

HD9 – Development of the Kidney and Ureter

Reading:

Gilbert: p460-468

Larsen: p265-277, 293-295

Learning Objectives:

KIDNEY DEVELOPMENT

Know the 3 major cellular compartments of the kidney (ureteric bud, nephron progenitor and stroma) and what they form

Understand what reciprocal induction means

Understand how the collecting duct system forms

Know what a ureteric bud is

Understand how nephrons form, and what the basic stages of nephron differentiation are

Know that Ret-Gdnf signaling controls branching morphogenesis

Know the distribution of Ret, Gdnf and the co-receptor Gfra1

Know the phenotypes of Ret mutants

Know that vitamin A (retinoids) secreted from stromal cells control Ret expression in ureteric bud tips

Know the function of Notch-2 in nephron differentiation

LOWER URINARY TRACT DEVELOPMENT:

Understand the difference between physical and functional obstruction

Know what hydronephrosis means

Know what vesicoureteral reflux means

Understand the Mackie-Stephens hypothesis

Understand how the bladder and urethra form

Understand how the ureteral valve works

Know what the trigone is, and its significance for ureteral valve function

Know what uroplakins are, and the phenotype of uroplakin-3 knockout mice

Know what peristalsis is

Understand the old and new models of ureter insertion