

## Appendix A. Supplementary data

The following is the Supplementary data to this article:

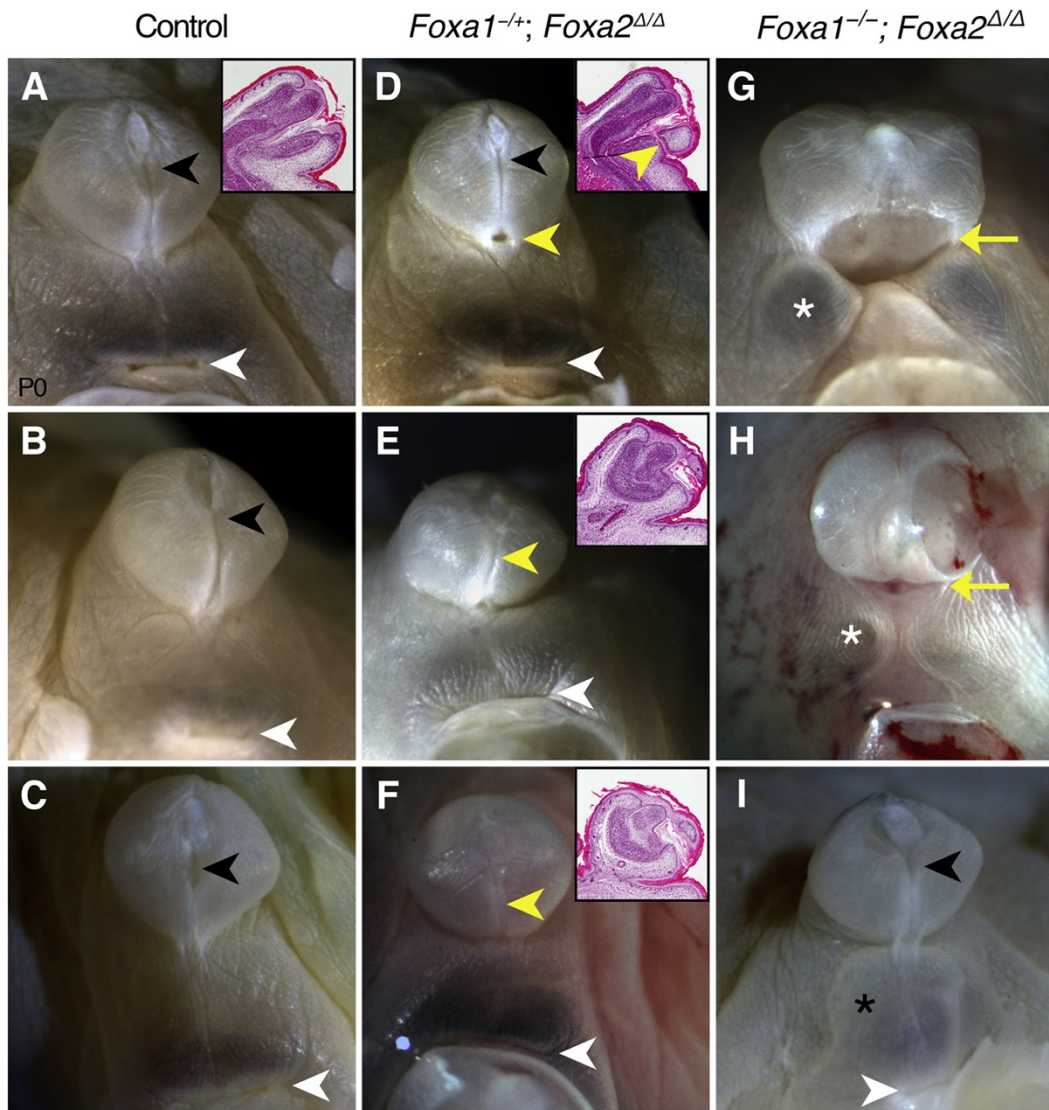


Fig S1. **Variable phenotypes of compound *Foxa1/a2* mutants.** Light micrographs of control (A-C), *Foxa1*<sup>-/+</sup>; *Foxa2*<sup>Δ/Δ</sup> (D-F), and *Foxa1*<sup>-/-</sup>; *Foxa2*<sup>Δ/Δ</sup> (G-I) male external genitalia show that *Foxa1*<sup>-/+</sup>; *Foxa2*<sup>Δ/Δ</sup> mice have urethral tube defects of varying severity and *Foxa1*<sup>-/+</sup>; *Foxa2*<sup>Δ/Δ</sup> mice have persistent cloaca (G, H) with the exception of one mutant that developed a distinct anus (I). A distal urethral meatus (black arrowhead) develops in control mice (A-C and inset in A). *Foxa1*<sup>-/+</sup>; *Foxa2*<sup>Δ/Δ</sup> mice develop either a second (hypospadiac) urethral opening (yellow arrowhead) in addition to the normal distal meatus (D and inset), or an abnormal urethral meatus that is extended (E and inset) or displaced (F and inset) proximally into the ventral prepuce. The most severe persistent cloaca (yellow arrow) of *Foxa1*<sup>-/-</sup>; *Foxa2*<sup>Δ/Δ</sup> mutants is associated with agenesis of the ventral prepuce (G) and bifid scrotum (white asterisks). Other *Foxa1*<sup>-/-</sup>; *Foxa2*<sup>Δ/Δ</sup> mutants with persistent cloaca develop a ventral prepuce and have a single cloacal opening at the base of the penis with bifid scrotum (H). One *Foxa1*<sup>-/-</sup>; *Foxa2*<sup>Δ/Δ</sup> mutant mouse developed distinct urethral and anorectal openings (I) and a hypoplastic scrotum (black asterisk). The sample in panel H was damaged during dissection. Note that embryos shown in the panel A inset, panel D, and panel D inset are shown in figure 2A, 1F, and 2B, respectively.