

## Renal Vignettes

### Potassium Regulation- Response to Increased Dietary K+ Intake

HUMAN vignettes are brief, highly targeted exercises aimed at reinforcing single basic physiological points. The student may then continue to explore by further modifying the experimental design as they wish.

Final K<sup>+</sup> balance is largely achieved by regulation of the K<sup>+</sup> secreting aldosterone sensitive principal cells of the late distal and cortical collecting tubules. These cells reabsorb Na<sup>+</sup> in exchange for K<sup>+</sup> secretion and are under aldosterone regulation

Below we increase dietary K<sup>+</sup> intake by 3X and then monitor the K<sup>+</sup> excretion response to determine the effectiveness of excretory response. [Further discussion of this topic can be found in Guyton 365-71 and accompanying figs. ].

Below please find the experimental protocol to carry out this investigation. [Note well that *you should understand each of the variables employed*; use Help info on: or from a Help screen pick the View summary of [all variables](#) link.]

**View Output:**  
EXK  EXNA  EXBIC  ALDO  PK  GFR   
as: graph  graph  text  graph  graph  text

**Experiment Controls**

Change Variable	Enter New Value	Info on Variable
DIETK <input type="text"/>	180 <input type="text"/>	60 mEq/Day <input type="text"/>
Choose <input type="text"/>	<input type="text"/>	<input type="text"/>

Run Experiment:  
for 24h minutes at 1h minute intervals.

**Help**

Help info on: DIETK

Tips: Control Dietary Intake

**View**

Variable Value: Choose

Patient Charts or Lab tests:  
Choose One

Graph Style Size: 600

Normalized, one graph

Characterize how well the kidney is handling the increased K<sup>+</sup> intake (EXK, PK). Account for the changes in EXNA and ALDO. What percentage of the mass flow into the nephrons of K (GFR\*PK) is being eliminated? How much is therefore being secreted? Has it risen from the baseline value? Note: you could extend this experiment to > 24 hour period to evaluate the effectiveness of the longer term response. Also note that EXBIC can be used as an indicator of H<sup>+</sup> excretion/retention provided PCO<sub>2</sub> remains fairly constant. A decrease indicates MORE acid is being excreted.