

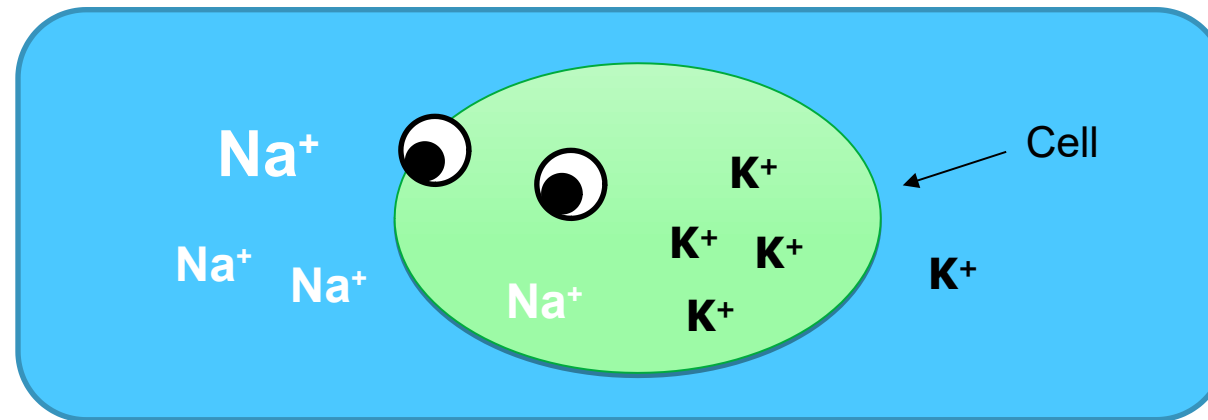
Electrolytes disturbances – Na, K

Martin Janků

Learning outcomes

- Student identifies Na & K disturbance
- Student names symptoms and possible causes of these disturbances
- Student is able to discuss the basic principles of Na & K disturbances therapy

The norm



Na^+

135-145 mmol/l

Mostly extracellular

Hydratation

K^+

3,5-5,3 mmol/l

Mostly intracellular

pH

Hyponatremia

!Correction too fast – pontine myelinolysis risk!

Na < 135 mmol/l

Na < 125mmol/l → symptoms (neuromuscular, CNS)

○ muscle weakness

Diff. diagnostics, careful treatment (p.o./IV)

○ nausea

○ vomiting

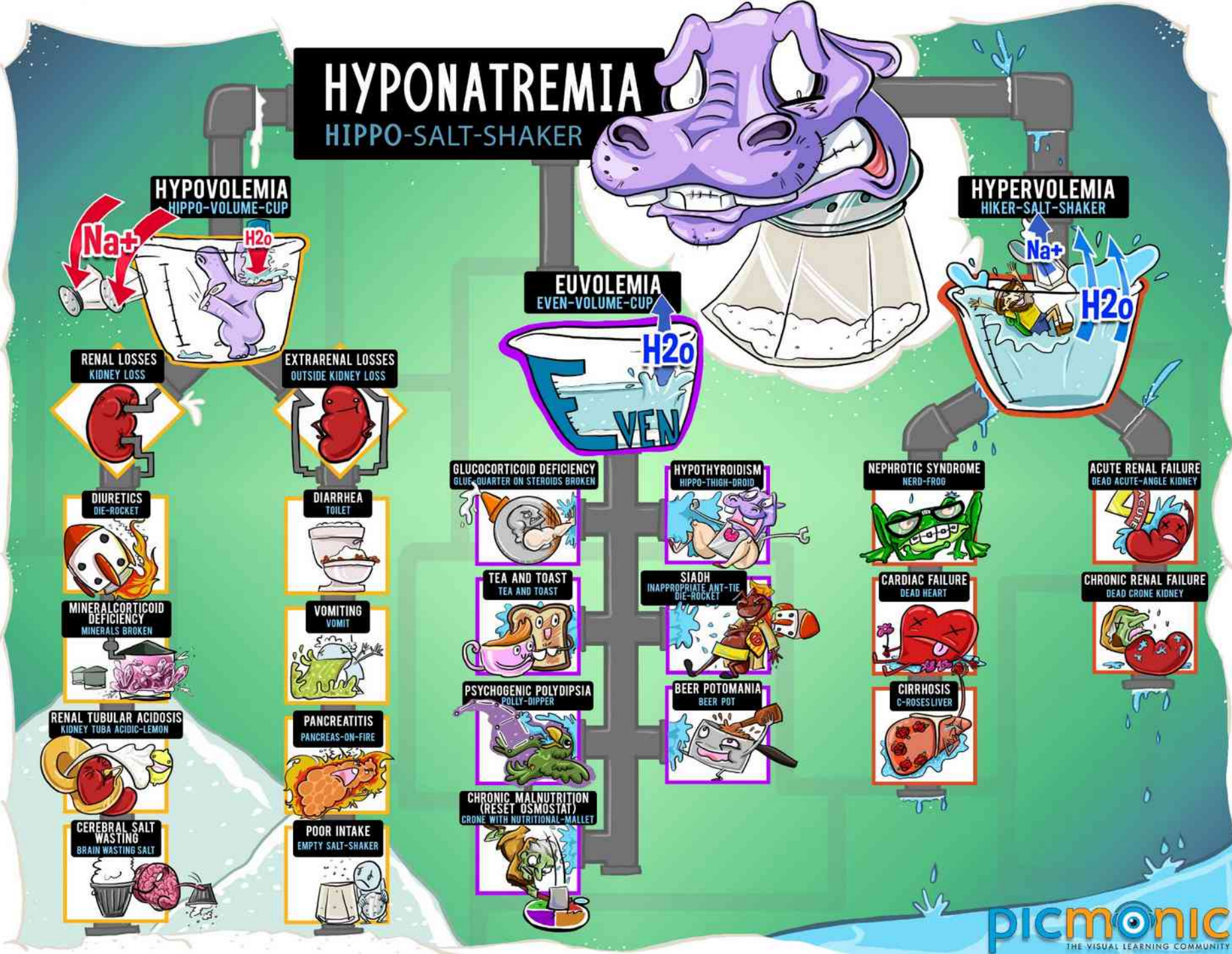
Aggressive treatment – 3%NaCl IV → till sympt. subside

○ loss of consciousness, cramps

+

causal therapy (eg.)

- water restriction
- thiazide withdrawal



Hypernatremia

Na > 145mmol/l → **symptoms** (thirst → confusion, nausea)

Na > 155mmol/l → higher mortality rates

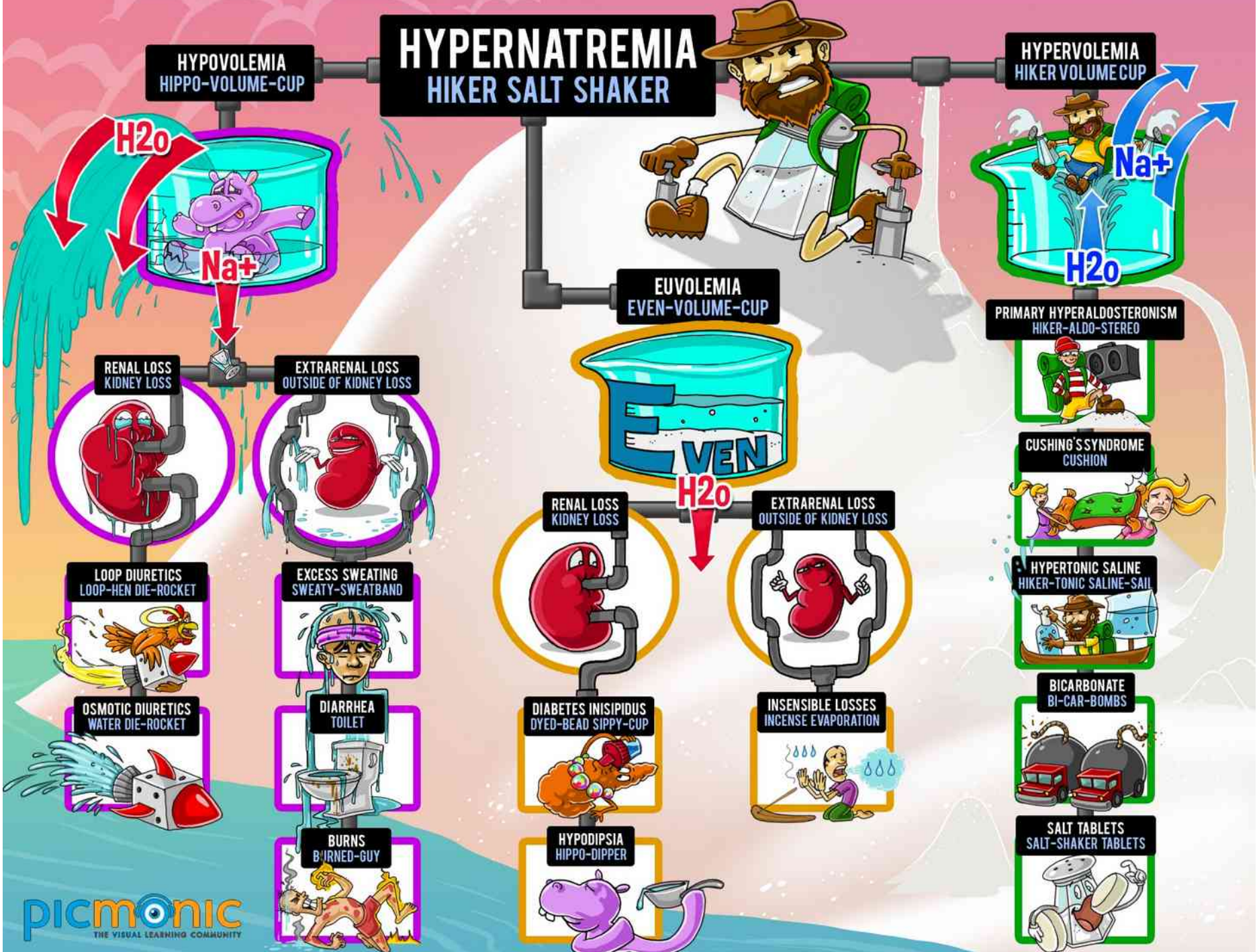
Therapy – free water substitution

• p.o. / 5%G / N/S ½

Deficit H₂O = CTV (1-140/S Na⁺)

(CTV = *men* 0,6 x BW, *women* 0,5 x BW)

• slowly – max. ↓Na by 0,5mmol/l/h

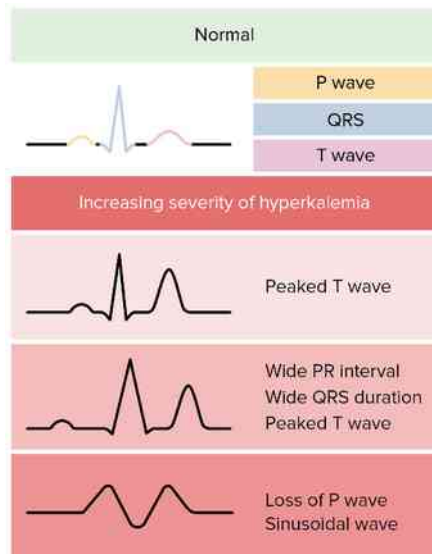


Hyperkalemia

⦿ $K > 5,6 \text{ mmol/l} \rightarrow$ **symptoms**

⦿ cardio


- ⦿ ECG
- ⦿ arrhythmias
- ⦿ bradycardia
- ⦿ muscle weakness
- ⦿ paresthesias
- ⦿ confusion

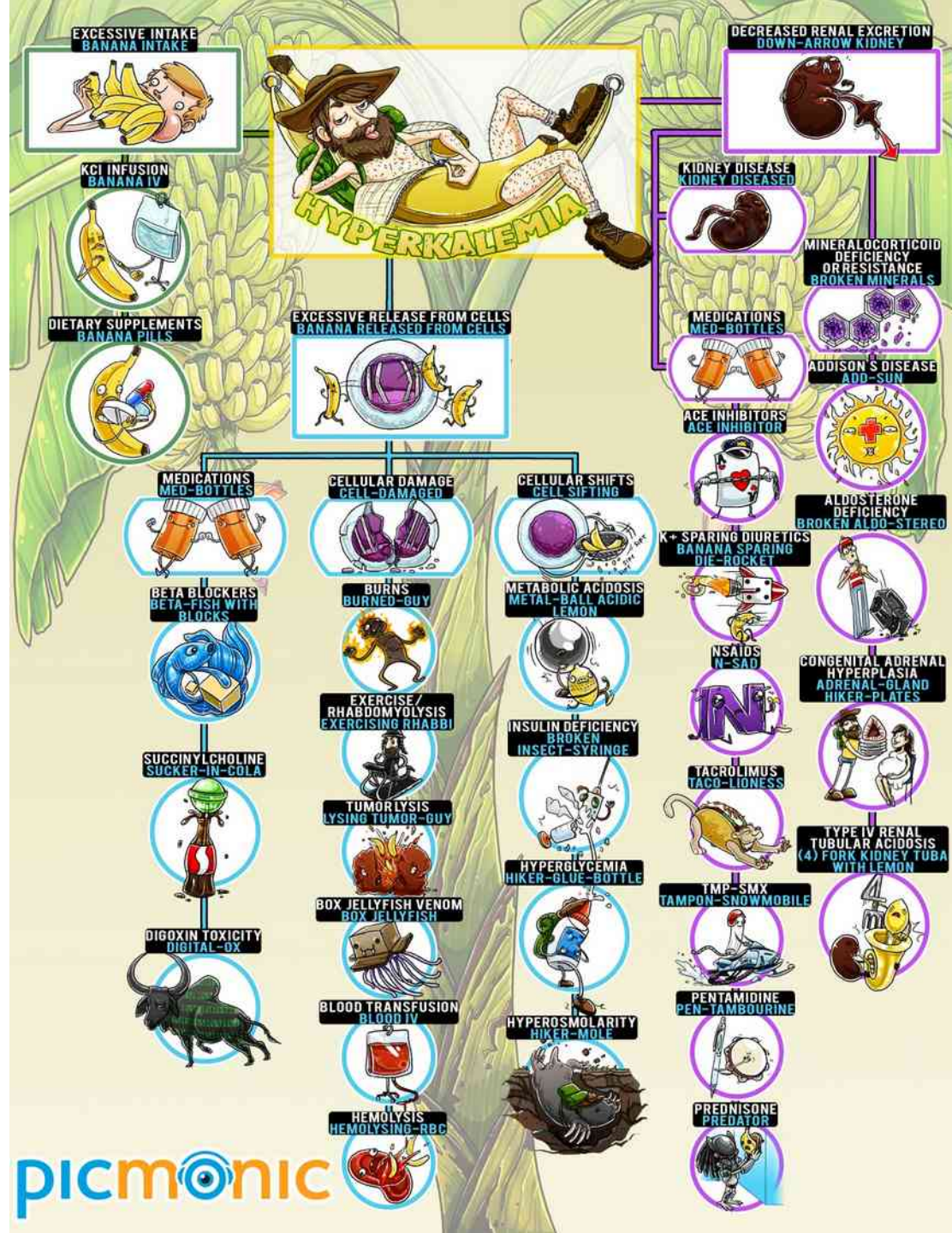


<https://cdn.lecturio.com/assets/Hyperkalemia-EKG-936x1200.png>

Therapy

rychlouost účinku

- ⦿ calcium gluconicum/chloratum IV 
- ⦿ salbutamol nebulization
- ⦿ furosemid IV + fluids
- ⦿ natrium bicarbonate (acidosis)
- ⦿ G10% + insulin
- ⦿ calcium resonium
- ⦿ hemodialysis



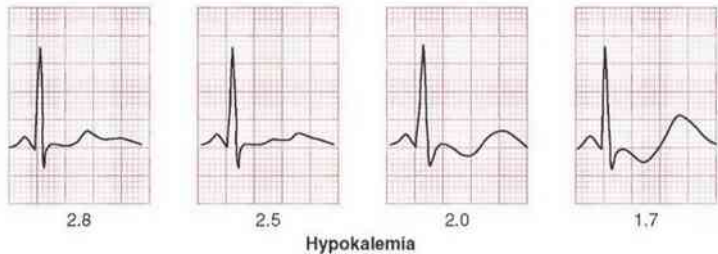
https://cdn.picmonic.com/pages/wp-content/uploads/2016/04/IM_INFO_Hyperkalemia_C1.7.jpg

Hypokalemia

⦿ $K < 3,5 \text{ mmol/l} \rightarrow$ symptoms

⦿ cardio

⦿ ECG



⦿ muscle weakness, cramps

⦿ GIT motility disturbances

⦿ fatigue

<http://what-when-how.com/wp-content/uploads/2012/04/tmp1421111.jpg>

Therapy

⦿ p.o. Kalnormin

⦿ IV KCl 7,45% max 30ml/1000ml N/S

Take home message

- Normal **natremia** is **135-145 mmol/l**
- Normal **kalemia** is **3,5-5,6 mmol/l**

- Natremia is highly dependent on **hydration** of the body
- Kalemia is tightly associated with plasmatic **pH**

- Acute symptomatic hyponatremia should be treated aggressively till the symptoms subside,
chronic/asymptomatic slowly and carefully
- Patients with hypo/hyperkalemia have characteristic ECG changes

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