

## Optimising dialysis for the patient with heart failure



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## Dialysing patients with heart failure



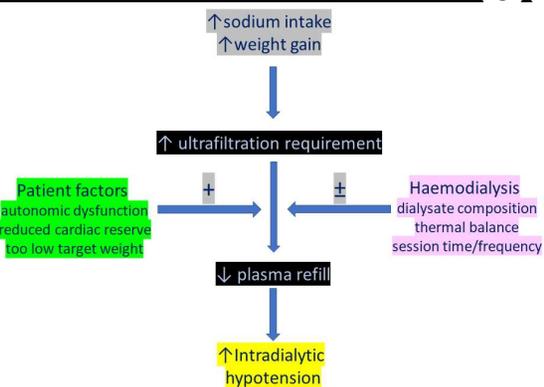
### Volume management

#### Objectives

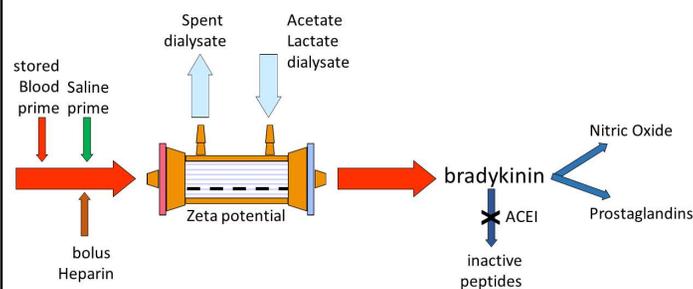
- maintain cardiac filling pressures
- preserve cardiac perfusion
- prevent arrhythmias

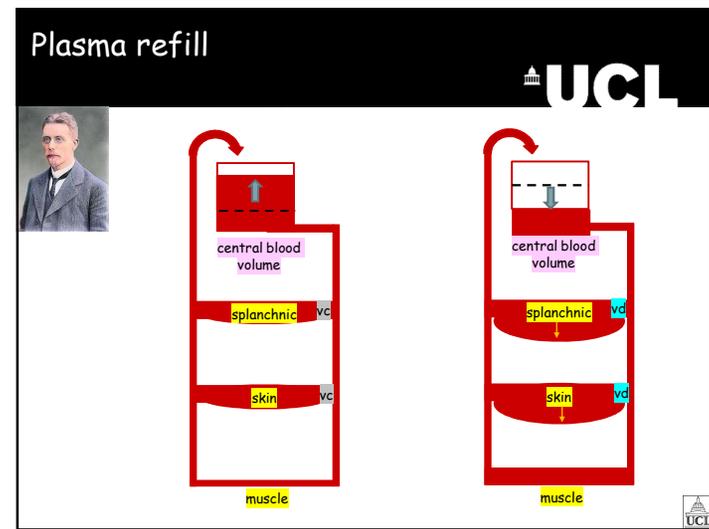
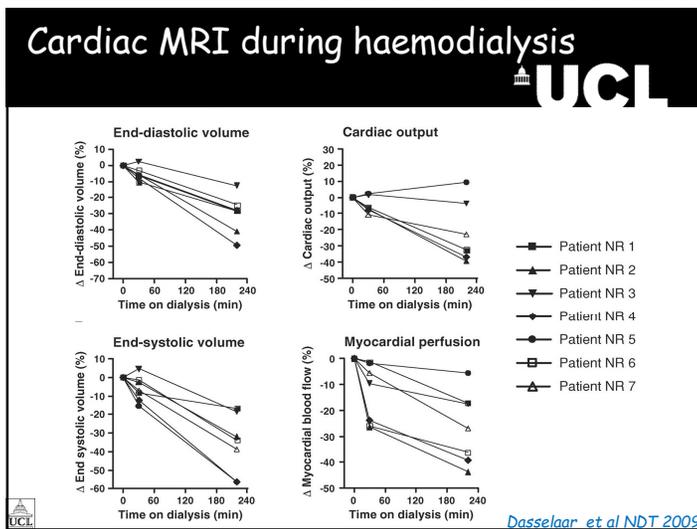
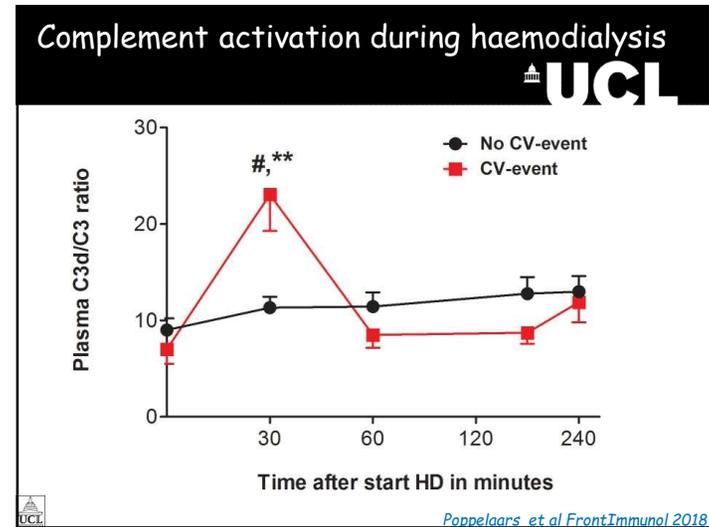
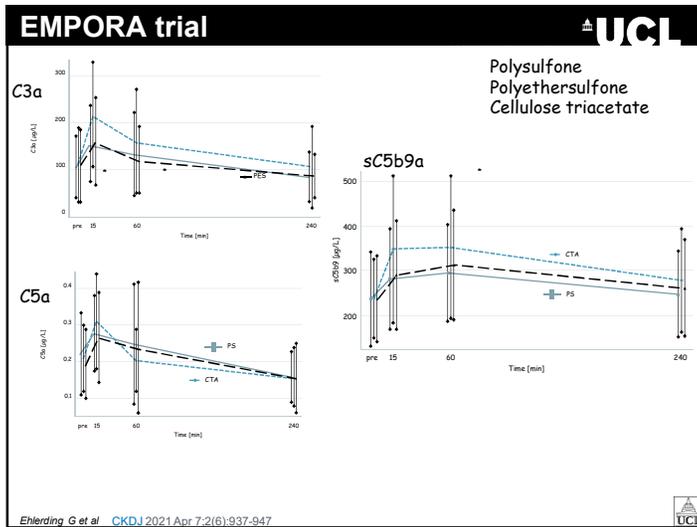


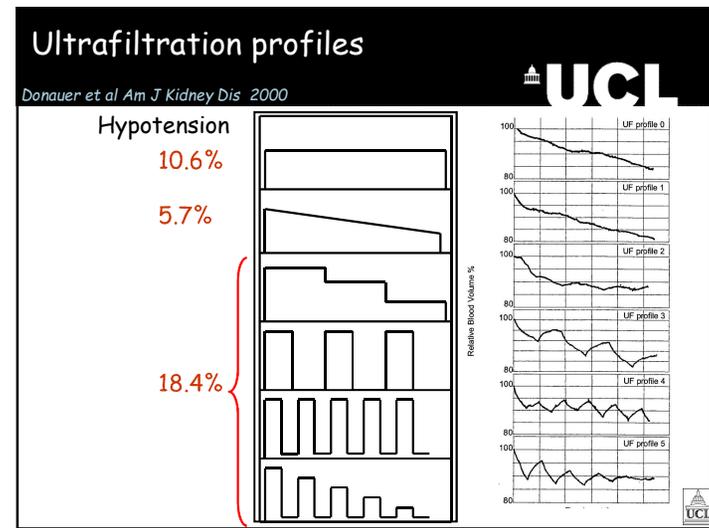
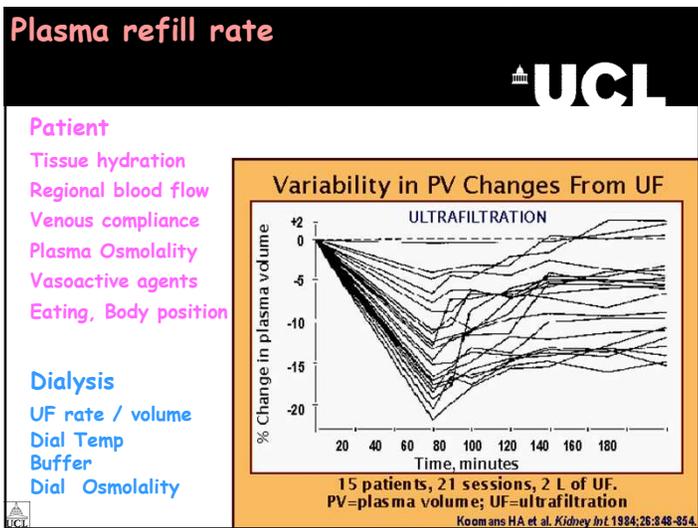
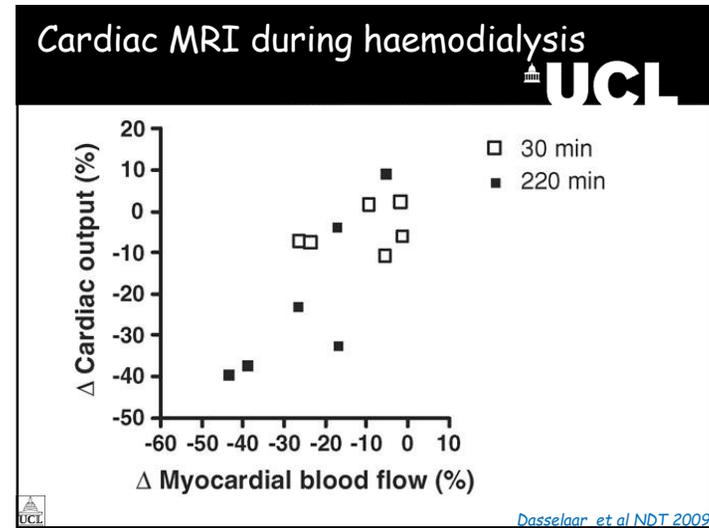
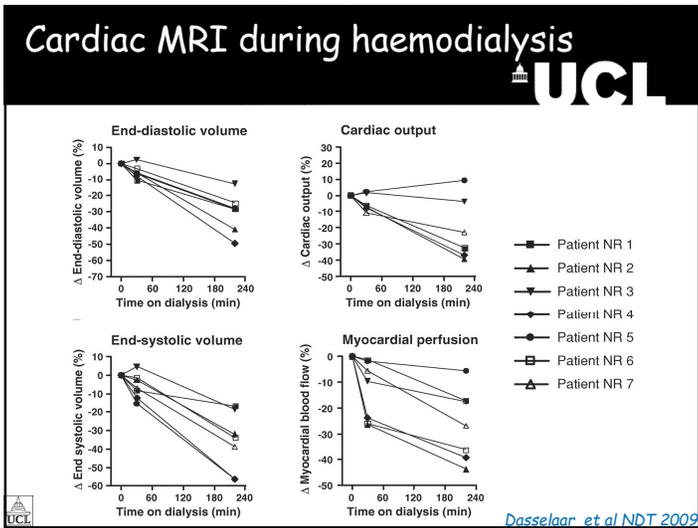
## Patient education

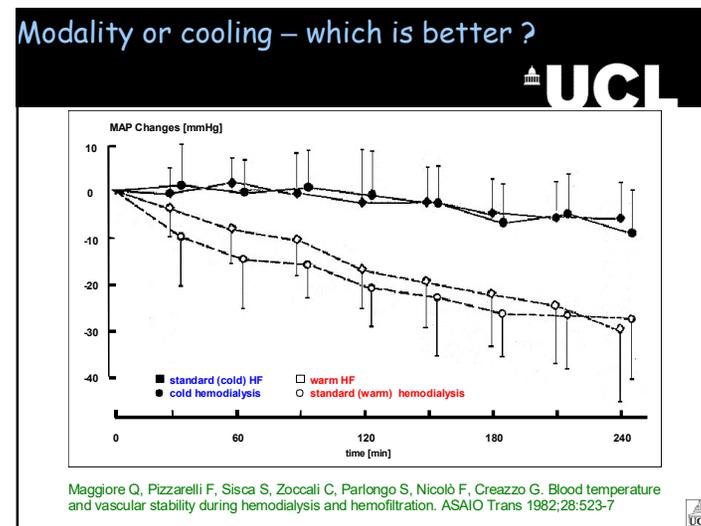
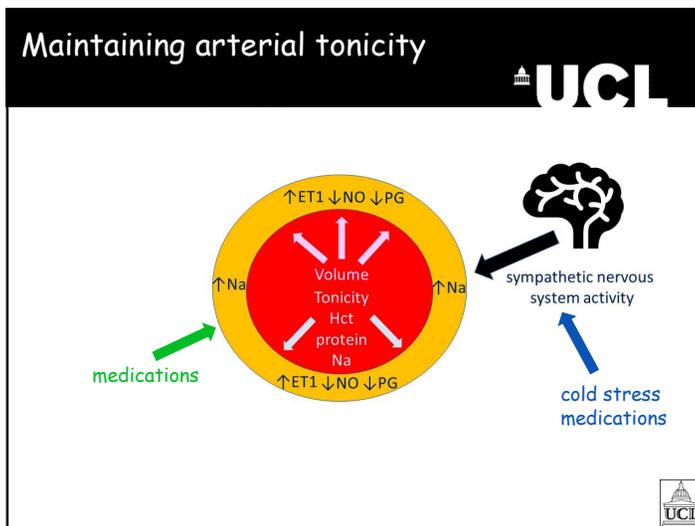
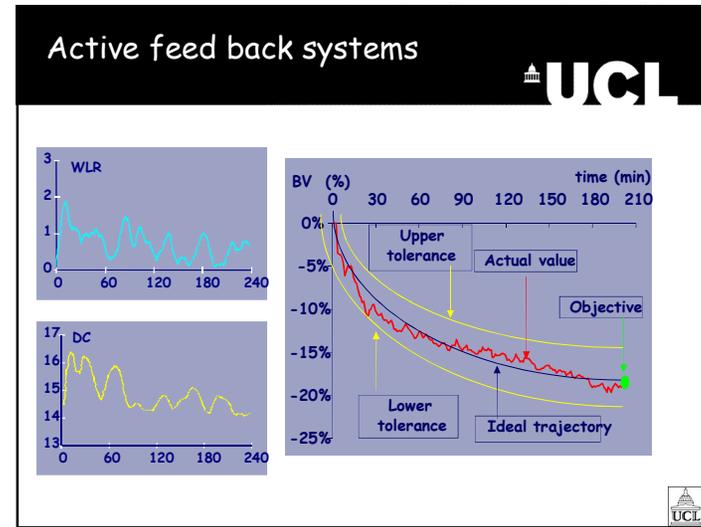
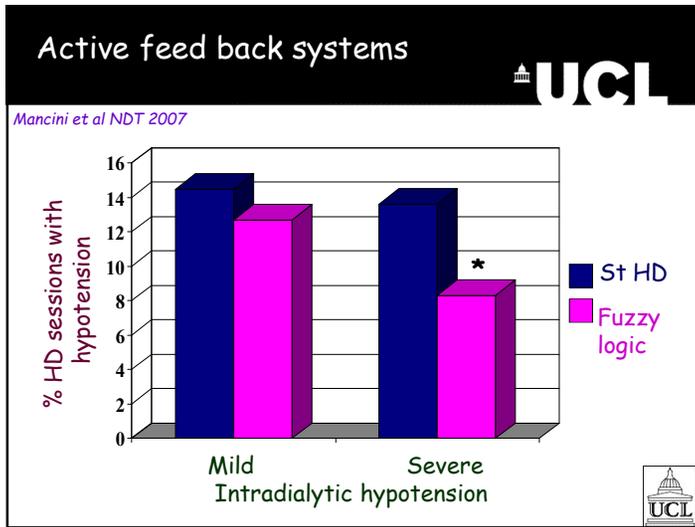


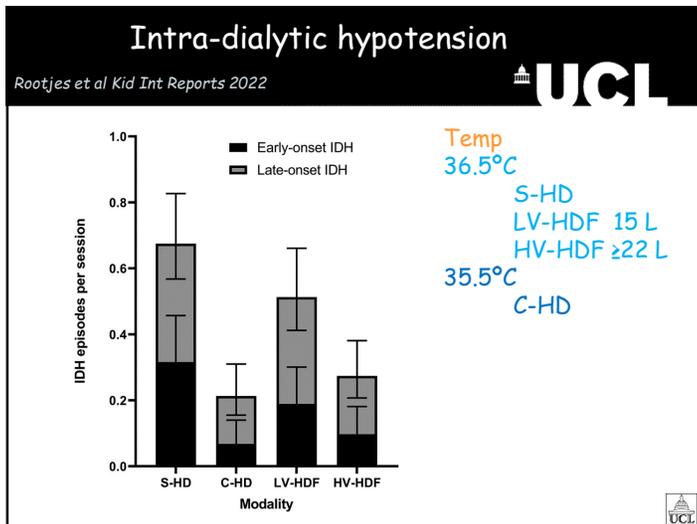
## Vasodilatation due to dialysis







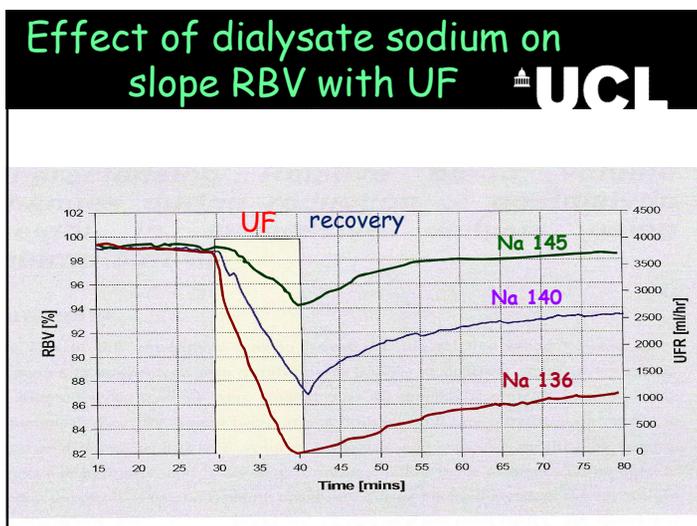




### Thermal energy balance and dialysis

modality	Change core Temp °C	Energy Transfer W	Max change MAP mmHg	Change RBV %
HD 37.5 °C	0.38 ±0.22	-3.53 ±6.4	-25.6 ±13.5	-7.3 ±5.0
HD 35.5 °C	0.0 ±0.29	-26.6 ±5.3	-15.1 ±13.8	-9.8 ±4.8
HDF 1.0 L/h 37.5 °C	0.29 ±0.23	-15.9 ±6.9	-23.0 ±14.0	-9.1 ±6.1
HDF 2.5 L/h 37.5 °C	-0.1 ±0.40	-25.3 ±7.9	-19.2 ±17.7	-9.8 ±6.5

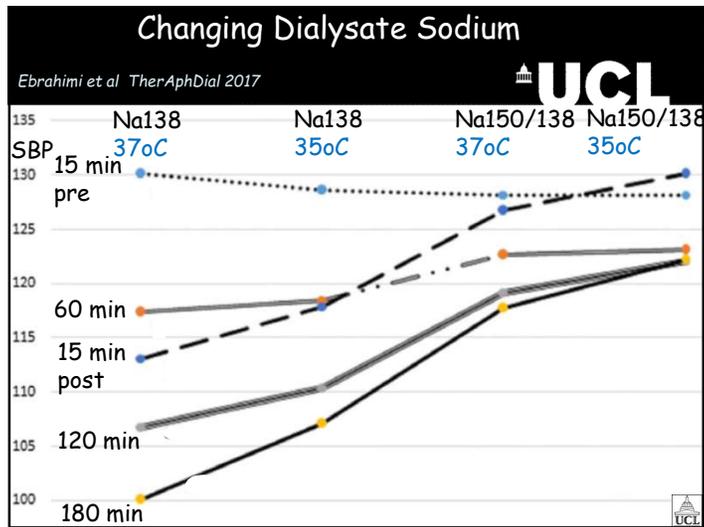
VanderSande et al JASN2001



### The importance of serum sodium

#### Osmotic or oncotic equivalents

- Change in serum Na 1.0 mmol/L
  - Urea 6 mg/dL (2 mmol/L)
  - Serum protein 10 g/dL

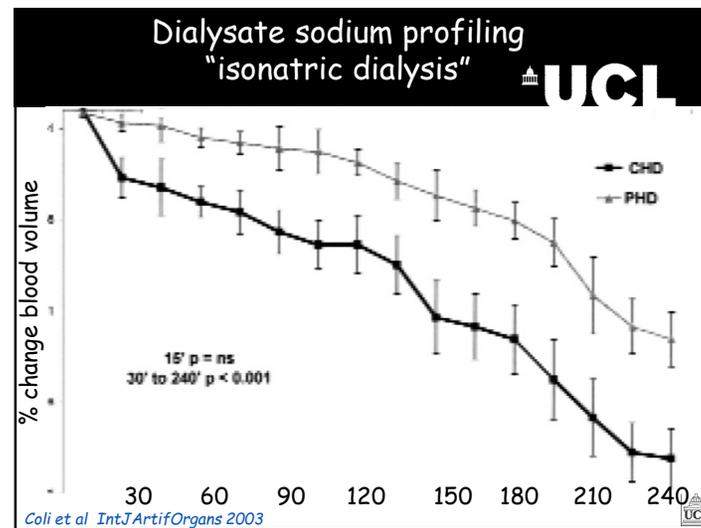
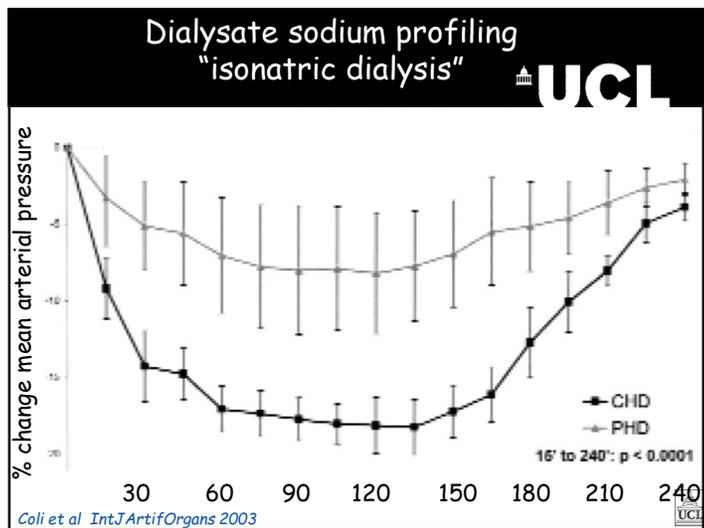


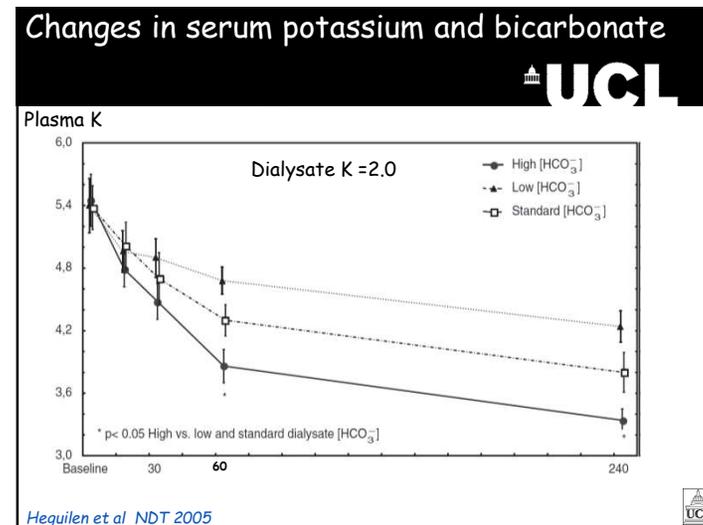
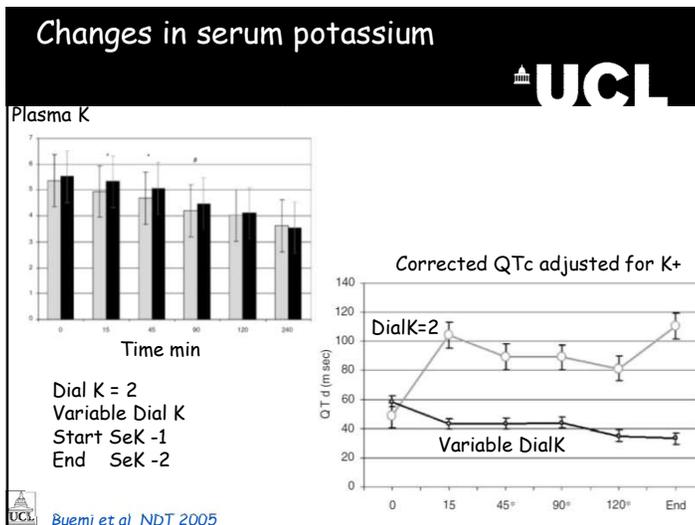
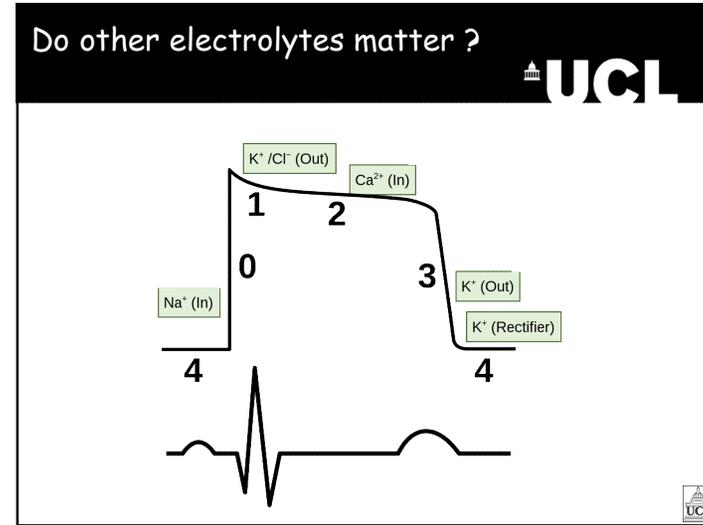
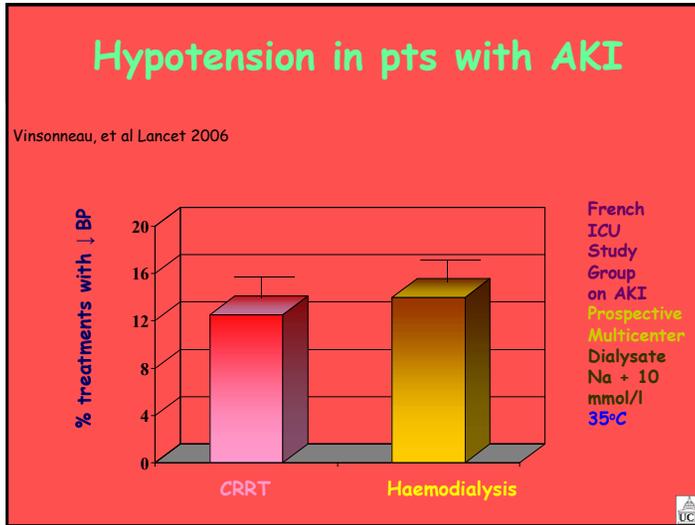
### Aiming for no change in serum sodium

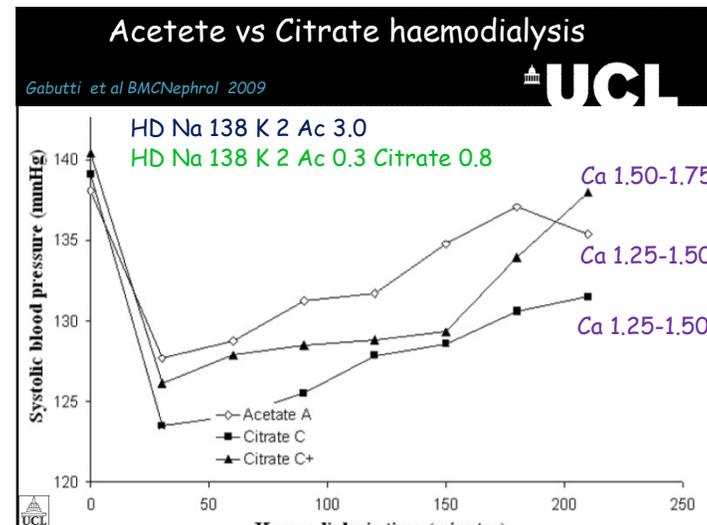
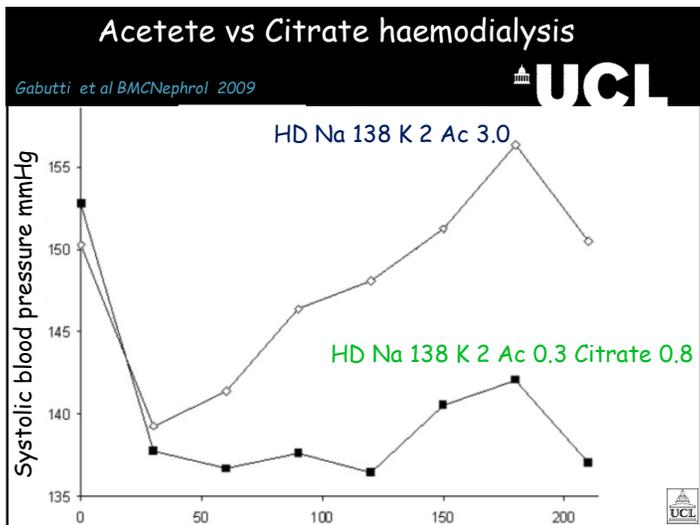
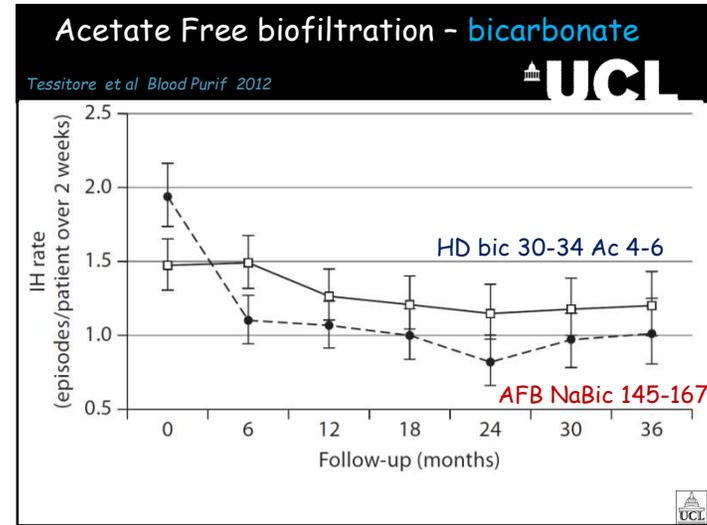
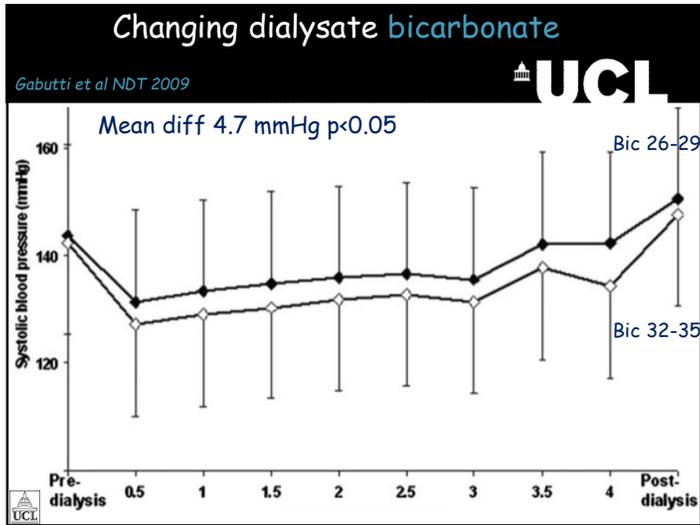
concept - isonatric dialysis

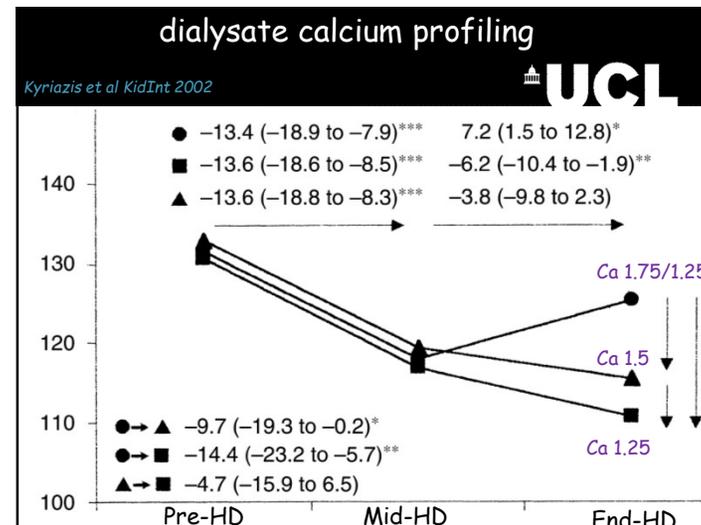
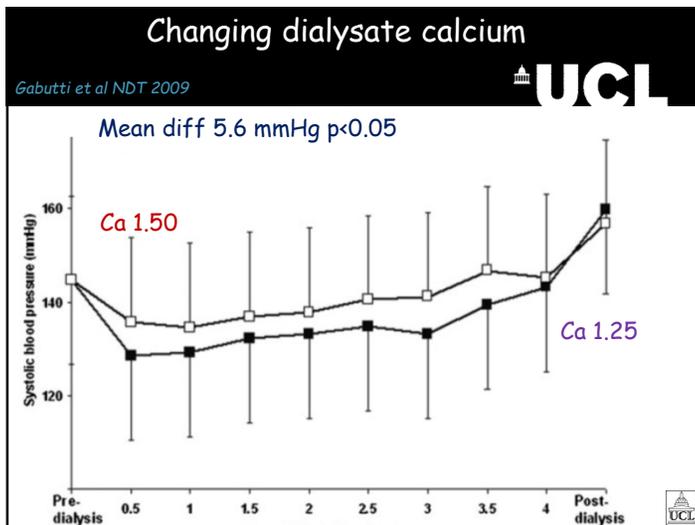
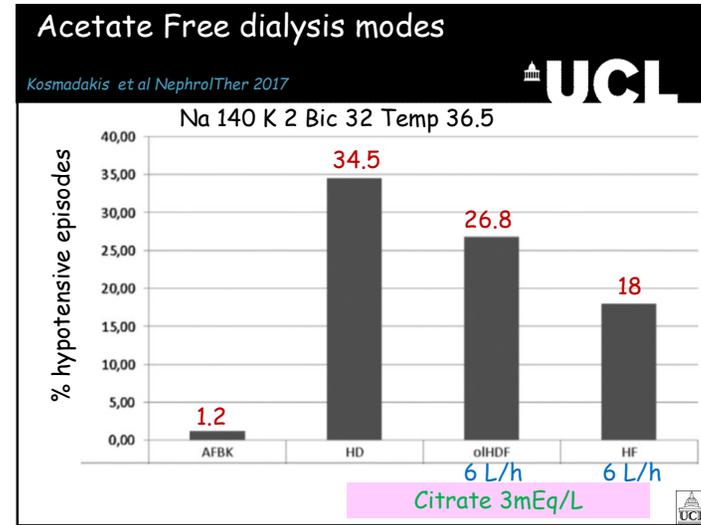
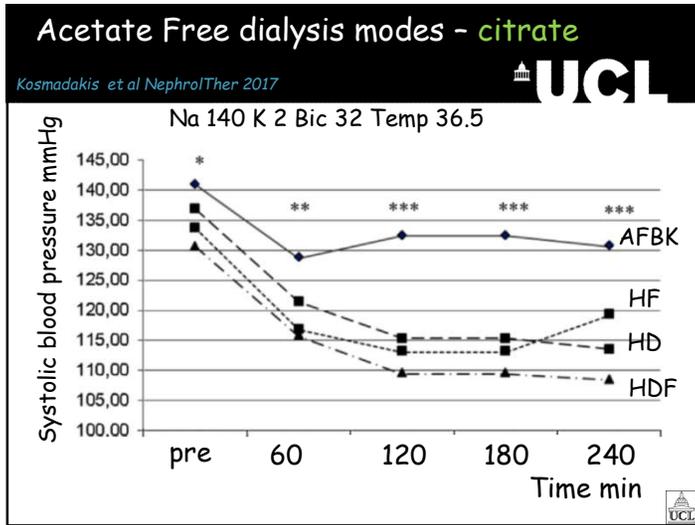
- Pre HD Na  $\approx$  post HD Na
- Dialysate Na =  $AvSeNa \times 0.95$
- Reduced IDWt gain
  - $2.9 \pm 0.3$  to  $2.3 \pm 0.9$  kg (%  $4.7 \pm 1.2$  to  $3.8 \pm 1.0$ )
- Reduced IDH
  - 9% to 2%

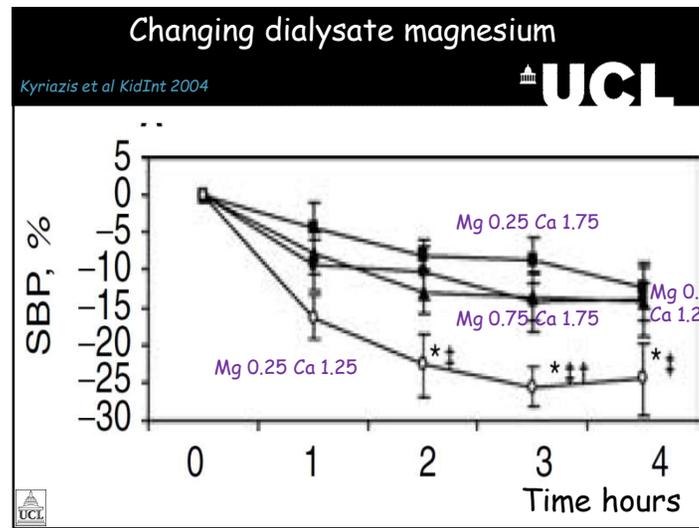
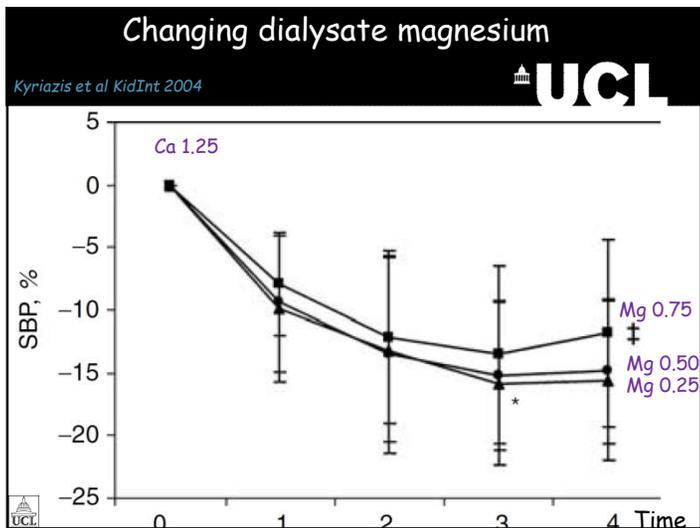
DePaula et al KidInt 2004











### How can we reduce intra-dialytic hypotension ?

- reduce intra-dialytic weight gains
- regular review target weight
- maintain plasma tonicity

- Dialysate
  - ❖ higher dialysate sodium
  - ❖ thermal energy loss/predilution HDF
  - ❖ acetate free biofiltration/lower bicarbonate
  - ❖ potassium/calcium/magnesium