

# Hydroxybutyric Acid Sodium

## Newborn Use only

2026

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| <b>Key points</b>         | Also known as hydroxybutyric acid sodium <sup>1,2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Indication</b>         | Multiple acyl-CoA dehydrogenase deficiency (MADD) (Glutaric aciduria type II)<br>3-hydroxy-3-methylglutaryl-coenzyme A (HMG-CoA) lyase deficiency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Action</b>             | Provides an exogenous ketone body and alternative energy substrate, particularly for the brain and heart. In HMG-CoA lyase deficiency it bypasses impaired endogenous ketogenesis; in MADD it may supplement inadequate ketone production secondary to impaired fatty-acid oxidation and mitochondrial energy metabolism.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Contraindications</b>  | Hypersensitivity to the preparation. No other specific contraindications have been established; seek metabolic specialist advice.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Precautions</b>        | High sodium load may cause hypernatraemia and metabolic alkalosis, particularly with high doses. Use with caution in dehydration, renal impairment or disorders of sodium/fluid balance. Close monitoring is required during dose escalation and acute illness.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Dose</b>               | 300 – 600 mg/kg/day, orally, in 4 - 8 divided doses.<br>Doses up to 900 mg/kg/day have been used during acute illness/metabolic decompensation. Dose should be individualised according to clinical response and specialist metabolic advice. <sup>1-3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Route</b>              | ORAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Presentation</b>       | Hydroxybutyric acid sodium (DL-beta) Powder (50/100 gram) (various brands – Veriton, Crescent, Inresa) – Obtained under Special Access Scheme (SAS) in Australia.<br>Hydroxybutyric acid sodium (DL-beta) (100mg/mL OR 250mg/mL solution) powder 10/25 gram - Obtained under Special Access Scheme (SAS) in Australia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Preparation</b>        | In-house preparation: Use powder to prepare a 100 mg/mL OR 250mg/mL solution. <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>IV Compatibility</b>   | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>IV Incompatibility</b> | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Administration</b>     | Administer orally in divided doses, preferably with or around feeds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Monitoring</b>         | Monitor clinical response, hydration and fluid balance, serum electrolytes including sodium, bicarbonate and acid–base status, renal, and cardiac function, particularly during dose escalation or acute illness. Blood or urine ketones may assist assessment of dose adequacy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Drug Interactions</b>  | No specific drug interactions were reported.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Adverse Reactions</b>  | Generally well tolerated; reported adverse effects below may be difficult to distinguish from the underlying disorder or intercurrent illness. <sup>2</sup> Constipation, diarrhoea, abdominal pain or nausea, vomiting, dehydration, hypernatraemia, and metabolic alkalosis, particularly at high doses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Overdose</b>           | Higher doses of up to 2,600 mg/kg/day, have been described in severe multiple acyl-CoA dehydrogenase deficiency (MADD) under specialist supervision. <sup>4</sup> (4) This dose should not be interpreted as a routine dose or toxicity threshold. Severe alkalosis and hypernatremia have been reported with doses above 1,400 mg/kg/day. <sup>5</sup> (5) High-dose therapy requires close monitoring of hydration, electrolytes and acid–base status. Symptomatic treatment with appropriate hydration and correction of electrolyte and acid–base disturbances is recommended. <sup>2</sup><br>AUSTRALIA: Contact the Poisons Information Centre on 13 11 26 for information on management.<br>NEW ZEALAND: Contact the National Poisons Centre on 0800 764 766 for information on management. |
| <b>Stability</b>          | Powder for oral solution: discard solution 7 days after reconstitution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Storage</b>            | Powder: store below 25°C.<br>Powder for oral solution: Refrigerate between 2-8°C after reconstitution.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Excipients</b>         | None                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Evidence</b>           | <b>Overview</b><br>S-DL-3OHB provides an exogenous ketone body that may serve as an alternative energy substrate, particularly for the brain and heart. It has been used as an adjunctive therapy in MADD and HMG-CoA deficiency. Evidence is limited predominantly to case reports and small observational series, which suggest potential clinical benefit and generally good tolerability. <sup>2-6</sup><br><b>Safety</b><br>It is generally well tolerated. Reported side effects are difficult to distinguish from the illness and may include constipation, diarrhea, abdominal pain, vomiting or nausea, and dehydration. Hypernatraemia and metabolic alkalosis may occur with high-dose therapy, reflecting the sodium load. <sup>2,4,5</sup>                                            |
| <b>Practice points</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| <b>References</b> | <ol style="list-style-type: none"> <li>1. British Inherited Metabolic Diseases Group (BIMDG). <a href="https://bimdg.org.uk/emergency/paediatric-guidelines/">https://bimdg.org.uk/emergency/paediatric-guidelines/</a>. Accessed on 11 August 2026.</li> <li>2. Devanapalli B, Tolun AA, Kim W-T, Wotton T, Thompson S, Balasubramaniam S. Use of sodium D, L-3-hydroxybutyrate as adjunct therapy in two siblings with HMG-CoA lyase deficiency. <i>Journal of Translational Genetics and Genomics</i>. 2023;7(3):186–95.</li> <li>3. Thompson S, Hertzog A, Selvanathan A, Batten K, Lewis K, Nisbet J, et al. Treatment of HMG-CoA Lyase Deficiency-Longitudinal Data on Clinical and Nutritional Management of 10 Australian Cases. <i>Nutrients</i>. 2023;15(3).</li> <li>4. Van Rijt WJ, Heiner-Fokkema MR, du Marchie Sarvaas GJ, Waterham HR, Blokpoel RG, van Spronsen FJ, et al. Favorable outcome after physiologic dose of sodium-D, L-3-hydroxybutyrate in severe MADD. <i>Pediatrics</i>. 2014;134(4):e1224–e8.</li> <li>5. Habarou F, Bahi-Buisson N, Lebigot E, Pontoizeau C, Abi-Warde M, Brassier A, et al. Ketone bodies as a possible adjuvant to ketogenic diet in PDHc deficiency but not in GLUT1 deficiency. <i>JIMD Reports</i>, Volume 38: Springer; 2017. p. 53–9.</li> <li>6. Gautschi M, Weisstanner C, Slotboom J, Nava E, Zürcher T, Nuoffer J-M. highly efficient ketone body treatment in multiple acyl-coa dehydrogenase deficiency-related leukodystrophy. <i>Pediatric research</i>. 2015;77(1):91–8.</li> </ol> |
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| Original 1.0          | 29/10/2026  |
| REVIEW (5 years)      | 29/10/2031  |

### Authors Contribution of the current version

|                         |                                                                                                                                                                                                                                                             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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