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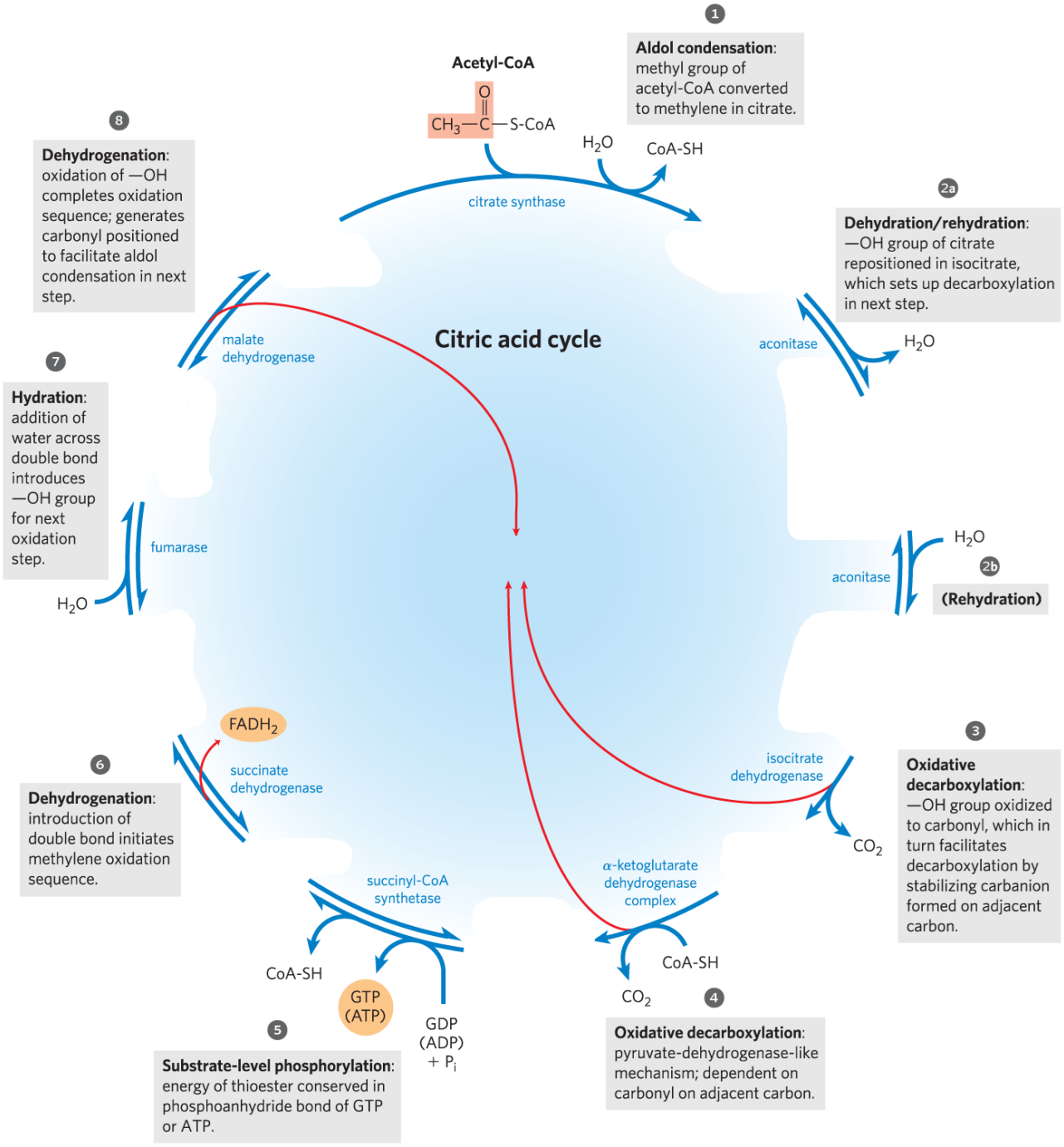
Worksheet #22: Citric Acid Cycle

Overview of the Citric Acid Cycle

Equivalents of ATP generated for each turn of the Citric Acid Cycle: _____
Number of steps in the Citric Acid Cycle: _____
Number of turns of the Citric Acid Cycle per glucose molecule: _____
Location of the Citric Acid Cycle: _____
Fill in the missing reactants and products in the diagram below and include key points of regulation.



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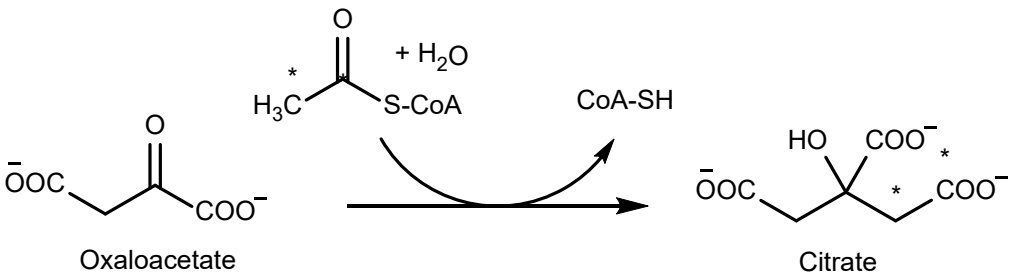
Reactions of the Citric Acid Cycle

Fill in the information for each reaction of the Citric Acid Cycle.

1. Formation of Citrate



Oxaloacetate Citrate

Name of Enzyme: _____

Enzyme class: _____

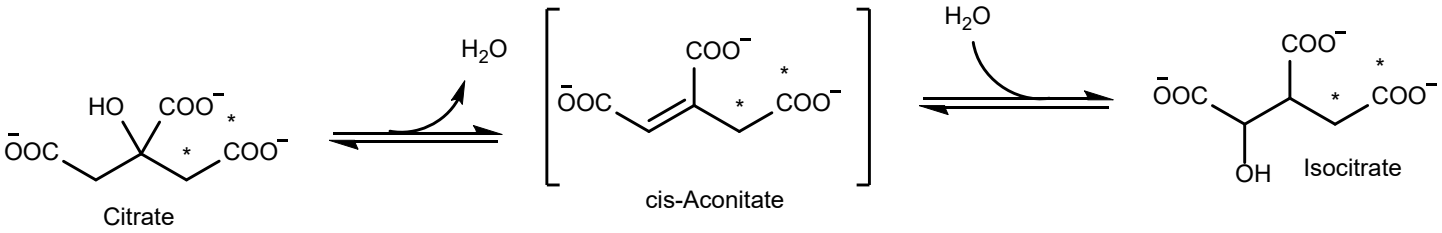
Change in standard free energy: _____

Circle one: Under biochemical standard conditions, the reaction is **exergonic** **endergonic**

Circle one: Under cellular conditions, the reaction is **reversible** **nonreversible**

Purpose of the reaction:

2. Formation of Isocitrate via *cis*-Acontinate



Citrate cis-Aconitate Isocitrate

Name of Enzyme: _____

Enzyme class: _____

Change in standard free energy: _____

Circle one: Under biochemical standard conditions, the reaction is **exergonic** **endergonic**

Circle one: Under cellular conditions, the reaction is **reversible** **nonreversible**

Purpose of the reaction:

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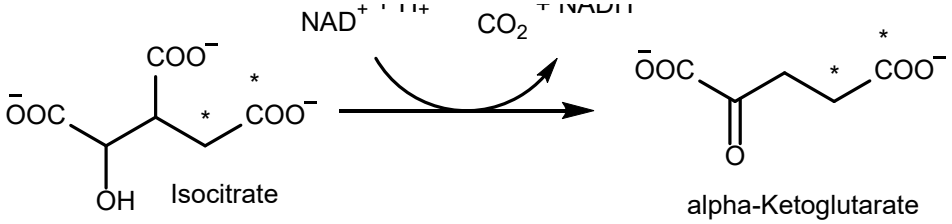
3. Oxidation of Isocitrate to alpha-Ketoglutarate



Name of Enzyme: _____

Enzyme class: _____

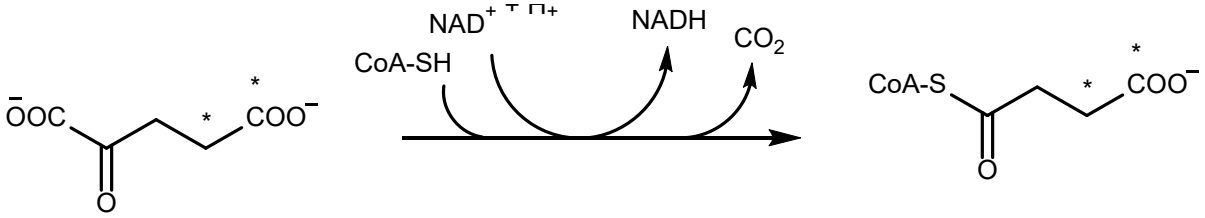
Change in standard free energy: _____

Circle one: Under biochemical standard conditions, the reaction is **exergonic** **endergonic**

Circle one: Under cellular conditions, the reaction is **reversible** **nonreversible**

Purpose of the reaction:

4. Oxidation of alpha-Ketoglutarate to Succinyl-CoA and CO_2



Name of Enzyme: _____

Enzyme class: _____

Change in standard free energy: _____

Circle one: Under biochemical standard conditions, the reaction is **exergonic** **endergonic**

Circle one: Under cellular conditions, the reaction is **reversible** **nonreversible**

Purpose of the reaction:

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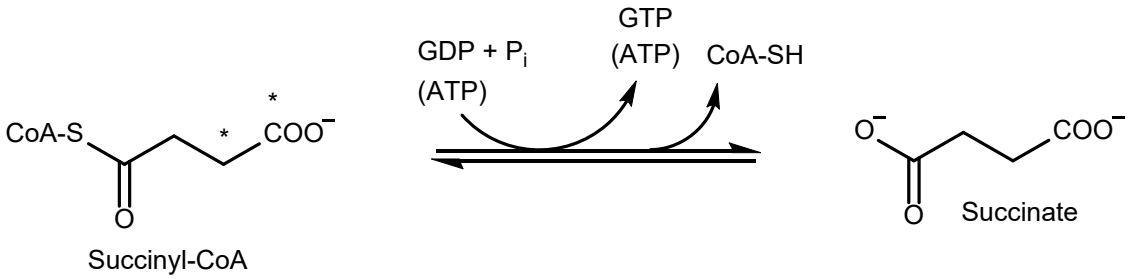
5. Conversion of Succinyl-CoA to Succinate



Name of Enzyme: _____

Enzyme class: _____

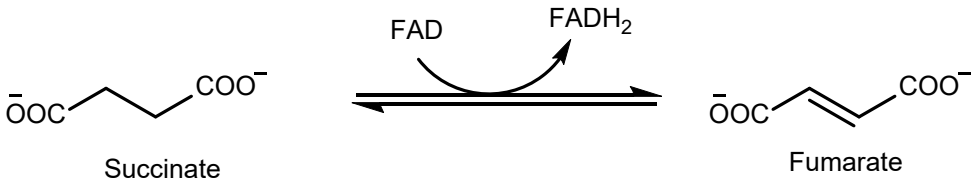
Change in standard free energy: _____

Circle one: Under biochemical standard conditions, the reaction is **exergonic** **endergonic**

Circle one: Under cellular conditions, the reaction is **reversible** **nonreversible**

Purpose of the reaction:

6. Oxidation of Succinate to Fumarate



Name of Enzyme: _____

Enzyme class: _____

Change in standard free energy: _____

Circle one: Under biochemical standard conditions, the reaction is **exergonic** **endergonic**

Circle one: Under cellular conditions, the reaction is **reversible** **nonreversible**

Purpose of the reaction:

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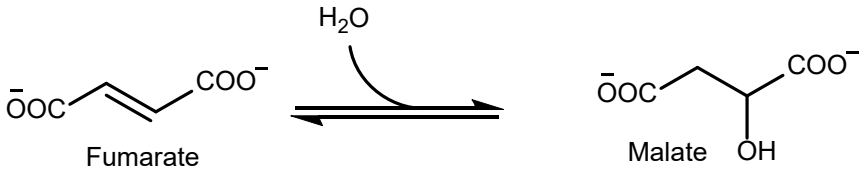
7. Hydration of Fumarate to Malate



Name of Enzyme: _____

Enzyme class: _____

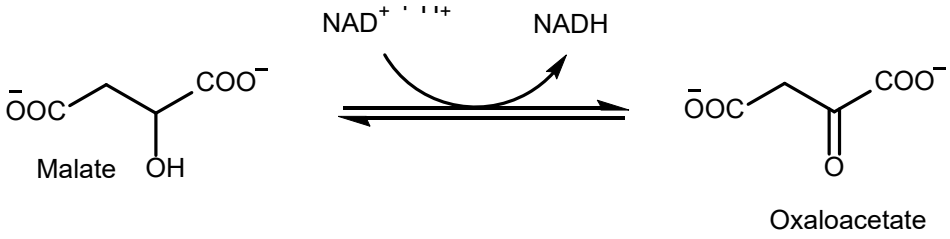
Change in standard free energy: _____

Circle one: Under biochemical standard conditions, the reaction is **exergonic** **endergonic**

Circle one: Under cellular conditions, the reaction is **reversible** **nonreversible**

Purpose of the reaction:

8. Oxidation of Malate to Oxaloacetate



Name of Enzyme: _____

Enzyme class: _____

Change in standard free energy: _____

Circle one: Under biochemical standard conditions, the reaction is **exergonic** **endergonic**

Circle one: Under cellular conditions, the reaction is **reversible** **nonreversible**

Purpose of the reaction: