JM

Product guide: Equilibrium shift

JM Johnson Matthey

Equilibrium shift enzymes

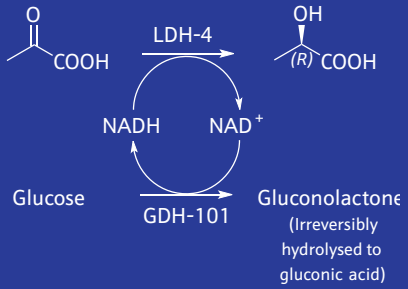
Transaminase-catalysed reactions generate pyruvate as the by-product when alanine is the amino donor. Pyruvate is a very good substrate for transaminases. Even traces of pyruvate can cause the reaction equilibrium to stall. Therefore, pyruvate has to be removed by the equilibrium-shifting enzymes.

Substrate Alanine Product Pyruvate

The JM enzyme kit includes: two equilibrium-shifting enzymes, one lactate dehydrogenase, and one alanine dehydrogenase.

Lactate Dehydrogenase

Lactate dehydrogenase (LDH) catalyses the reduction of pyruvate to either (*R*)- or (*S*)-lactate, while oxidising in turn NADH to NAD^+, which is then regenerated using glucose dehydrogenase (GDH).

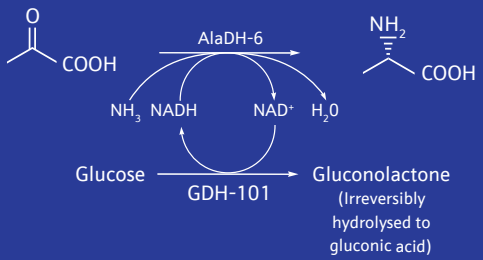


One LDH is provided.

LDH-4 is a D-lactate dehydrogenase, reducing pyruvate to (*R*)-lactate. As with most LDHs, LDH-4 accepts only NADH as cofactor and it is active between pH 6.0 and 9.0.

Alanine Dehydrogenase

Alanine dehydrogenase (AlaDH) catalyses the reductive amination of pyruvate to L-alanine. AlaDH requires NADH cofactor and ammonia to carry out the reaction. NAD^+ is regenerated to NADH by GDH.



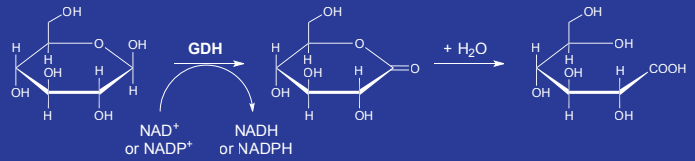
One AlaDH is provided.

AlaDH-6 is active between pH 6.0 and 9.0 and accepts only NAD^+ as cofactor.

Glucose Dehydrogenase

Glucose dehydrogenase (GDH) is needed by both LDH and AlaDH to ensure NADH regeneration while pyruvate is efficiently transformed by the equilibrium-shifting enzymes.

GDH catalyses the reduction of NAD^+ or $NADP^+$ to NADH or NADPH at the expense of glucose that is transformed to gluconolactone.



GDH-101 accepts both NAD^+ and $NADP^+$ cofactors. It is stable between pH 6 and 9 and active at temperatures up to 50°C.

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