

**Masculinization-related genes and cell-mass structures during early gonadal differentiation in the African clawed frog *Xenopus laevis***

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The African clawed frog *Xenopus laevis* has a female heterogametic ZZ/ZW-type sex-determining system. Previously my laboratory members discovered a W-linked female sex-determining gene *dm-W* that was involved in ovary formation probably through the up-regulation of the estrogen synthesis gene *cyp19a1*. They also reported that a unique “mass-in-line structure”, which disappears from ZZ gonads during early testicular development, could serve as the base for ovary differentiation in ZW gonads. However, the molecular mechanisms underlying early masculinization including destruction of the mass-in-line structure are poorly understood. To elucidate the development of bipotential gonads into testes after sex determination in this species, I focused on the orthologs of five mammalian sex-related genes: three nuclear factor genes, *dax1*, *sfl* (also known as *ad4bp*), and *sox9*, and two genes encoding members of the tumor growth factor- $\beta$  (TGF- $\beta$ ) family, *anti-Müllerian hormone (amh)* and *inhibin  $\beta$ b (inhbb)*. Quantitative RT-PCR analysis revealed that the expression of *dax1*, *sox9*, *amh*, and *inhbb* or *sfl* was greatly or slightly higher in ZZ than in ZW gonads during early sex development. In situ hybridization analysis revealed that *amh* and *inhbb* mRNAs were expressed in somatic cells on the inner and outer sides of cell masses in the mass-in-line structure, respectively, in the developing ZZ gonads. Because a homodimer of INHBB is called Activin B, I built up a hypothesis that it could function as a deconstruction factor for the mass-in-line structure during construction of primary testicular structure. Then I examined an effect of estrogen, indicating that it repressed the collapse of the mass-in-line structure in developing ZZ gonads. These findings suggest that TGF- $\beta$  signaling is involved in the deconstruction of the mass-in-line structure, which could be maintained by estrogen.