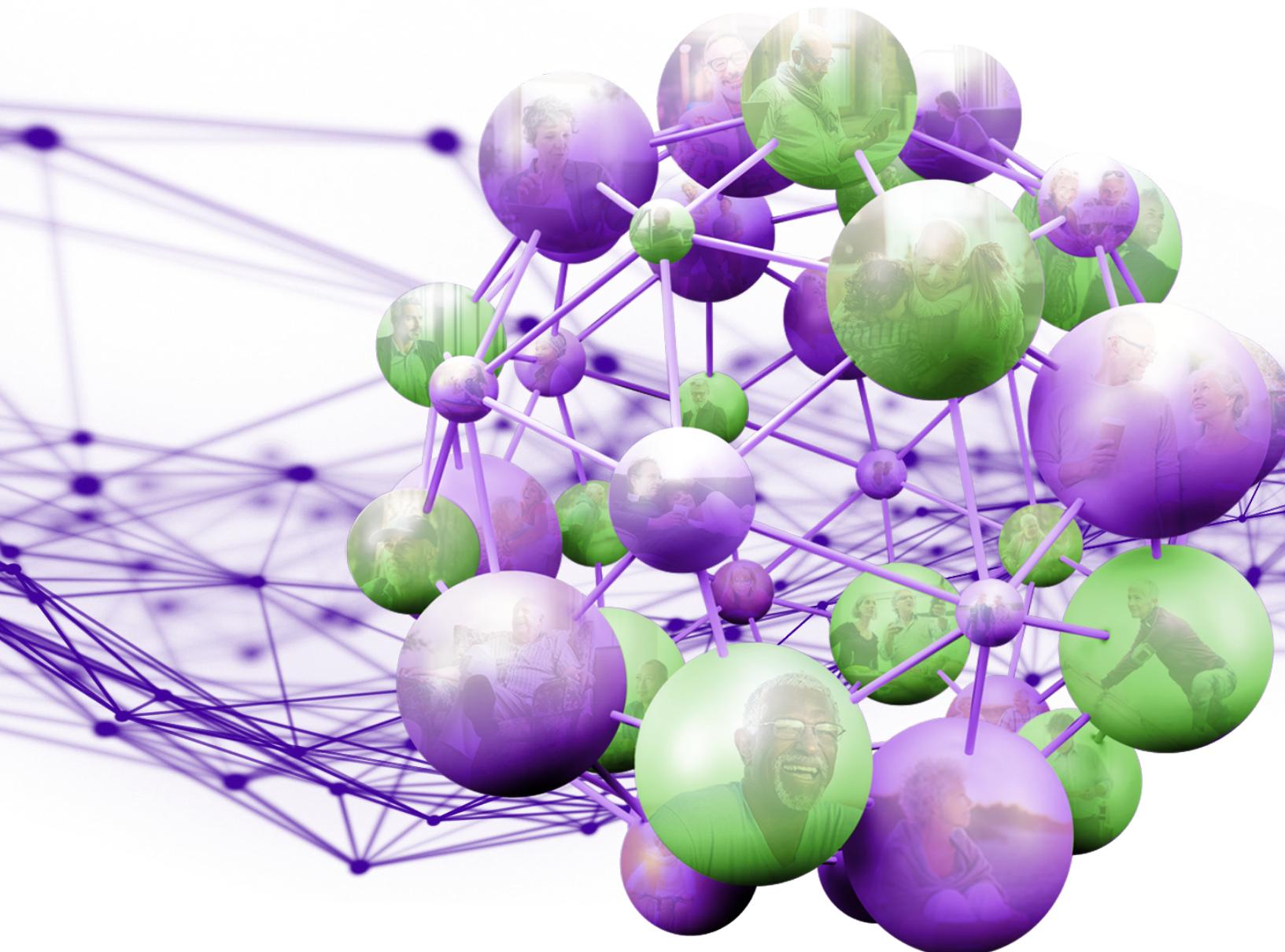




Electrolytes: Relevance and impact

Key information on sodium, magnesium and calcium



Sodium

Na⁺

Definition

Sodium is the most prevalent electrolyte in the extracellular fluid, playing an essential role in cellular homeostasis¹

Physiological role

Adequate amounts of sodium (1.5 g/day) are needed in the diet to maintain optimal nerve and muscle function, fluid and electrolyte balance, and blood pressure¹

Potential risks

- High intakes of sodium from diet and medications are known to increase extracellular fluid volume and blood pressure, which may accelerate disease progression in chronic kidney disease (CKD) and heart failure (HF) patients²⁻⁵
- Consequently, KDIGO and ESC Guidelines recommend that patients with CKD, HF and hypertension limit their dietary sodium intake (<2 g/day) to minimise the risk of adverse renal and cardiovascular outcomes¹¹

Implication and Relevance

- Depending on the dosing regimen, some potassium binders (e.g. sodium polystyrene sulphonate) indicated for the treatment of hyperkalaemia may contain up to three times (6.0 g)* the guideline recommended dose of sodium for patients with CKD, HF and hypertension (<2 g/day)^{5-7,8}



- The sodium content in these potassium binders may compromise the efficacy of RAASi therapy, and worsen symptoms of CKD, HF and hypertension³

Relevance to Veltassa®

- Veltassa® binds potassium in exchange for calcium instead of sodium, and is excreted with potassium to lower total body K⁺ levels^{9,10}
- Ensures suitability for patients who cannot tolerate even a small increase in sodium load, such as your patients with severe heart failure, hypertension or marked oedema^{9,10}

*Since the *in vivo* efficiency of sodium-potassium exchange resins is approximately 33%, about one third of the resin's actual sodium content is being delivered to the body.

1. Strazzullo P & Leclercq C. ASN Adv Nutr 2014;5(2):188–90. 2. Visser FW, et al. Obesity 2009;17(9):1684–8. 3. Clegg DJ, et al. Mayo Clin Proc 2017;92(8):1248–60. 4. George J, et al. BMJ 2013;347:1–8. 5. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. 6. McMurray JJV, et al. Eur Heart J 2012;33:1787–847. 7. Williams B, et al. Eur Heart J 2018;39:3021–104. 8. Kayexalate® Prescribing Information (Canada). Sanofi 2014. 9. Li L, et al. J Card Pharmacol Ther 2016;21(5):456–65. 10. Veltassa® SmPC 2022. 11. KDIGO 2021 Clin Pract Guideline for the management of Blood Pressure in CKD. KI Suppl. 2021;99:S1–S87

Magnesium



Definition

Magnesium is a crucial cofactor which helps to stabilise numerous enzymes across the body, including those that are involved in the generation of adenosine triphosphate¹

Physiological role

Magnesium plays a part in multiple essential physiological functions, such as the regulation of heart rhythm, vascular tone, platelet-activated thrombosis, neurotransmitter release and bone formation.¹ The European Food Safety Authority (EFSA) recommends that adult (≥ 18 years) men and women consume 350 mg and 300 mg of magnesium each day, respectively²

Potential risks

- Hypomagnesaemia (less than 0.7 mmol/L) is thought to have a prevalence of around 2.5–15% in the general population,³ but is common in hospitalised patients due to issues such as reduced absorption from impaired GI activity, malnutrition, renal wasting of various drugs and diabetes mellitus^{4–6}
- Hypomagnesaemia can lead to irregularities in other mineral levels, such as hypocalcaemia and hypokalaemia⁴
- Permanent/chronic hypomagnesaemia is associated with an increased risk of osteoporosis, atherosclerosis, neuromuscular disorders and cardiovascular disease^{4,7}
- Whereas, excessive magnesium levels (hypermagnesaemia) can result in other adverse cardiovascular events, ranging from

bradycardia (slower than normal heart rate), atrial fibrillation, asystole (cardiac arrest rhythm with no discernible electrical activity) and complete heart blocks¹

Relevance of magnesium in Veltassa®

- Veltassa® can also bind to magnesium. The majority of magnesium uptake occurs in the small intestine, therefore any remaining magnesium binding by Veltassa® in the colon is likely to be minor^{8,9}
- Approximately 9% of patients in clinical trials developed hypomagnesaemia with a serum Mg²⁺ level of >0.58 mmol/L.¹⁰ Hypomagnesaemia was reported as an adverse reaction in 5.3% of patients treated with patiromer¹⁰
- Hypomagnesaemia was reported as mild-to-moderate,¹ and no patient developed serum Mg²⁺ levels >0.4 mmol/L¹⁰
- Magnesium supplementation should be considered in patients who develop low serum magnesium levels¹⁰

1. Jähnen-Dechent W & Ketteler M. *Clin Kidney J* 2012;5(Suppl 1):i3–i14. 2. Scientific Opinion on Dietary Reference Values for magnesium. European Food Safety Authority Journal 2015;13(7):4186. 3. Ayuk J, Gittoes NJ. How should hypomagnesaemia be investigated and treated? *Clin Endocrinol (Oxf)*. 2011 Dec;75(6):743–6. doi: 10.1111/j.1365 4. Swaminathan R. *Clin Biochem Rev* 2003;24:47–66. 5. Hansen B-A & Bruserud Ø. *J Intensive Care* 2018;6:21. 6. Wang AK, et al. *Indian J Crit Care Med* 2014;18(7):456–60. 7. Feillet-Coudray, et al. *J Nutr* 2003;133(4):1220–3. 8. Pitt B & Garza D. *Expert Opinion on Drug Safety* 2018;17(5):525–35. 9. Beccari BV, et al. *Core Evidence* 2017;12:11–24. 10. Veltassa® SmPC 2022. 11. Bakris GL, et al. *JAMA* 2015;314(2):151–61.

Calcium



Definition

The majority of calcium in the body (99%) is stored in bones and teeth as a calcium-phosphate crystal lattice called hydroxyapatite^{1,2}

Physiological role

Adequate calcium intake is required for normal growth, development and skeletal strength. In addition, small serum calcium levels are necessary for muscle function, nerve transmission, hormonal secretion and vascular contraction.² According to the EFSA, all adults aged ≥ 25 years (including lactating and pregnant women) should consume at least 750 mg of calcium each day³

Potential risks

As CKD progresses, and the kidneys stop functioning, calcitriol production ceases and parathyroid hormone levels excessively increase to maintain serum calcium levels. As a result, calcium is extracted from bones in order to maintain adequate levels in the blood, which increases the risk of fractures and osteoporosis. In addition, the excessive production of parathyroid hormone can result in high calcium blood levels

(hypercalcaemia), increasing the risk of vascular calcification, atherosclerosis and cardiovascular disease⁴

Relevance of calcium in Veltassa®

- Veltassa® uses calcium as the counter-exchange ion for potassium, with approximately 1.6 g of calcium complexed within an 8.4 g dose of Veltassa®⁵
- Veltassa® is designed to ensure that most of the calcium exchanged for potassium occurs in the colon, where calcium absorption is minimal; with a small calcium fraction being released during transit through the GI system^{6,7}
- Studies in healthy individuals have shown that the mean 24-hour urine ion excretion of calcium increased with 73 mg after a maximal recommended daily dose (25.2g) of Veltassa®; such amounts are unlikely to increase the risk of vascular calcification in CKD patients^{6,7}

Abbreviated prescribing information Veltassa®

Veltassa (patiromer), 8,4 g, 16,8 g och 25,2 g pulver till oral suspension, Rx, (F), Farmakoterapeutisk grupp: V03AE09, läkemedel för behandling av hyperkalemi och hyperfosfatemi. **Indikation:** Behandling av hyperkalemi hos vuxna. **Kontraindikation:** Överkänslighet mot den aktiva substansen eller mot något hjälppämne. **Warning och försiktighet:** Veltassa ska inte användas som ersättning för akut behandling av livshotande hyperkalemi. Serummagnezium bör övervakas under minst 1 månad efter påbörjad behandling och magnesiumkomplettering övervägas hos patienter som utvecklar låga nivåer av serummagnezium. Nyttan och riskerna med administrering av Veltassa bör utvärderas noga hos patienter med rådande eller tidigare allvarliga gastrointestinala besvär före och under behandling, samt hos patienter med risk för hyperkalciemi. Serumkalium bör övervakas när det är kliniskt indikerat, och efter att Veltassa-dosen har titreras. Patienter bör instrueras att inte avbryta behandlingen utan att först rådgöra med läkare. Patienter med fruktosintolerans bör inte ta detta läkemedel. Patiromer kan binda vissa oralt samadministrerade läkemedel, vilket skulle kunna minska den gastrointestinala absorptionen av dem. Som förebyggande åtgärd ska administrering av patiromer separeras minst 3 timmar från andra orala läkemedel. Vanliga biverkningar är hypomagnesemi, förstopning, diarré, buksmärter och gasbildning. **Graviditet och Amning:** *Graviditet:* Som en försiktighetsåtgärd bör man undvika användning av patiromer under graviditet. *Amning:* Beslutet om man ska avbryta amningen eller avbryta/avstå från behandlingen med patiromer måste fattas med hänsyn till fördelarna med amning för barnet och fördelarna med behandlingen för kvinnan. **Förman:** Subventioneras endast för patienter med kronisk njursjukdom (CKD) i stadier 3-5 med eller utan kronisk hjärtsvikt, för vilka behandling med Resonium inte är lämpligt samt för patienter med kronisk hjärtsvikt utan samtidig kronisk njursjukdom. **Baserad på produktresumé från** 2022-10-06. För fullständig förskrivningsinformation och priser se www.fass.se. **Vifor Pharma Nordiska AB** www.viforpharma.se, info.nordic@viforpharma.com

