Le potassium

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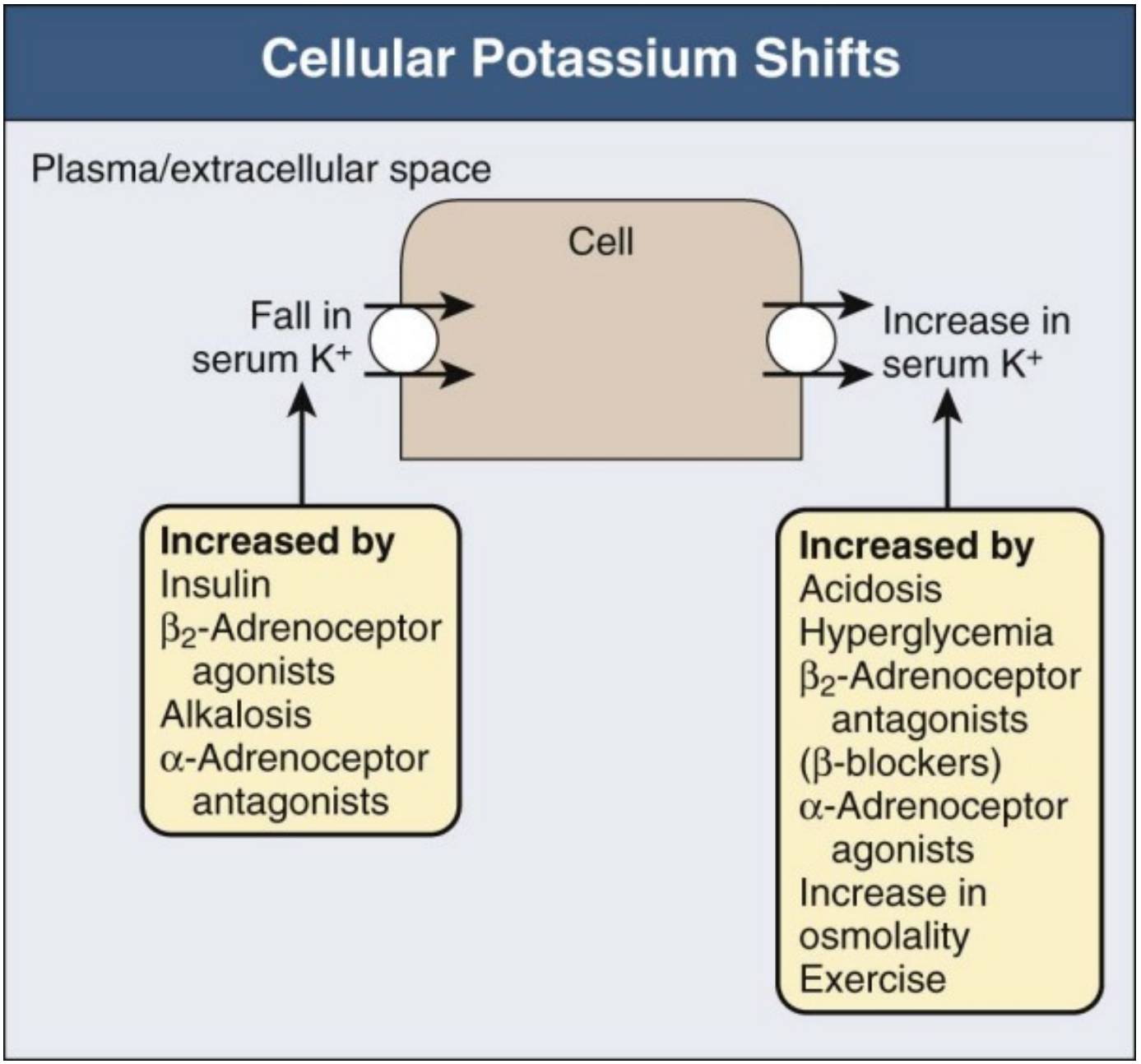
Distribution of Total Body Potassium in Organs and Body Compartments

Organs and Compartments		Body Compartment Concentrations	
Muscle	2650 mmol	Intracellular concentration	150 mmol/l
Liver	250 mmol	Extracellular concentration	4 mmol/l
Interstitial fluid	35 mmol		
Red blood cells	35 mmol		
Plasma	15 mmol		


Cellular Potassium Shifts
Plasma/extracellular space
Cell
Fall in serum K+
Increase in serum K+
Increased by
Insulin
β2-Adrenoceptor agonists
Alkalosis
α-Adrenoceptor antagonists
Increased by
Acidosis
Hyperglycemia
β2-Adrenoceptor antagonists (β-blockers)
α-Adrenoceptor agonists
Increase in osmolality
Exercise

HYPERKALIEMIE
étiologies

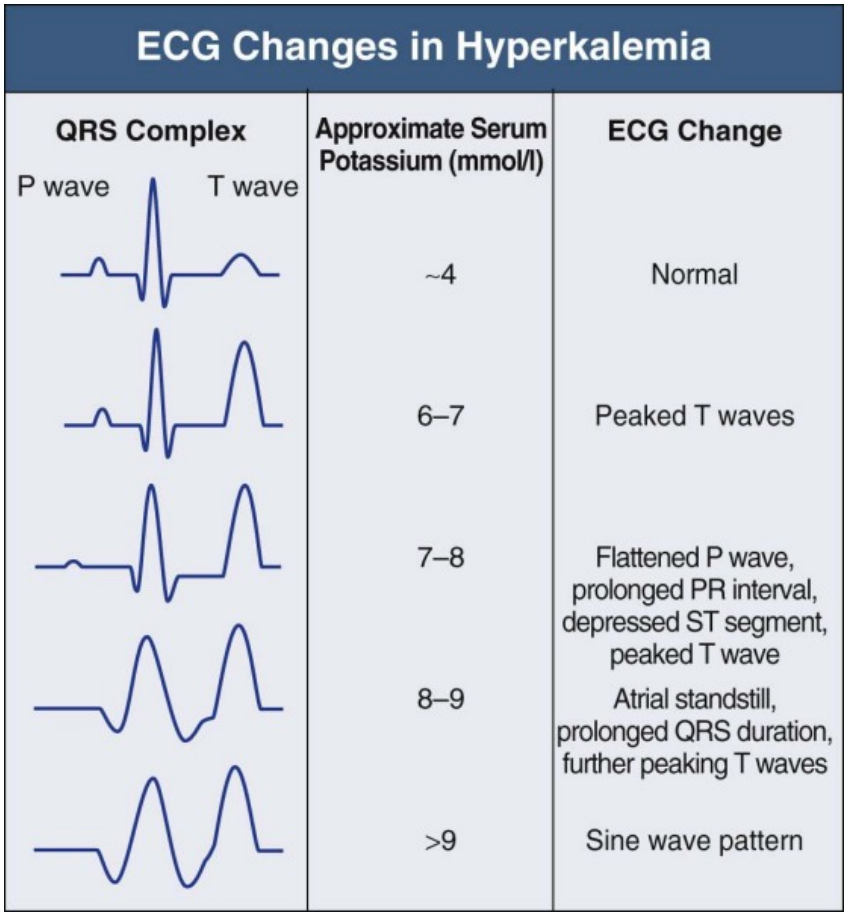
- Libération excessive de K par les cellules
  - Acidose
  - Lyse tumorale
  - Rhabdomyolyse
  - Déficit en insuline
- Diminution de l'élimination rénale
  - Insuffisance rénale chronique
  - Médicaments
  - Hypo cortisisme <> hypo aldostéronisme

Medications Associated with Hyperkalemia

Class	Mechanism	Example
Potassium-containing medicines	Increased potassium intake	KCl, PCN G, PolyCitra, PolyCitra K
β-Adrenergic receptor blockers	Inhibit renin release	Propranolol, metoprolol, atenolol
ACE inhibitor	Inhibit conversion of angiotensin I to Ang II	Captopril, lisinopril
Angiotensin receptor blocker (ARB)	Inhibit activation of AT_1 receptor by Ang II	Losartan, valsartan, irbesartan
Heparin	Inhibit aldosterone synthase, rate-limiting enzyme for aldosterone synthesis	Heparin sodium
Aldosterone receptor antagonist	Block aldosterone receptor activation	Spironolactone, eplerenone
Potassium-sparing diuretic	Block collecting duct apical sodium channel, decreasing gradient for potassium secretion	Amiloride, triamterene; certain antibiotics, specifically trimethoprim and pentamidine
NSAID and COX-2 inhibitors	Inhibit prostaglandin stimulation of collecting duct potassium secretion; inhibit renin release	Ibuprofen
Digitalis glycosides	Inhibit Na^+, K^+-ATPase necessary for collecting duct potassium secretion	Digoxin
Calcineurin inhibitors	Inhibit Na^+, K^+-ATPase necessary for collecting duct potassium secretion	Cyclosporine, tacrolimus

HYPERKALIEMIE
Manifestations cliniques

- Asymptomatique
- Fatigue
- Faiblesse musculaire
- Troubles respiratoires par paralysie du diaphragme
- Troubles ECG



HYPERKALIEMIE
Traitement

- Corriger la cause : arrêt des médicaments impliqués

- Hyperkaliémie modérée
  - Diurétique de l'anse
  - Chélateur de potassium (PO vs IR)
  - Conseils alimentaires

- Hyperkaliémie sévère (> 6.5 mmol/l)
  - Monitoring cardiaque
  - Gluconate calcique : stabilisateur membranaire
  - Glucosé / Insuline
  - B2 mimétique
  - Bicarbonate de sodium
  - Dialyse

Treatment of Hyperkalemia

Mechanism	Therapy	Dose	Onset	Duration
Antagonize membrane effects	Calcium	Calcium gluconate, 10% solution, 10 ml IV over 10 min	1–3 min	30–60 min
Cellular potassium uptake	Insulin	Regular insulin, 10 U IV, with dextrose, 50%, 50 ml if plasma glucose <250 mg/dl	30 min	4–6 h
	β_2-Adrenergic agonist	Nebulized albuterol, 10 mg	30 min	2–4 h
Potassium removal	Sodium polystyrene sulfonate	Kayexalate, 60 g PO, in 20% sorbitol, or 60 g in 250 ml water, per retention enema	1–2 h	4–6 h
	Hemodialysis	—	Immediate	Until dialysis completed

HYPOKALIEMIE
Manifestations cliniques

- Adynamie - fatigue – constipation
- Paralysie musculaire – troubles respiratoires
- Arythmie cardiaque
- Rénale
  - Fibrose tubulo-interstitielle et formation kystiques
  - polyurie

HYPOKALIEMIE
Etiologies

- Pertes non-rénales
  - Vomissements et diarrhée (anorexique ++)
- Pertes rénales
  - Médicaments
  - Hyperaldostéronisme
- Anomalie du transport intra-rénal
  - Syndrome de Bartter
  - Syndrome de Gitelman

HYPOKALIEMIE ET MEDICAMENTS

- Pertes accrues de potassium
  - Diurétiques : thiazides et diu de l'anse
  - Corticostéroïdes
  - Laxatifs
  - …
- Accumulation cellulaire
  - Sympathicomimétiques : bronchodilatateur, tocolytiques, vasoconstricteurs
  - Xanthines
  - …

HYPOKALIEMIE
Traitement

- Supplément : chlorure de potassium
  - IV en cas d'hypokaliémie sévère
  - PO en cas d'hypokaliémie modérée
    - Solution : Ultra K
    - Comprimés : Kallium durette

- Si hypokaliémie liée aux diurétiques :
  - Association avec un diu d'épargne potassique.