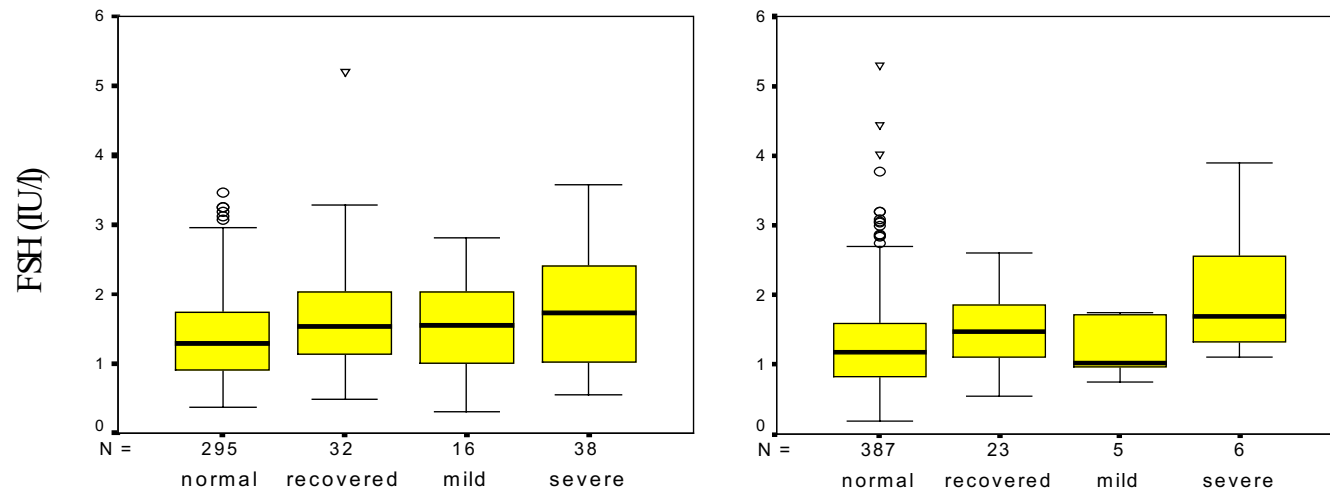


Inhibin and FSH

Inh B



FSH

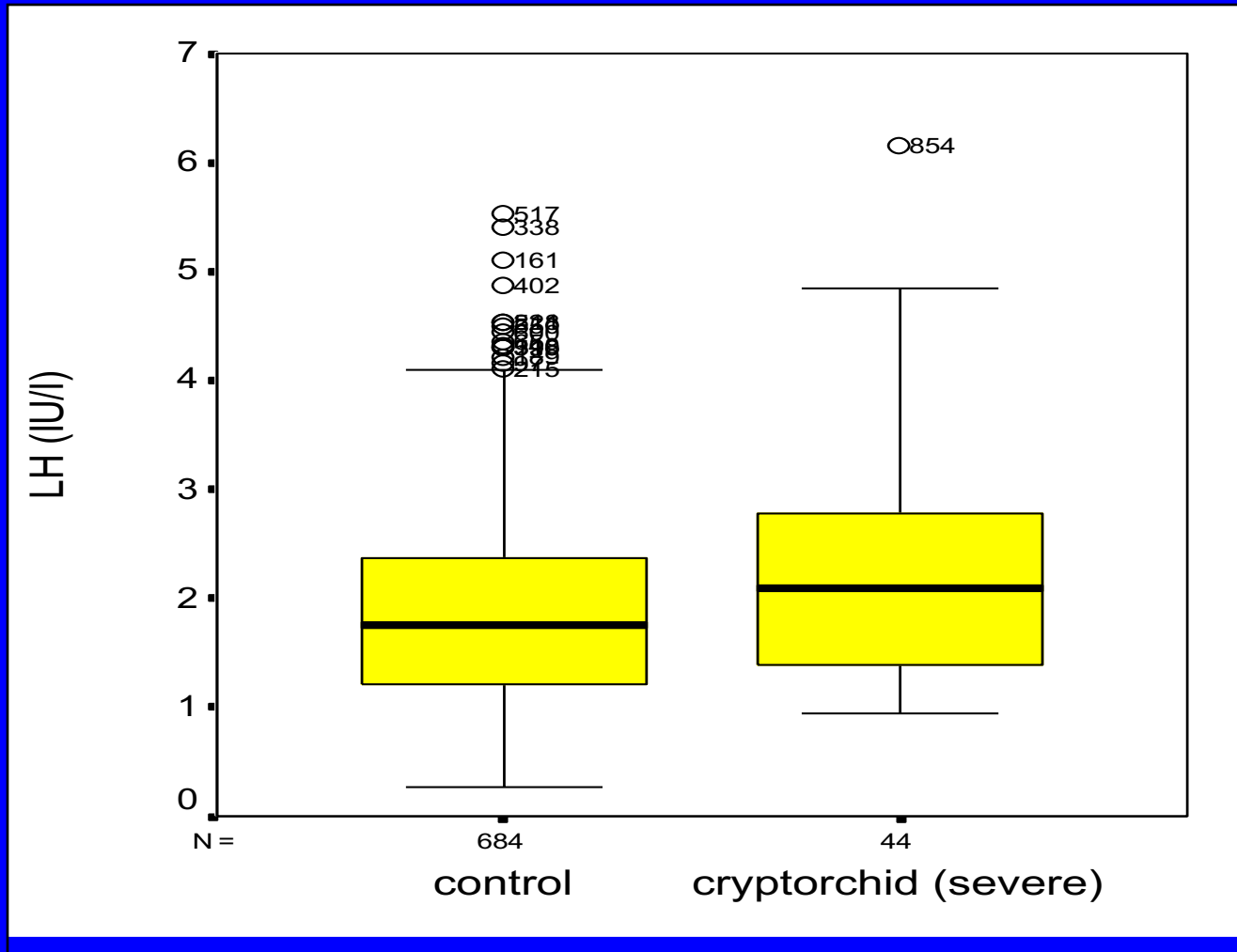


norm recov. mild severe

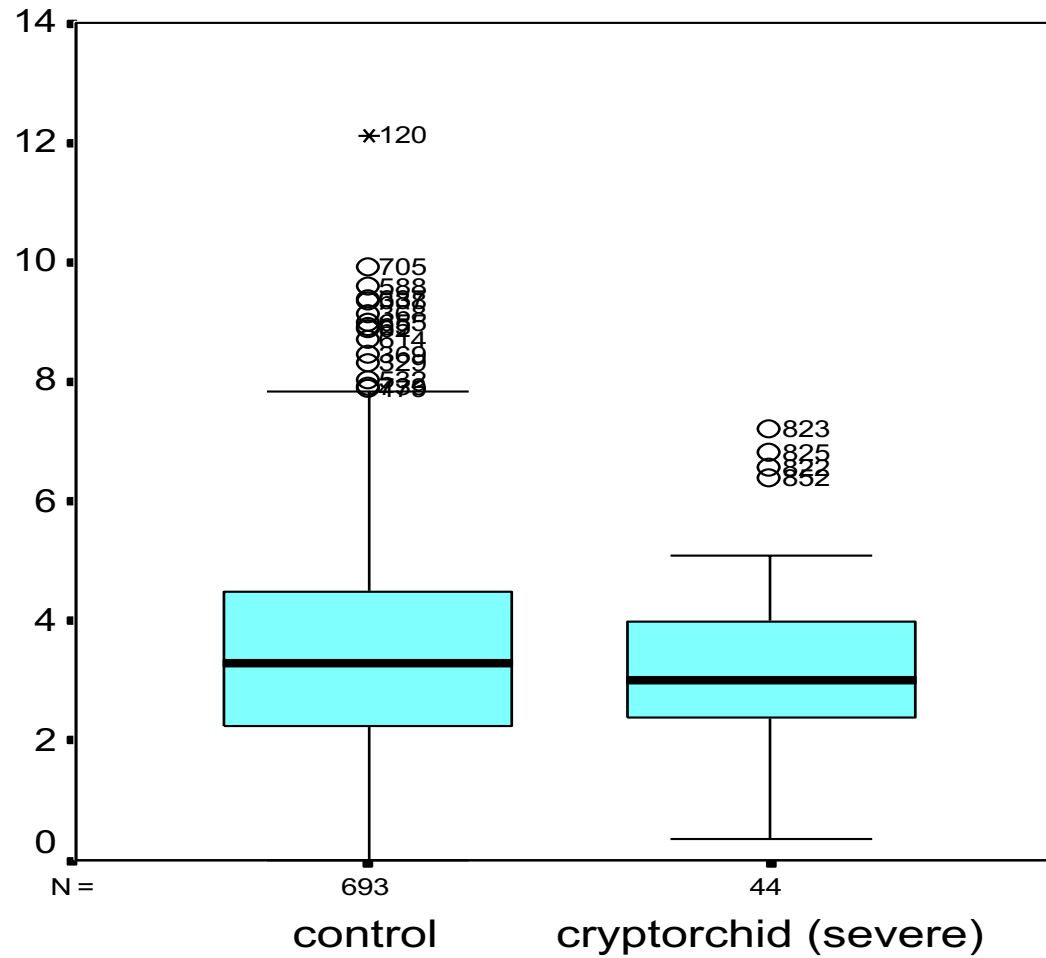
norm recov. mild severe

Suomi et al. JCEM 2006

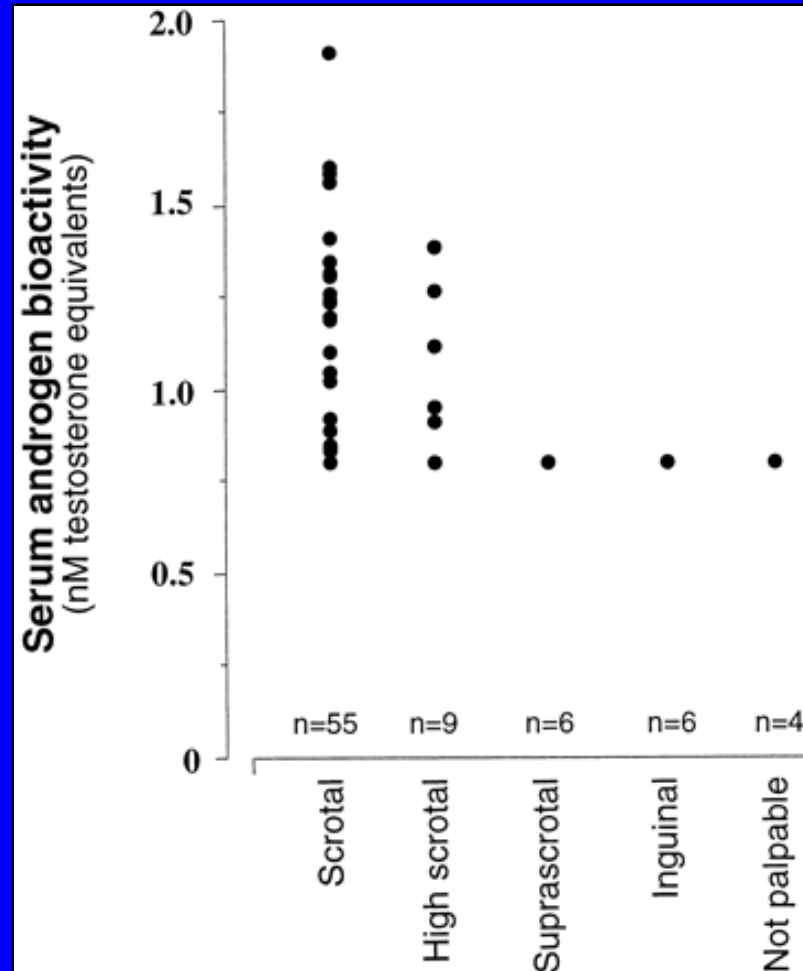
LH



Testosterone



Androgen bioactivity

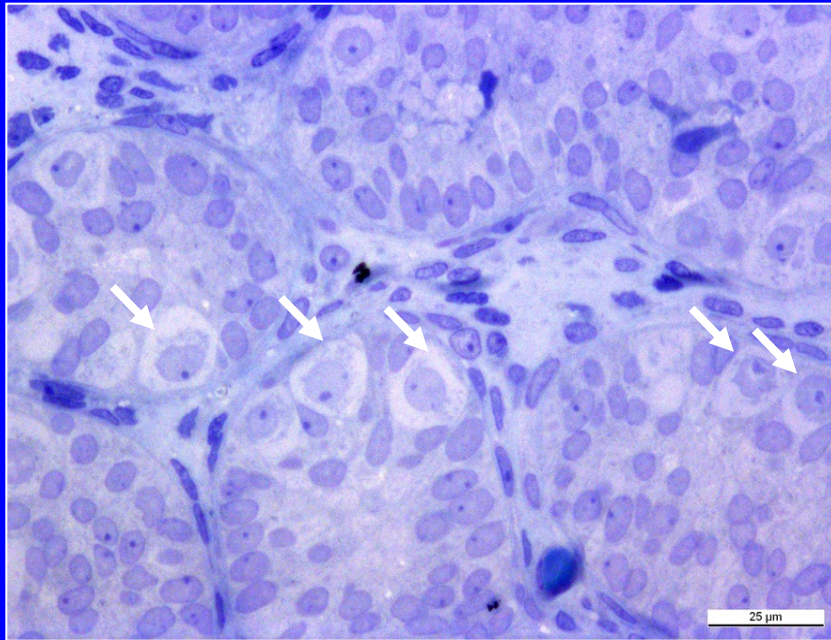


Raivio et al., JCEM 2003

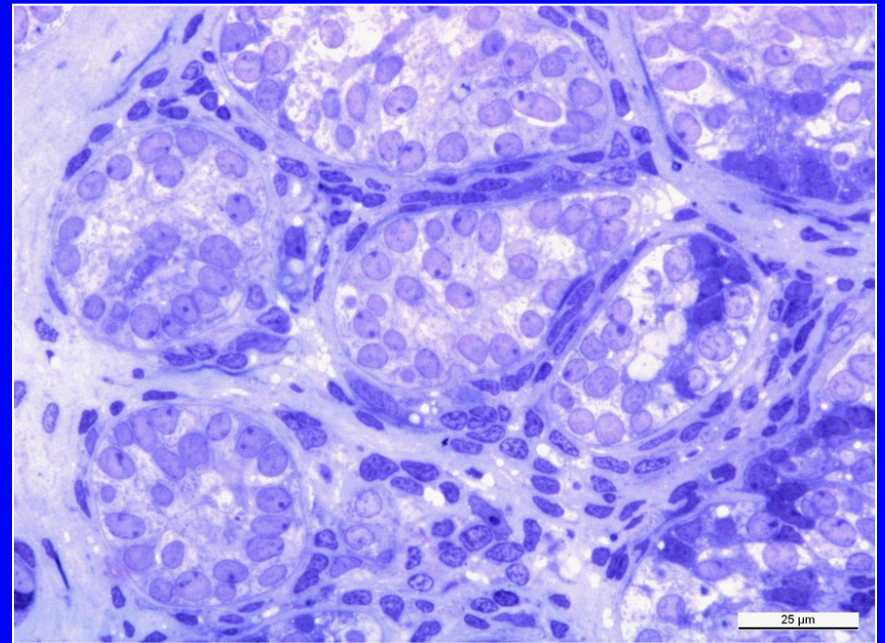
Hormone levels in cryptorchidism

- At 3 months, boys with severe cryptorchidism have
 - elevated LH and FSH levels
 - low inhibin B levels
 - unmeasurable testosterone bioactivity
 - normal testosterone levels
 - decreased INSL-3 levels
- These findings point to primary testicular failure associated to cryptorchidism

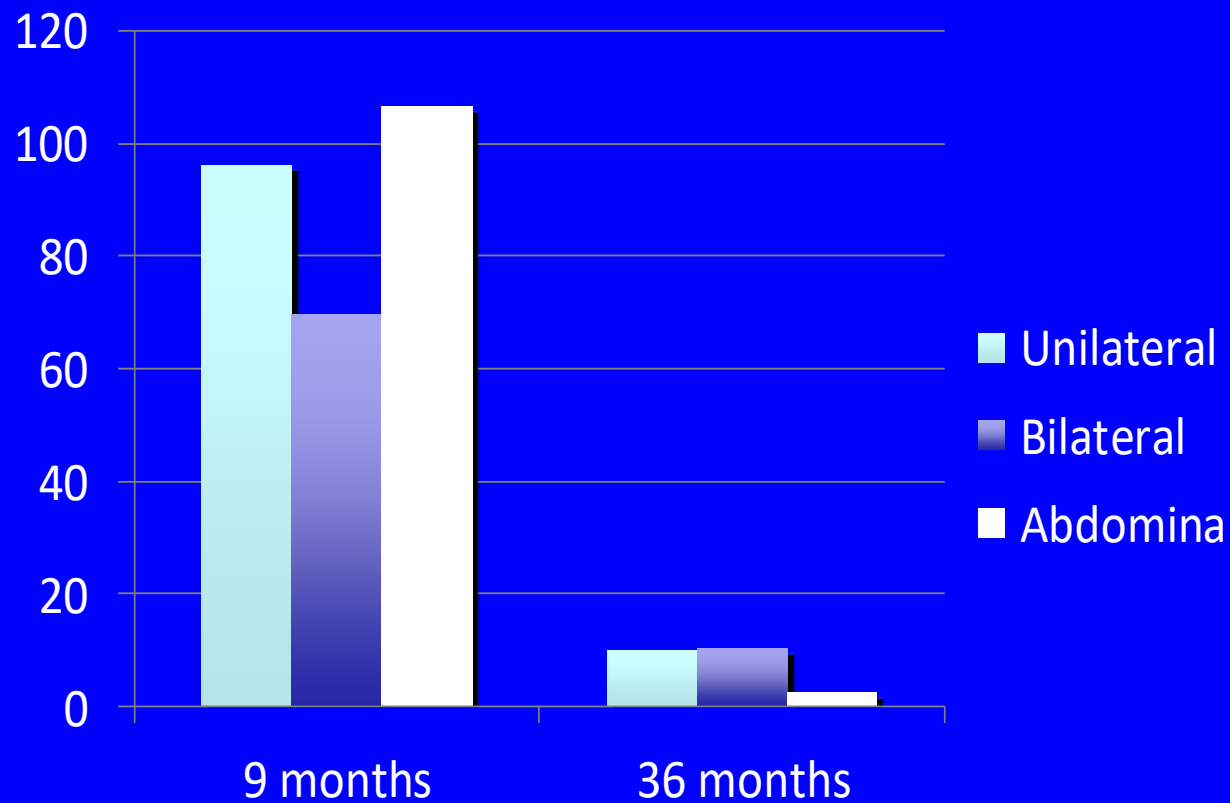
9 month



36 month

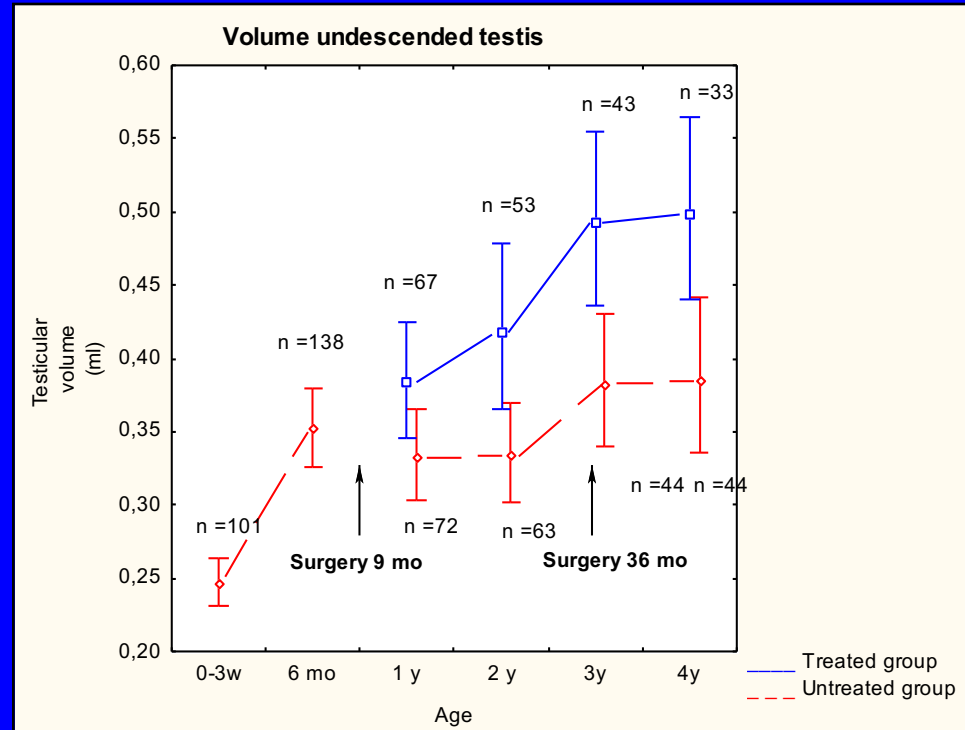
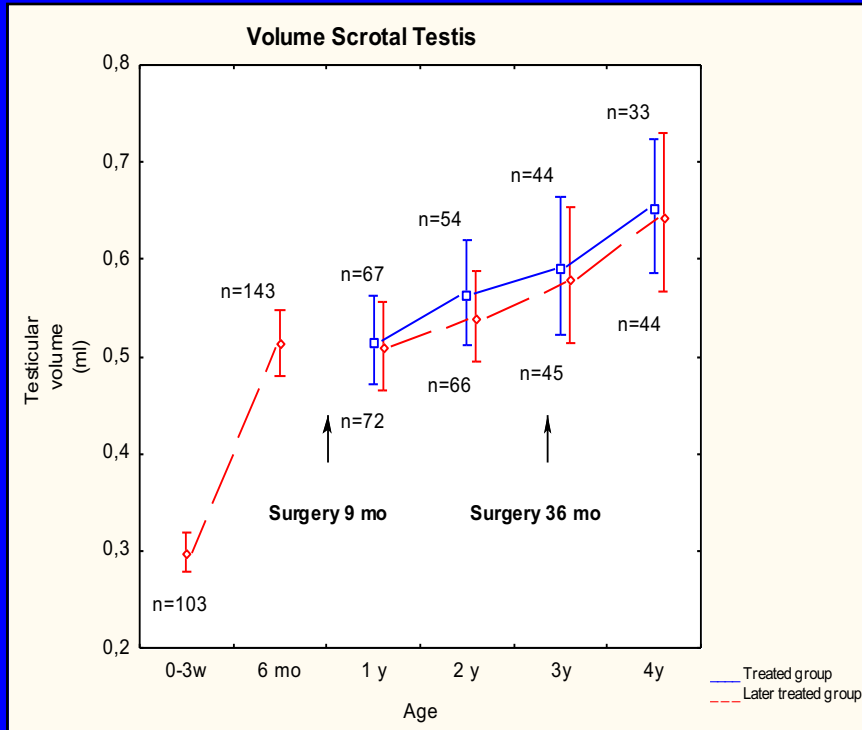


Massive loss of germ cells in undescended testes between 9 and 36 months. Kollin et al., JCEM 2012



Kollin et al. JCEM 2012, 97:4588-95

Comparison between retained and scrotal testes



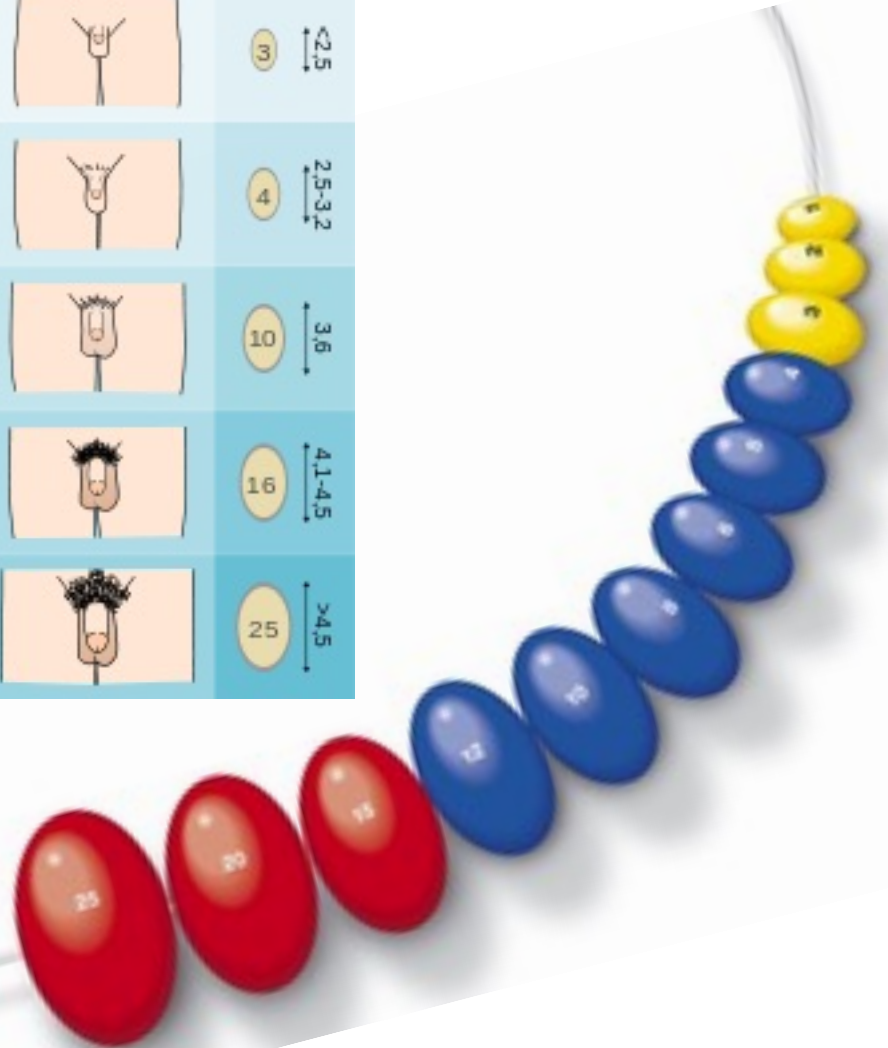
Kollin et al., J Urol 2007

Turku Puberty follow-up

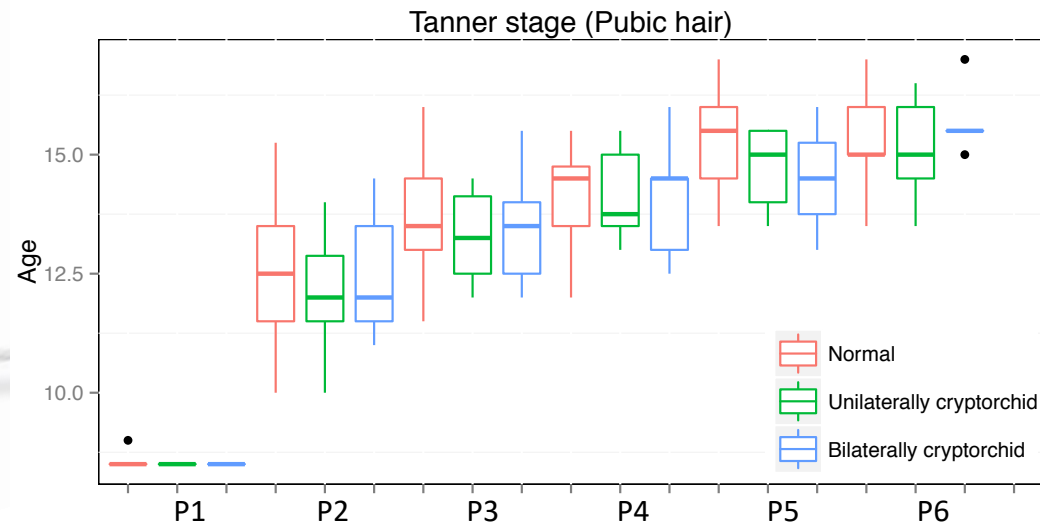
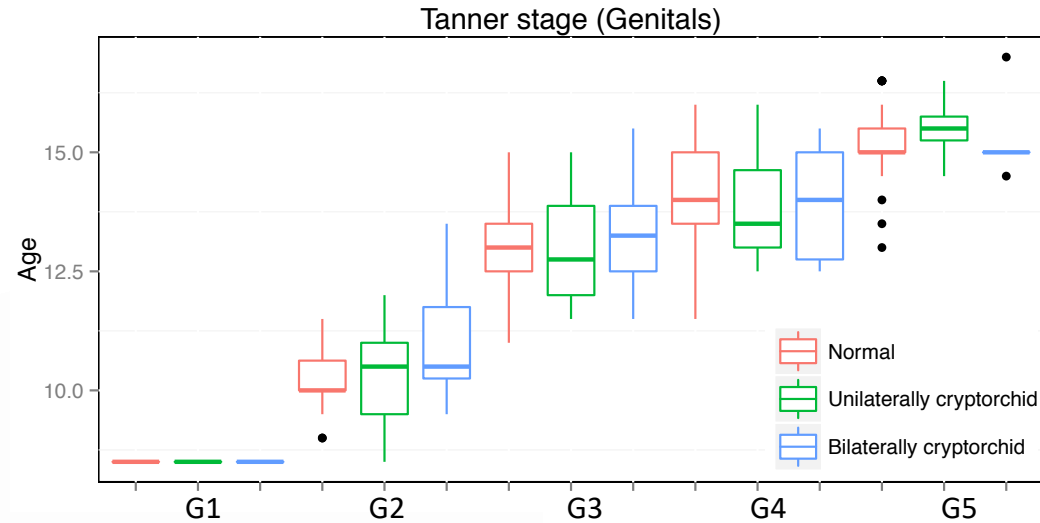
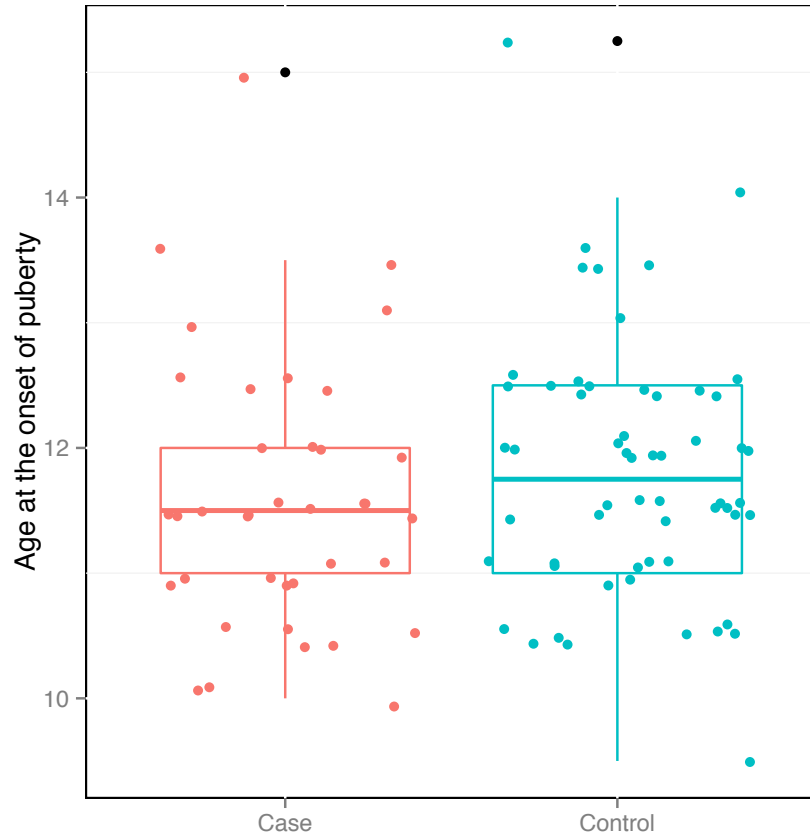
- Longitudinal case-control study
- Based on the previous Finnish birth cohort
- Follow-up of cryptorchid boys (& controls) from 8.5 years until adult testis volume is reached.
- Examination twice a year including orchidometry, testicular ultrasound, Tanner staging, and anthropometric measures.

I		3 ≤2.5
II		4 2.5-3.2
III		10 3.6
IV		16 4.1-4.5
V		25 >4.5

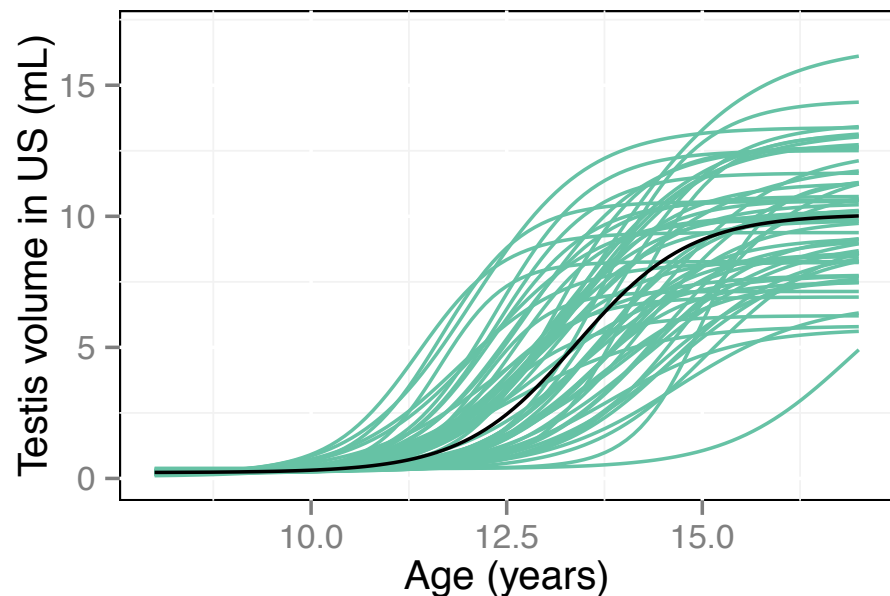
Sadov et al. JCEM 2016



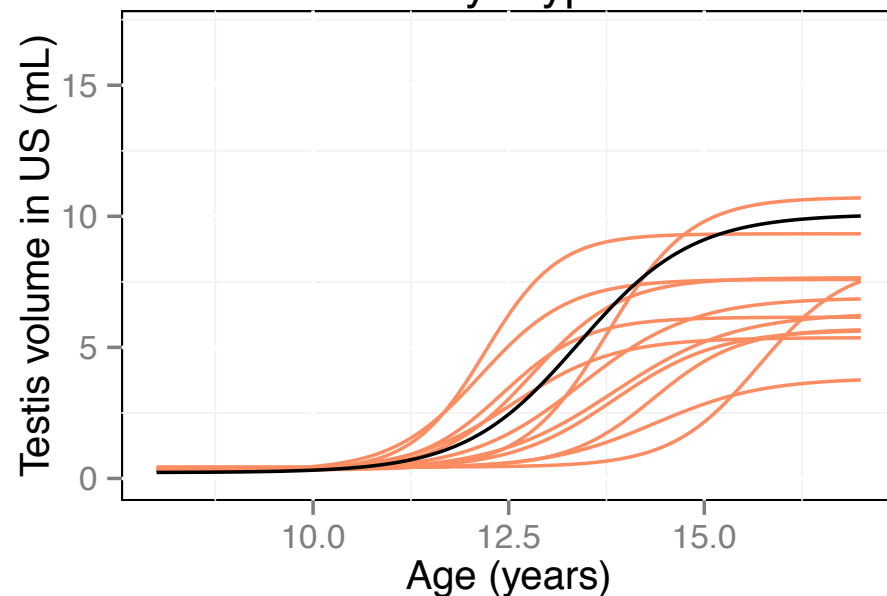
No difference in the age at the onset of puberty



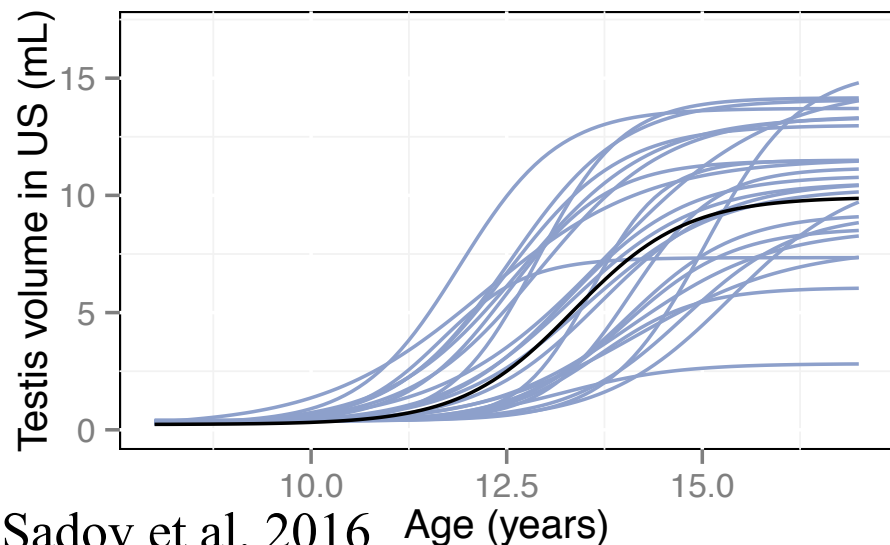
Control



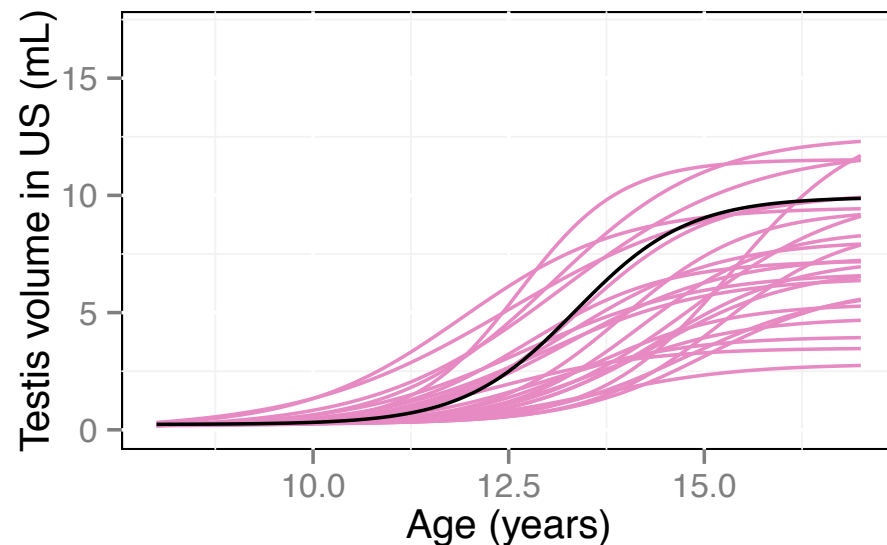
Bilaterally cryptorchid



Unilaterally cryptorchid,
descended at birth



Unilaterally cryptorchid,
undescended at birth



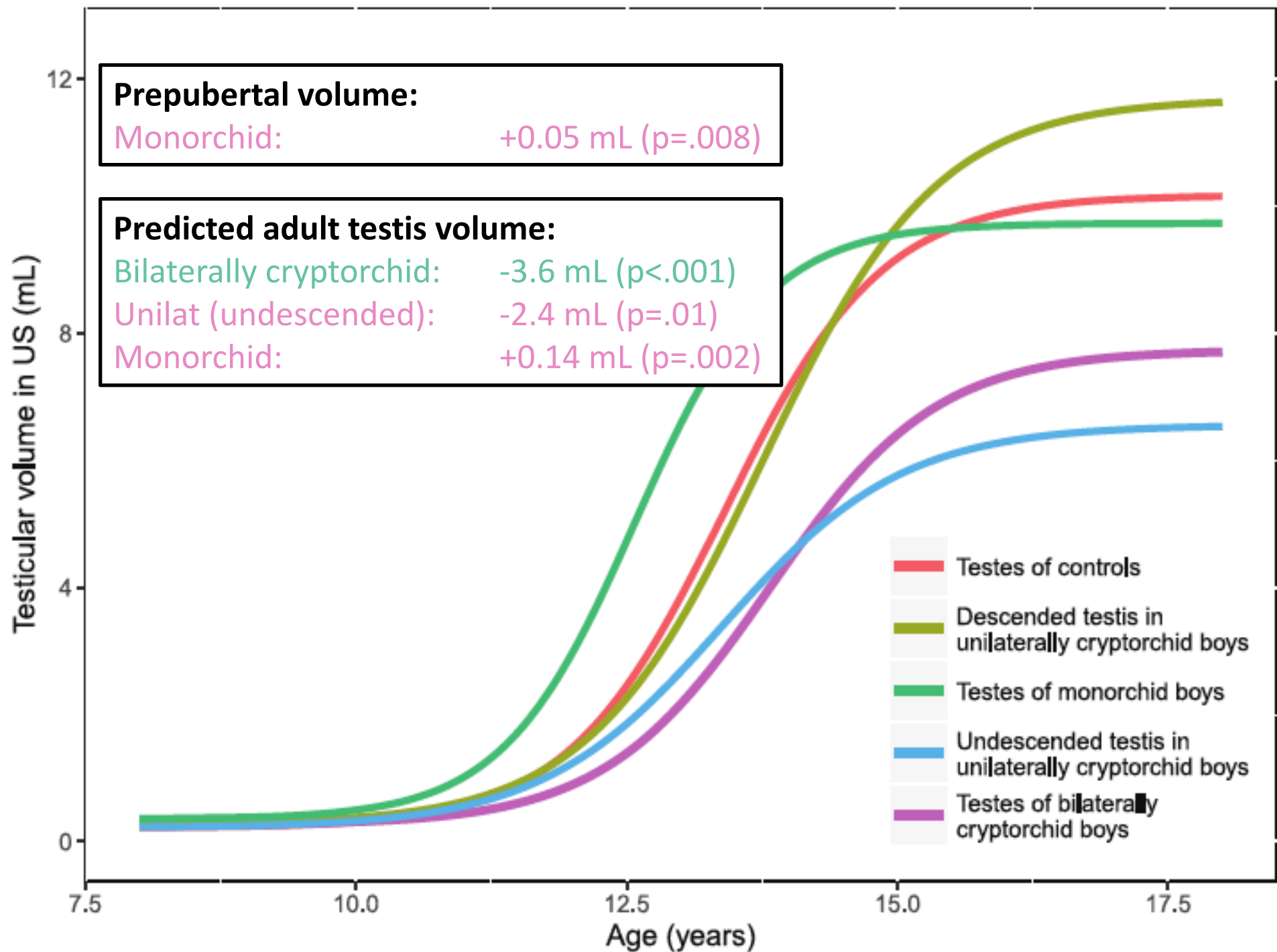
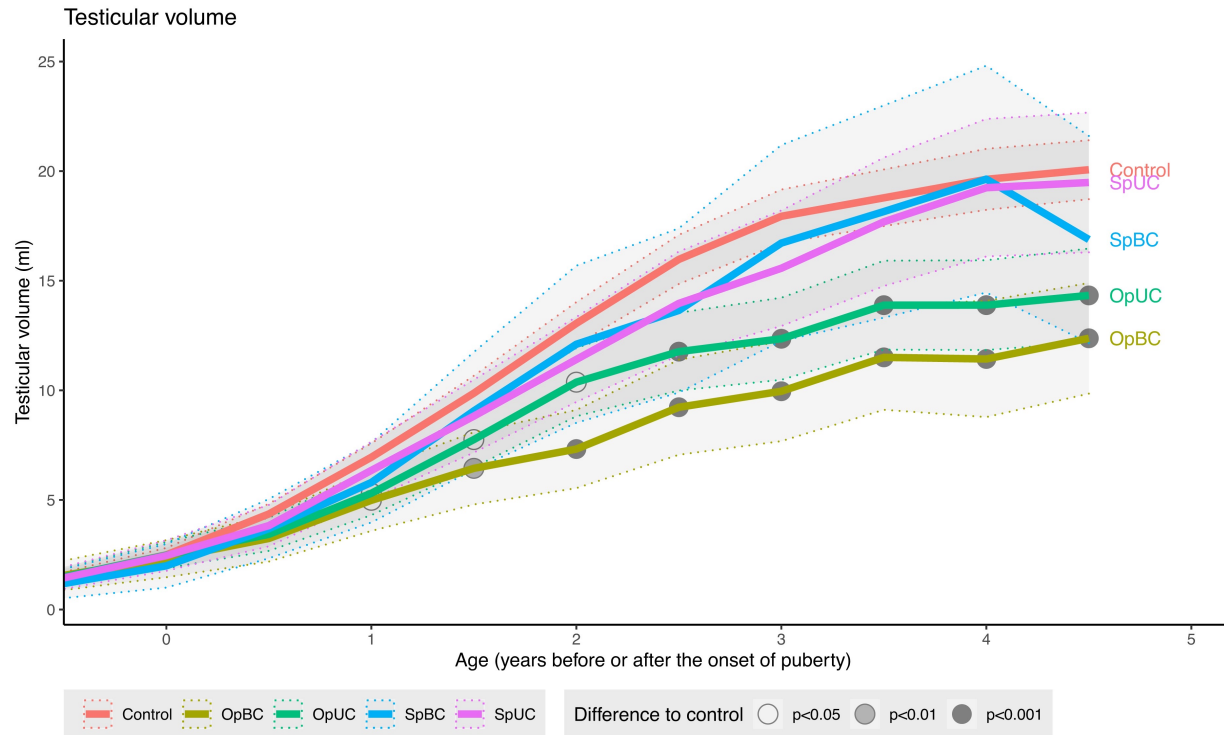
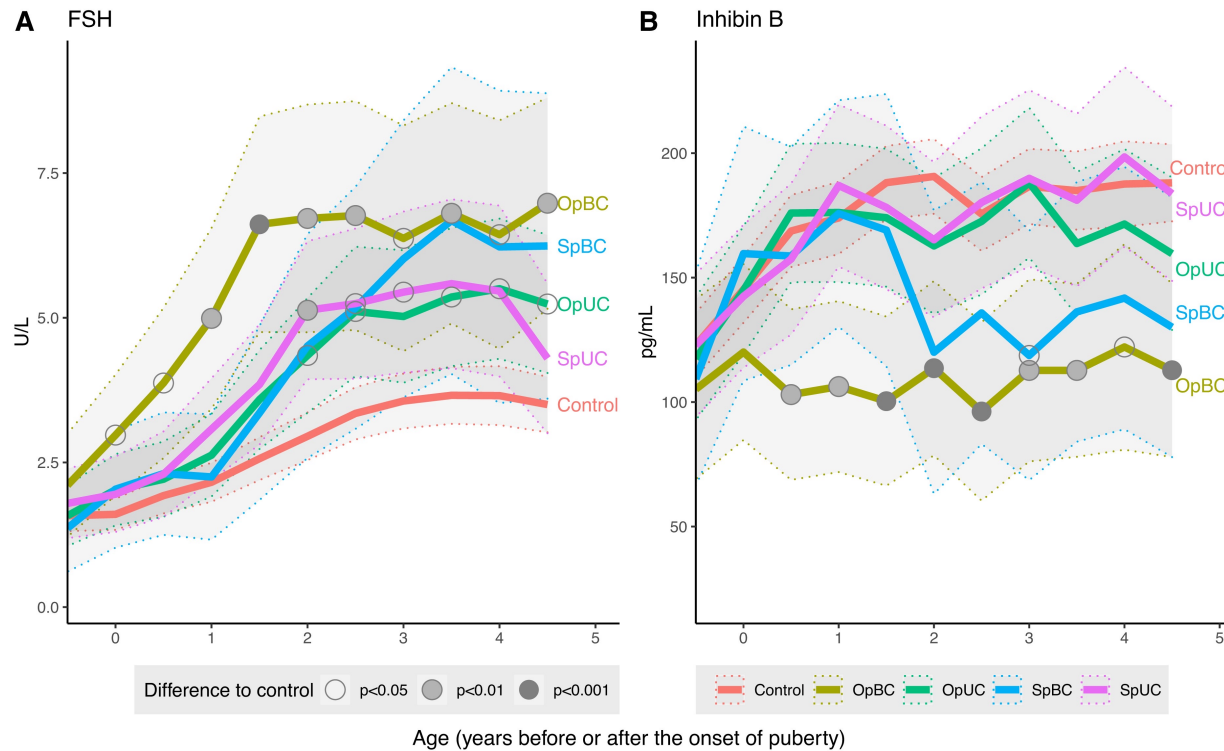


Figure 4. Combined testicular volume (in ultrasonography) of boys in study groups based on age standardized to the ...



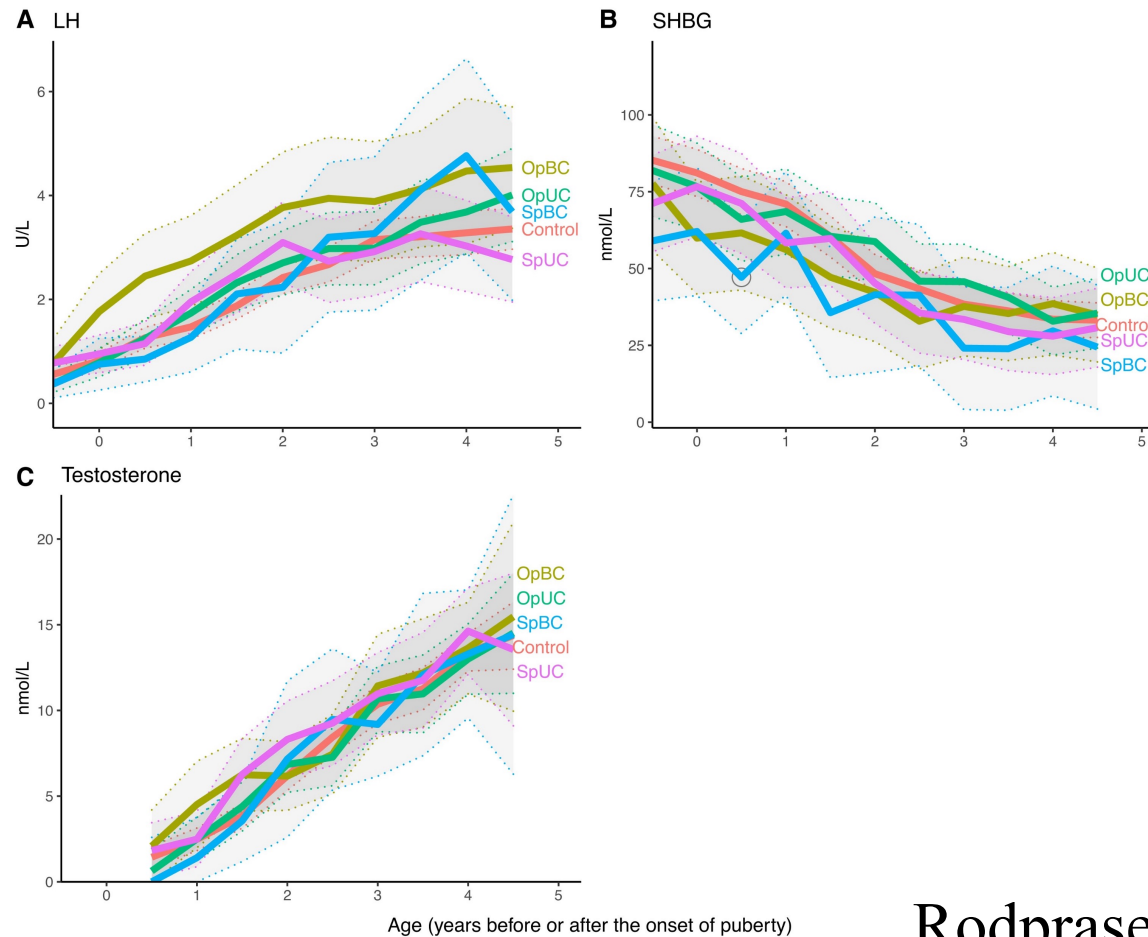
Rodprasert et al. 2022

Figure 1. FSH and inhibin B levels in study groups based on age standardized to the onset of puberty (denoted by 0). ...



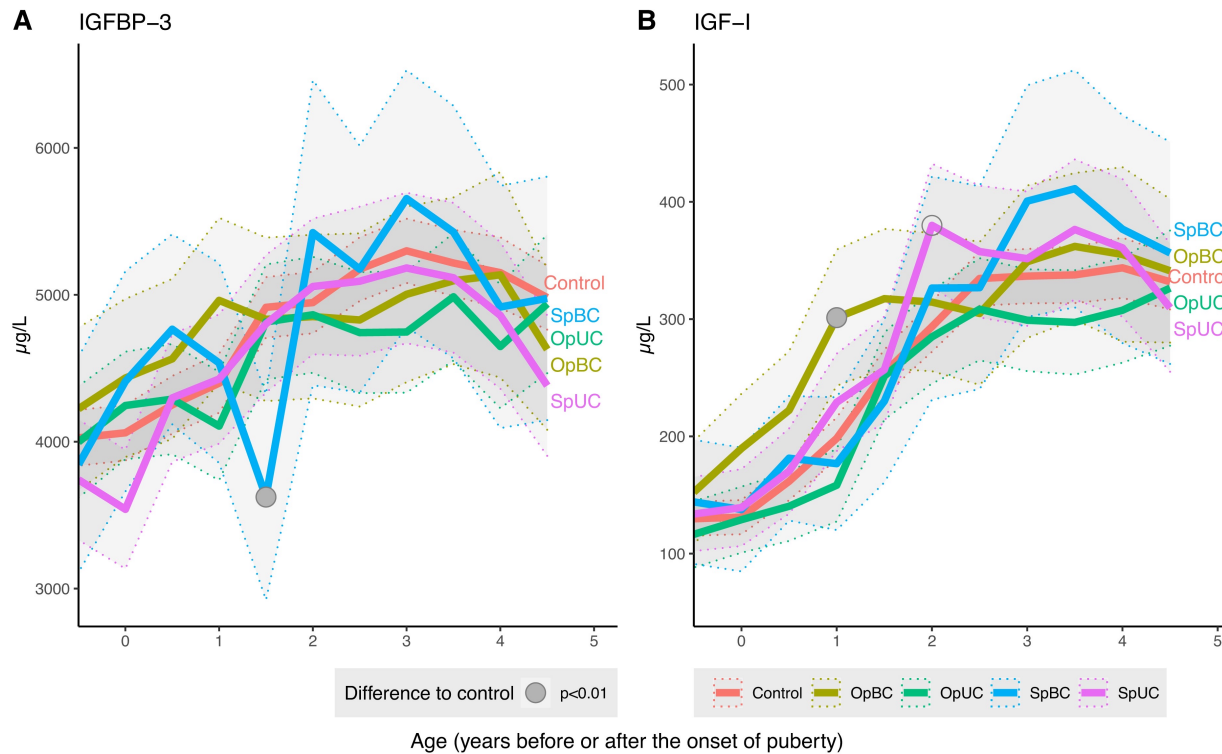
Rodprasert et al. 2022

Figure 2. Luteinizing hormone (LH), total testosterone, and SHBG levels in study groups based on age standardized to ...

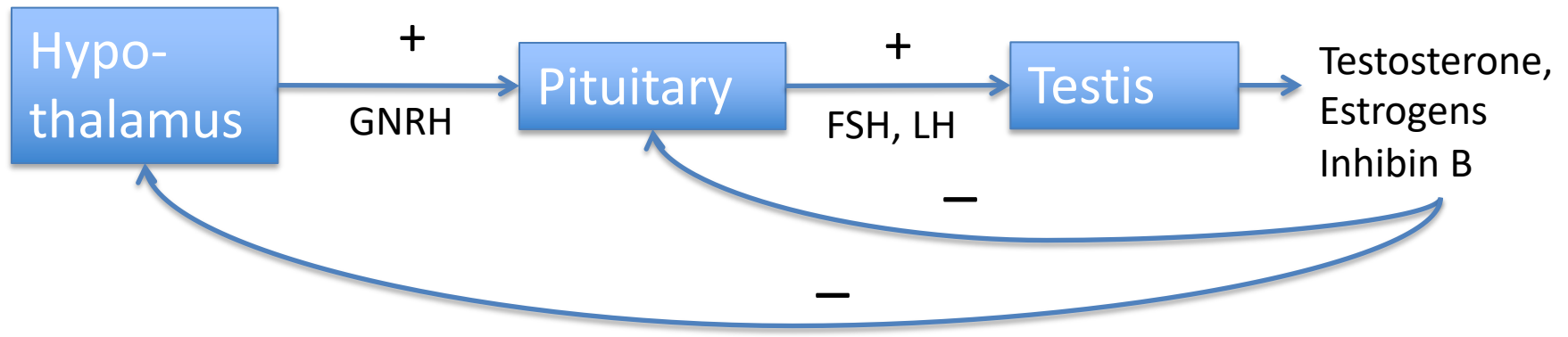


Rodprasert et al. 2022

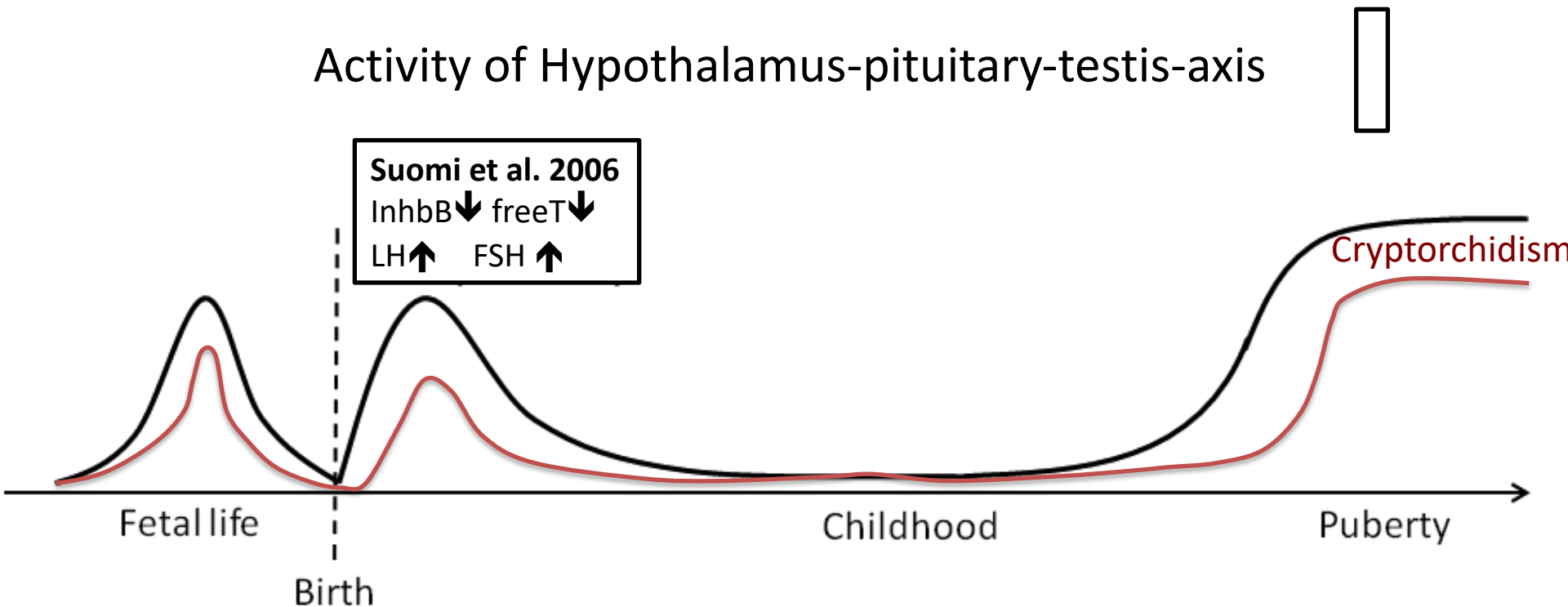
Figure 3. Insulin-like growth factor I (IGF-I) and insulin-like growth factor-binding protein 3 (IGFBP-3) levels in ...



Rodprasert et al. 2022



Activity of Hypothalamus-pituitary-testis-axis



Conclusions

- Testicular growth is compromised in puberty, particularly when orchiopexy has been necessary
- High FSH and low inhibin-B levels through puberty in the boys with past cryptorchidism
- LH and testosterone levels similar

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