
malonyl-S-ACP:biotin-protein carboxyltransferase

2.1.3.10

1 Nomenclature

EC number

2.1.3.10

Systematic name

malonyl-[acyl-carrier protein]:biotinyl-[protein] carboxyltransferase

Recommended name

malonyl-S-ACP:biotin-protein carboxyltransferase

Synonyms

MadC,D

acetyl-S-acyl carrier protein:malonate acyl carrier protein-SH transferase <1>

[1]

malonyl-S-acyl-carrier protein:biotin-protein carboxyltransferase

malonyl-[acyl-carrier protein]:biotinyl-[protein] carboxyltransferase

CAS registry number

80700-20-5 (multienzyme complex malonate decarboxylase)

2 Source Organism

<1> *Malonomonas rubra* [1]

3 Reaction and Specificity

Catalyzed reaction

a malonyl-[acyl-carrier protein] + a biotinyl-[protein] = an acetyl-[acyl-carrier protein] + a carboxybiotinyl-[protein]

Natural substrates and products

S acetyl-CoA + dephospho-CoA <1> (Reversibility: r) [1]

P CoA + acetyl-dephospho-CoA

S malonyl-CoA + dephospho-CoA <1> (Reversibility: r) [1]

P CoA + malonyl-dephospho-CoA

S Additional information <1> (<1> enzyme catalyzes the transfer of acyl carrier protein from acetyl acyl carrier protein and malonate to yield malonyl acyl carrier protein and acetate. Malonate is thus activated on the enzyme by exchange for the catalytically important enzyme-bound acetyl thioester residues [1]) (Reversibility: ?) [1]

P ?

Substrates and products

S acetyl-CoA + dephospho-CoA <1> (Reversibility: r) [1]

P CoA + acetyl-dephospho-CoA

S malonyl-CoA + dephospho-CoA <1> (Reversibility: r) [1]

P CoA + malonyl-dephospho-CoA

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P ?

Inhibitors

citrate <1> [1]

malonate <1> [1]

Specific activity (U/mg)

367 <1> [1]

K_m-Value (mM)

0.5 <1> (malonate, <1> pH 6.0 [1]) [1]

1.9 <1> (malonyl-CoA, <1> pH 6.0 [1]) [1]

6.9 <1> (acetyl-CoA, <1> pH 6.0 [1]) [1]

54 <1> (acetate, <1> pH 6.0 [1]) [1]

K_i-Value (mM)

0.4 <1> (malonate, <1> pH 6.0 [1]) [1]

3 <1> (citrate, <1> pH 6.0 [1]) [1]

pH-Optimum

5.5 <1> [1]

pH-Range

4.5 <1> (<1> sharp decrease in activity from pH 5.5 to pH 4.5 [1]) [1]

4 Enzyme Structure

Molecular weight

59000 <1> (<1> gel filtration [1]) [1]

Subunits

monomer <1> (<1> 1 * 67000, SDS-PAGE [1]) [1]

5 Isolation/Preparation/Mutation/Application

Purification

<1> (purification of subunit acetyl-S-acyl carrier protein: malonate acyl carrier protein-SH transferase) [1]

References

- [1] Hilbi, H.; Dimroth, P.: Purification and characterization of a cytoplasmic enzyme component of the Na⁺-activated malonate decarboxylase system of *Malonomonas rubra*: acetyl-S-acyl carrier protein: malonate acyl carrier protein-SH transferase. *Arch. Microbiol.*, **162**, 48-56 (1994)