# Summary

February 14, 2025

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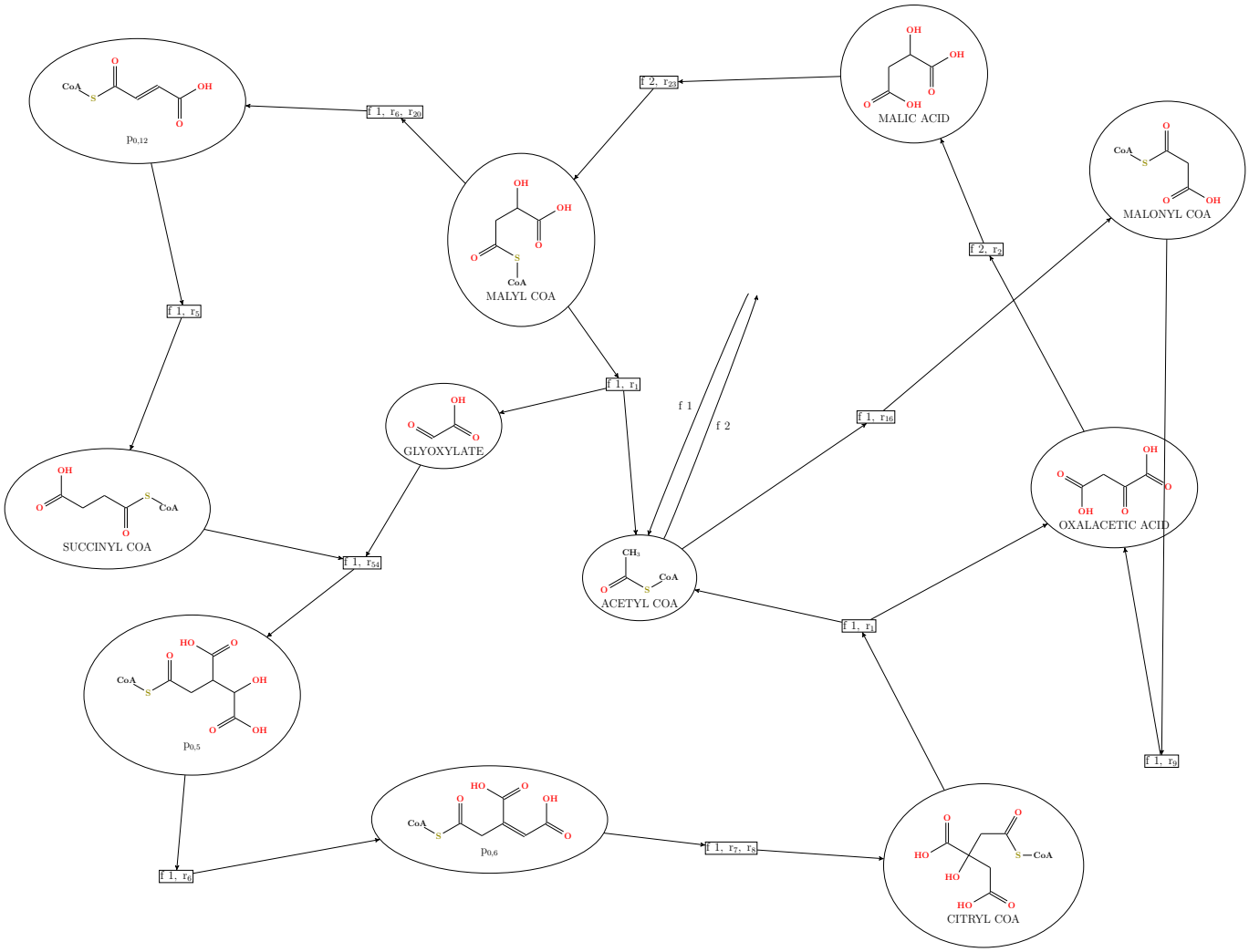
### 0.0.1 Solution 0

#### Overall Data

```
Objective value (integral): 11
Vertex/Graph In Out OA
ACETYL COA   1  2   1
ADP          2  1   0
AMP          0  2   0
ATP          1  0   0
CO2          1  0   0
CoASH        1  0   0
Fdox         0  2   0
Fdred        2  0   0
H2O          0  1   0
HCO3-        1  0   0
NAD+         0  1   0
NADH         1  0   0
NADP+        0  2   0
NADPH        2  0   0
Pi           0  3   0
hplus        6  0   0
```

### Filtered Graph




File: `out/025_dg_0_11100_f_0_0_filt`

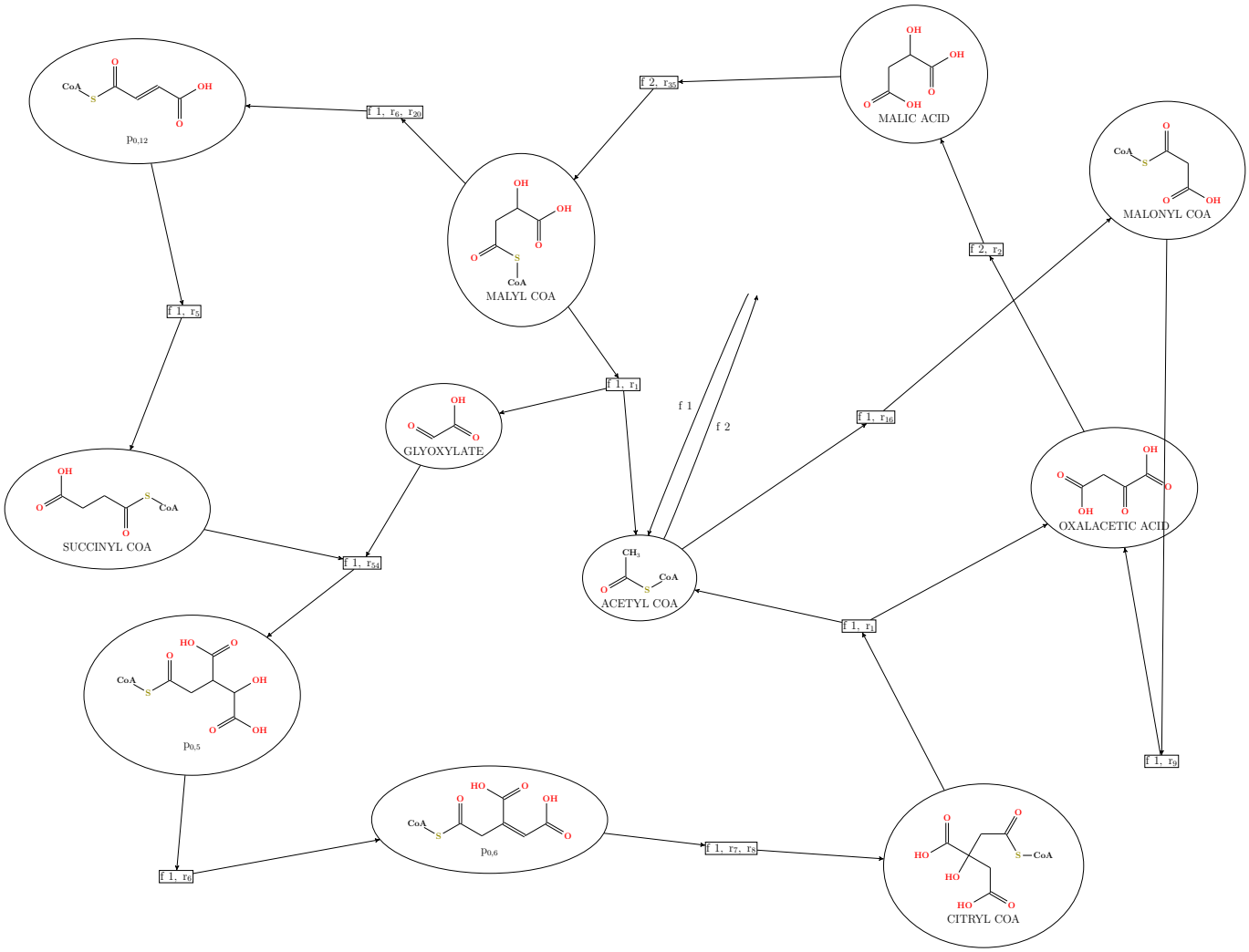
## 0.0.2 Solution 1

### Overall Data

```
Objective value (integral): 11
Vertex/Graph In Out OA
ACETYL COA   1  2   1
ADP          0  1   0
ATP          1  0   0
CO2          1  0   0
CoASH        1  0   0
Fdox         0  2   0
Fdred        2  0   0
H2O          0  3   0
HCO3-        1  0   0
NAD+         0  1   0
NADH         1  0   0
NADP+        0  2   0
NADPH        2  0   0
Pi           0  1   0
```

| | | | |
|---|---|---|---|
| hplus | 6 | 0 | 0 |

### Filtered Graph




File: `out/028_dg_0_11100_f_0_1_filt`

## 0.0.3 Solution 2

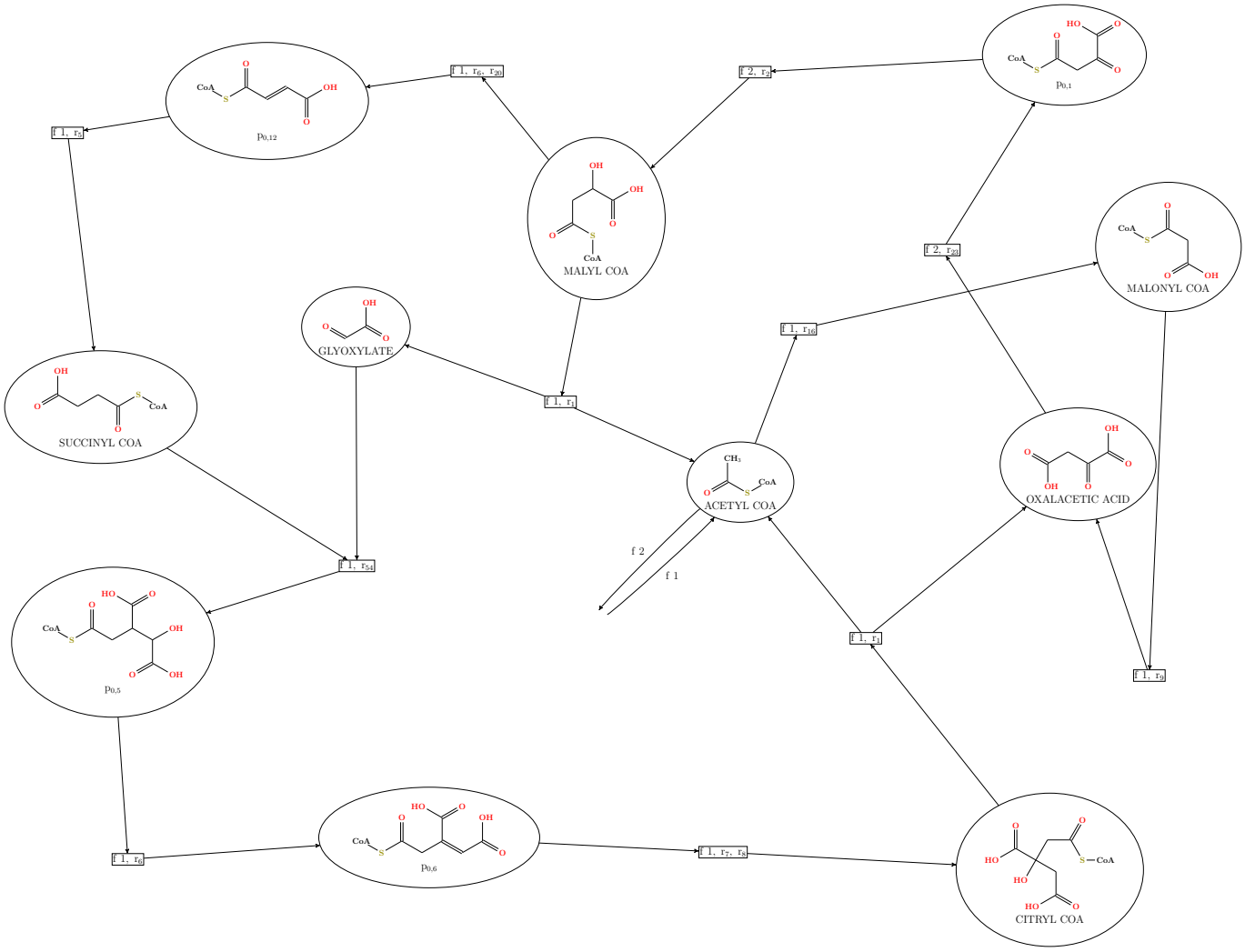
### Overall Data

```
Objective value (integral): 11
```

| Vertex/Graph | In | Out | OA |
|---|---|---|---|
| ACETYL COA | 1 | 2 | 1 |
| ADP | 0 | 1 | 0 |
| AMP | 0 | 2 | 0 |
| ATP | 3 | 0 | 0 |
| CO2 | 1 | 0 | 0 |
| CoASH | 1 | 0 | 0 |
| Fdox | 0 | 2 | 0 |
| Fdred | 2 | 0 | 0 |
| H2O | 0 | 1 | 0 |
| HCO3- | 1 | 0 | 0 |
| NAD+ | 0 | 1 | 0 |
| NADH | 1 | 0 | 0 |

| | | | |
|---|---|---|---|
| NADP+ | 0 | 2 | 0 |
| NADPH | 2 | 0 | 0 |
| PPi | 0 | 2 | 0 |
| Pi | 0 | 1 | 0 |
| hplus | 6 | 0 | 0 |

### Filtered Graph




File: `out/033_dg_0_11100_f_0_2_filt`

## 0.0.4 Solution 3

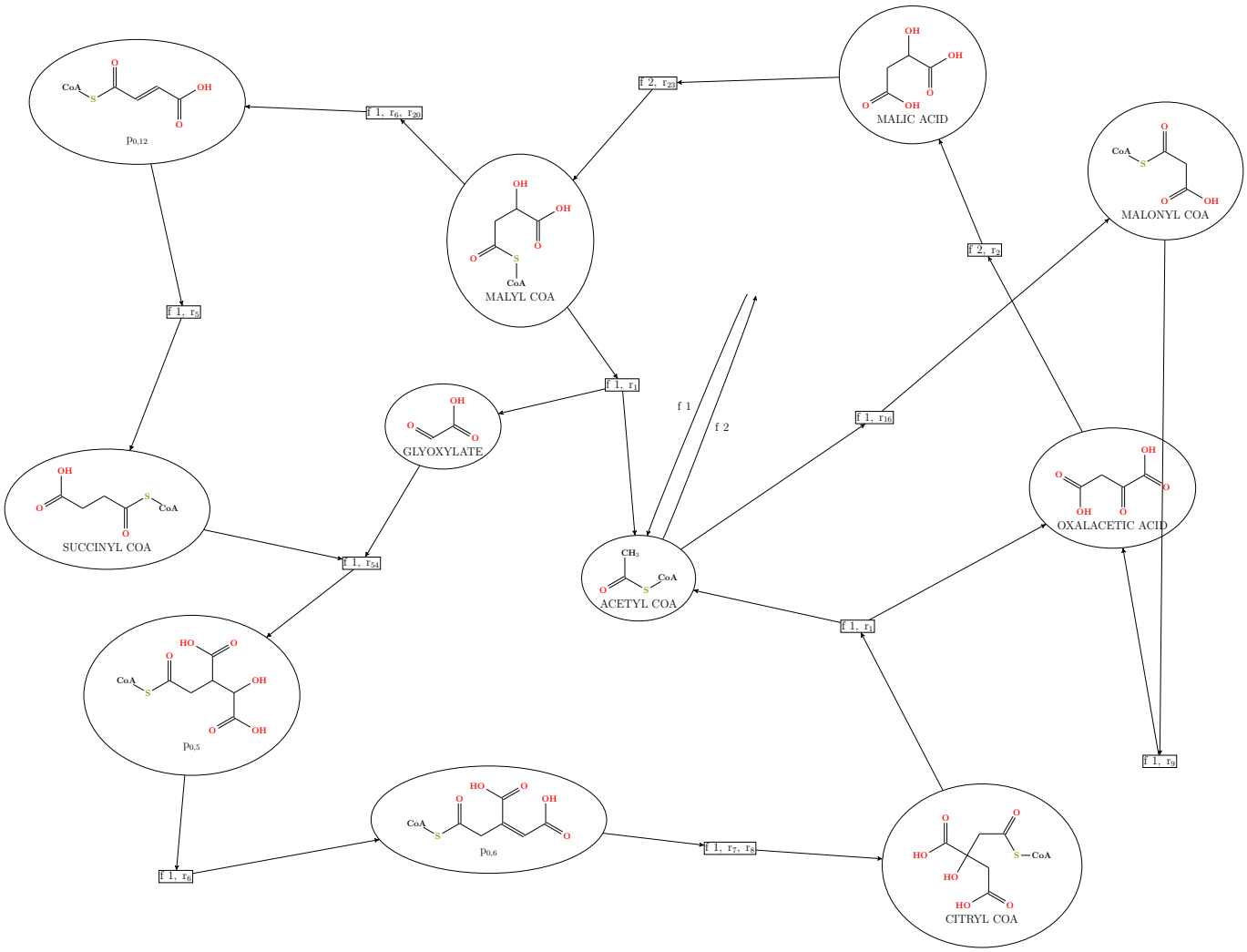
### Overall Data

Objective value (integral): 11

| Vertex/Graph | In | Out | OA |
|---|---|---|---|
| ACETYL COA | 1 | 2 | 1 |
| ADP | 0 | 1 | 0 |
| AMP | 0 | 2 | 0 |
| ATP | 3 | 0 | 0 |
| CO2 | 1 | 0 | 0 |
| CoASH | 1 | 0 | 0 |
| Fdox | 0 | 2 | 0 |

| | | | |
|---|---|---|---|
| Fdred | 2 | 0 | 0 |
| H2O | 0 | 1 | 0 |
| HCO3- | 1 | 0 | 0 |
| NAD+ | 0 | 1 | 0 |
| NADH | 1 | 0 | 0 |
| NADP+ | 0 | 2 | 0 |
| NADPH | 2 | 0 | 0 |
| PPi | 0 | 2 | 0 |
| Pi | 0 | 1 | 0 |
| hplus | 6 | 0 | 0 |

### Filtered Graph




File: out/036_dg_0_11100_f_0_3_filt

## 0.0.5 Solution 4

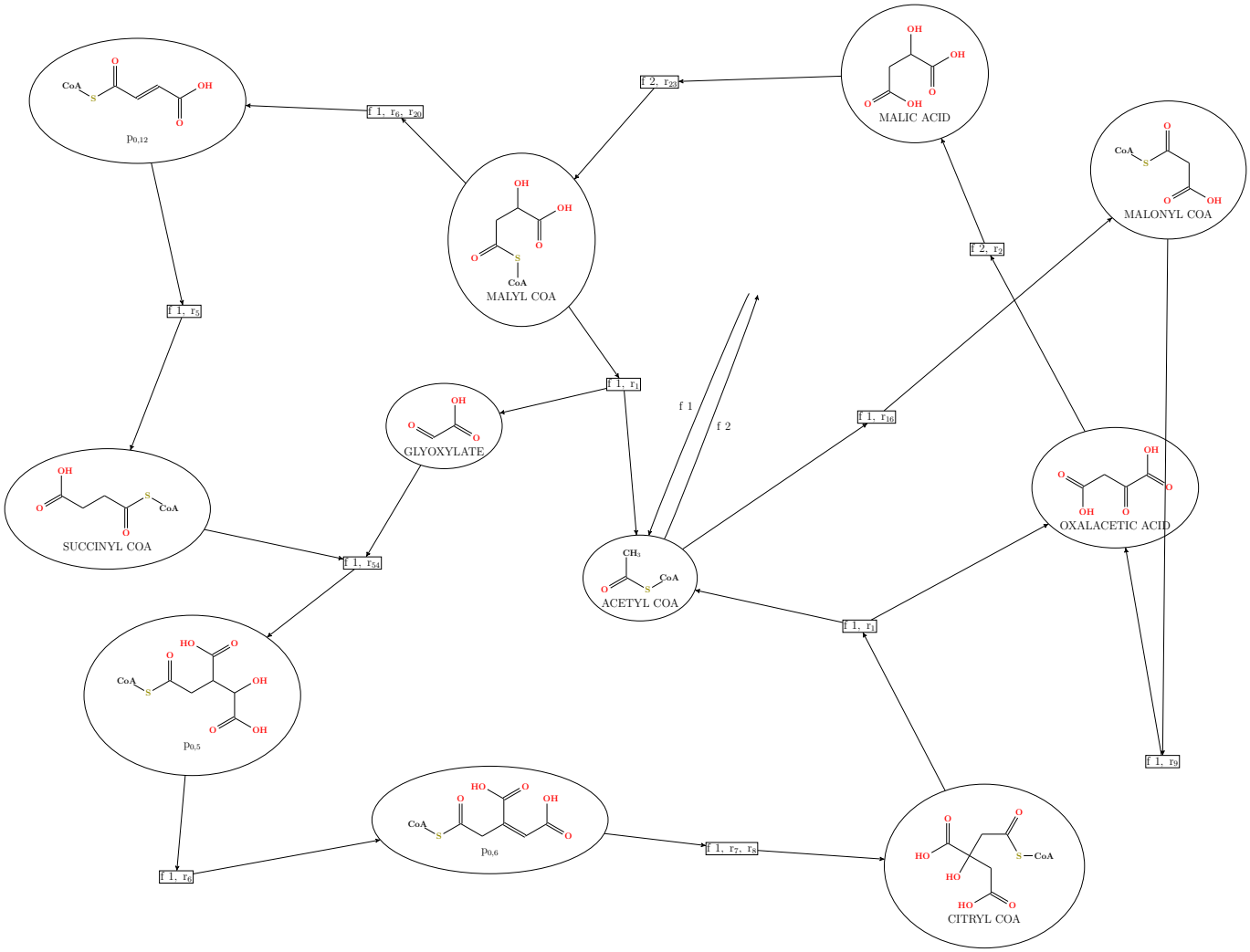
### Overall Data

Objective value (integral): 11

| Vertex/Graph | In | Out | OA |
|---|---|---|---|
| ACETYL COA | 1 | 2 | 1 |
| ADP | 1 | 0 | 0 |
| AMP | 0 | 2 | 0 |

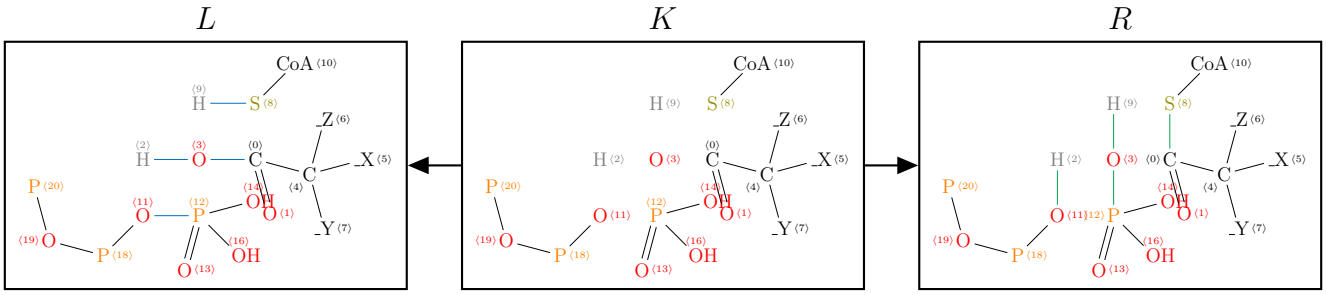
| | | | |
|---|---|---|---|
| ATP | 1 | 0 | 0 |
| CO2 | 1 | 0 | 0 |
| CoASH | 1 | 0 | 0 |
| Fdox | 0 | 2 | 0 |
| Fdred | 2 | 0 | 0 |
| H2O | 0 | 1 | 0 |
| HCO3- | 1 | 0 | 0 |
| NAD+ | 0 | 1 | 0 |
| NADH | 1 | 0 | 0 |
| NADP+ | 0 | 2 | 0 |
| NADPH | 2 | 0 | 0 |
| Pi | 0 | 3 | 0 |
| hplus | 6 | 0 | 0 |

## Filtered Graph




File: `out/039_dg_0_11100_f_0_4_filt`

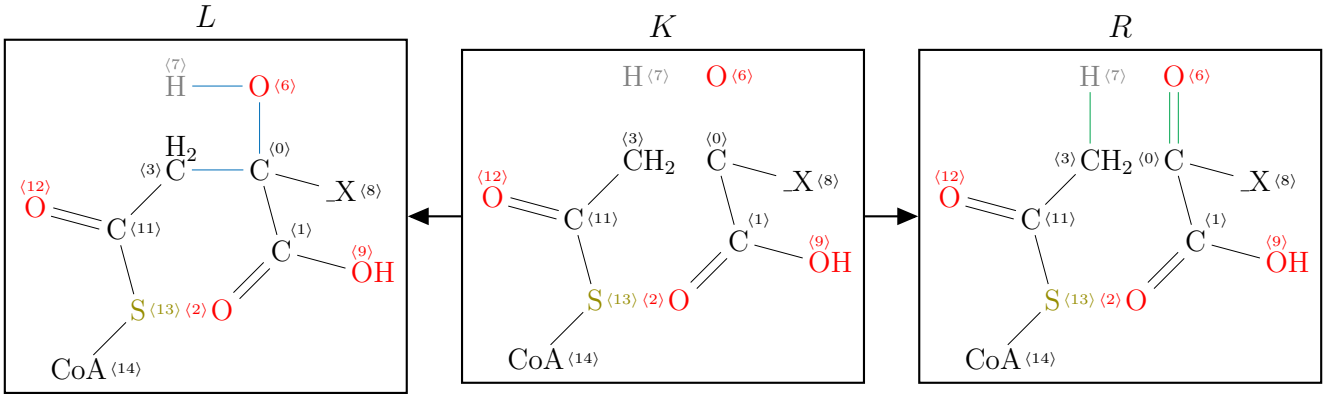
### 0.0.6 rTCA_activation_succinyl_CoA_synthetase_01




Files: out/041_r_0_11300110_{L, K, R}

_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}
_Z ∈ {'C', 'H'}

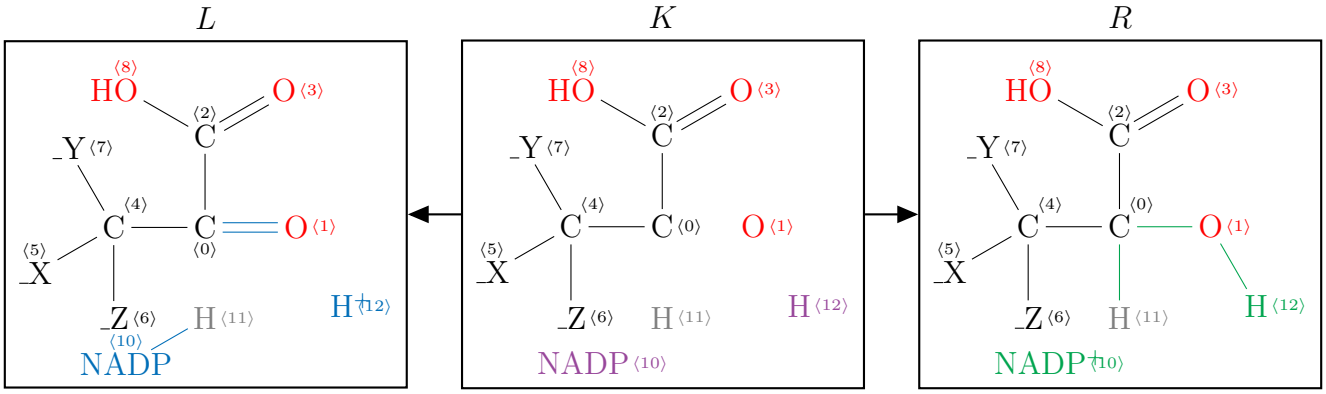
### 0.0.7 rTCA_activation_ATP_citrate_lyase_01




Files: out/044_r_1_11300110_{L, K, R}

_X ∈ {'C', 'H'}

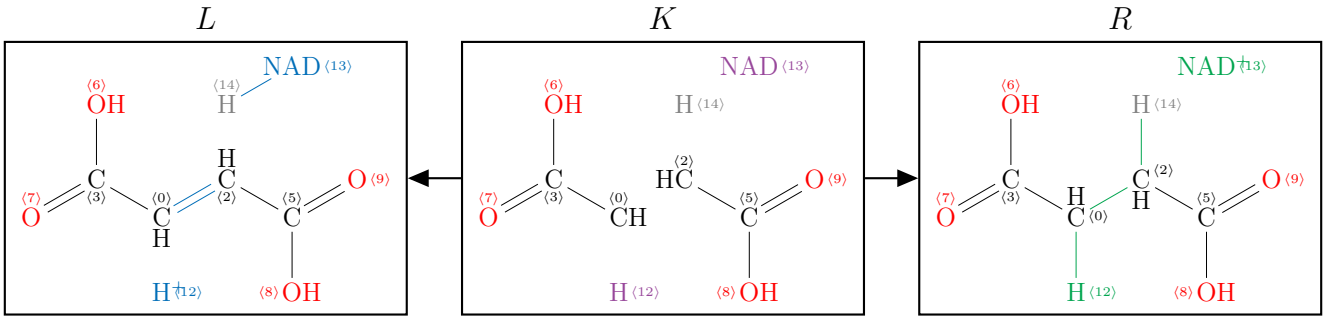
### 0.0.8 rTCA_reduction_malate_dehydrogenase_01




Files: out/047_r_2_11300110_{L, K, R}

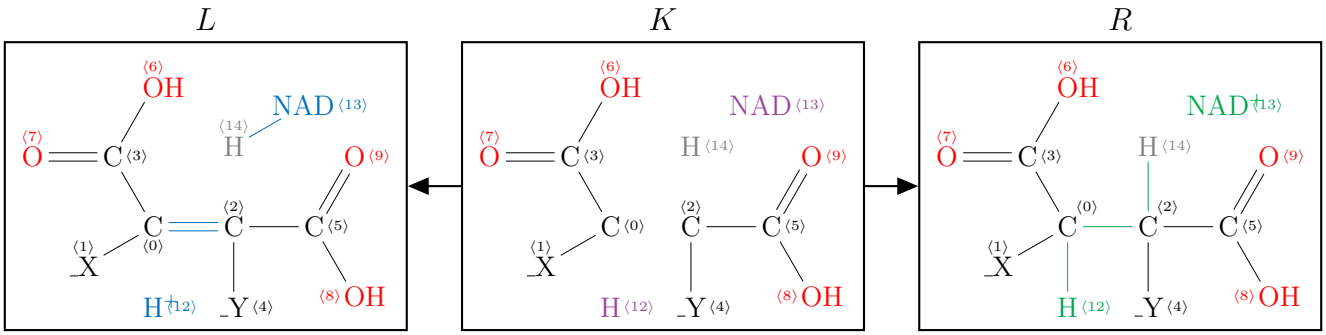
_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}
_Z ∈ {'C', 'H'}

### 0.0.9 rTCA_reduction_fumarate_reductase_01




Files: out/050_r_3_11300110_{L, K, R}

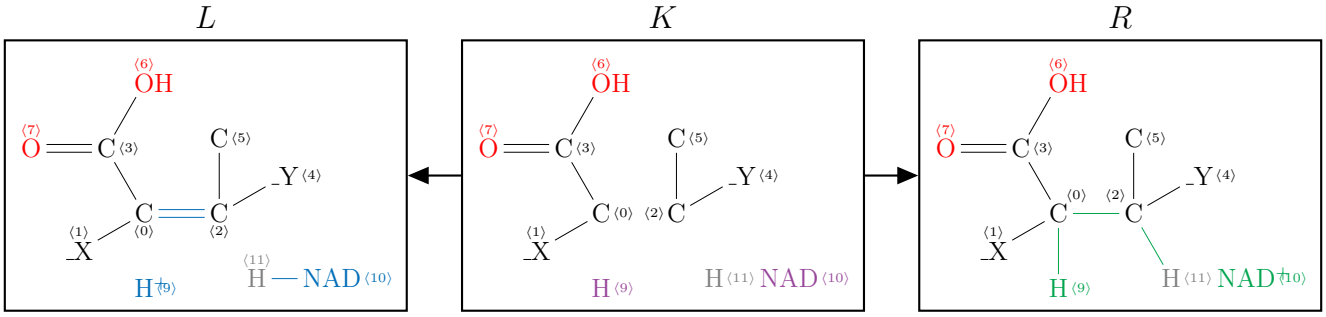
### 0.0.10 rTCA_reduction_fumarate_reductase_01_1




Files: out/053_r_4_11300110_{L, K, R}

_X ∈ {'H', 'C'}
_Y ∈ {'H', 'C'}

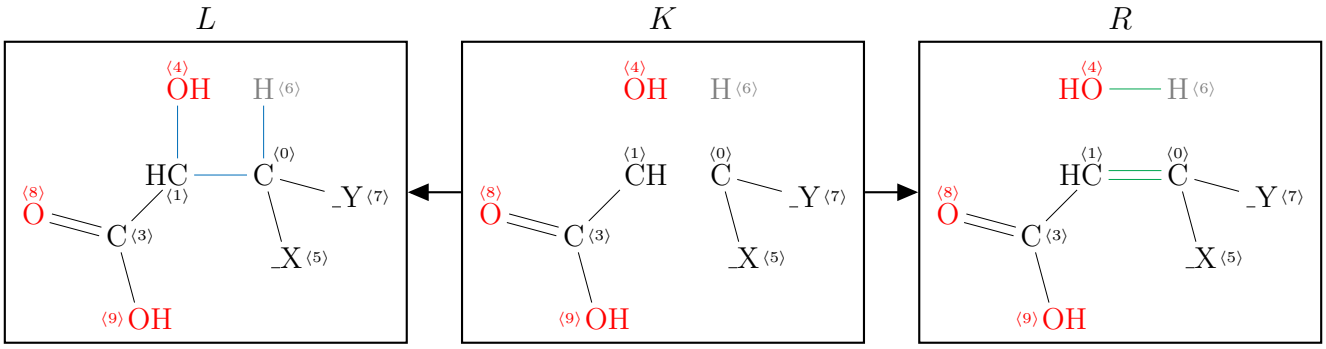
### 0.0.11 rTCA_reduction_fumarate_reductase_01_2




Files: out/056_r_5_11300110_{L, K, R}

_X ∈ {'H', 'C'}
_Y ∈ {'H', 'C'}

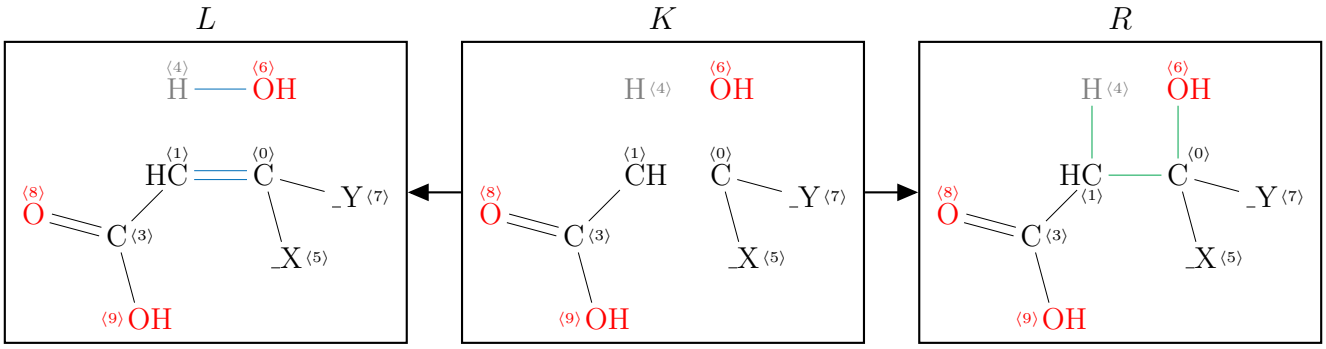
### 0.0.12 rTCA_dehydration_fumarase_01




Files: out/059_r_6_11300110_{L, K, R}

_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}

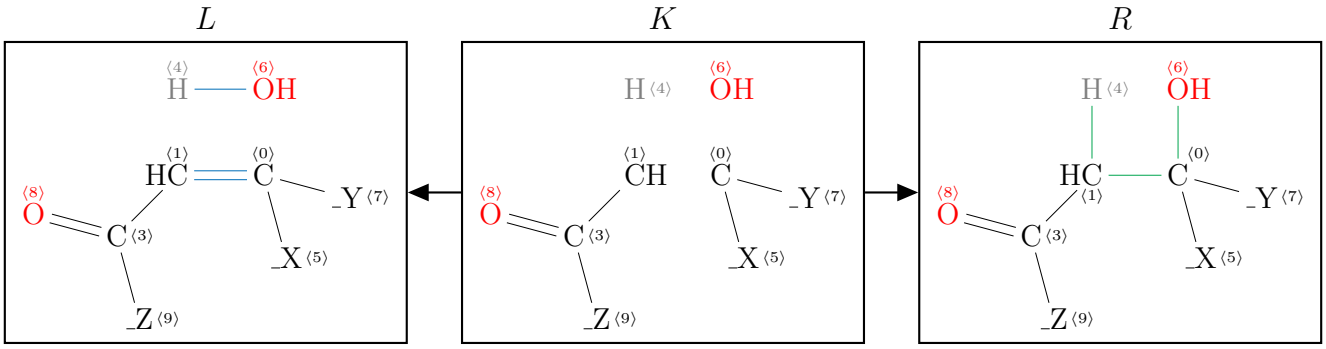
### 0.0.13 rTCA_dehydration_rehydration_aconitase_02




Files: out/062_r_7_11300110_{L, K, R}

_X ∈ {'C'}
_Y ∈ {'C'}

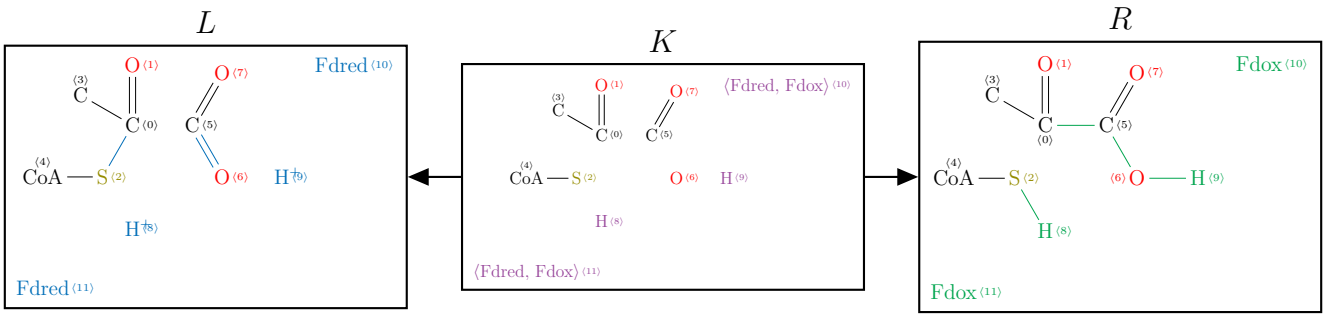
### 0.0.14 rTCA_dehydration_rehydration_crotonase_02_1




Files: out/065_r_8_11300110_{L, K, R}

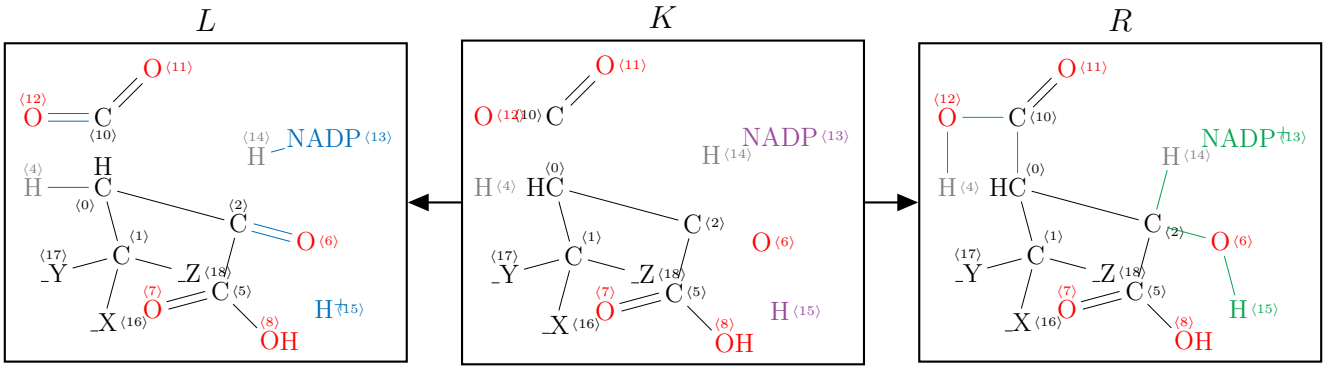
_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}
_Z ∈ {'O', 'S'}

### 0.0.15 rTCA_carboxylation_2KFOR_PFOR_01




Files: out/068_r_9_11300110_{L, K, R}

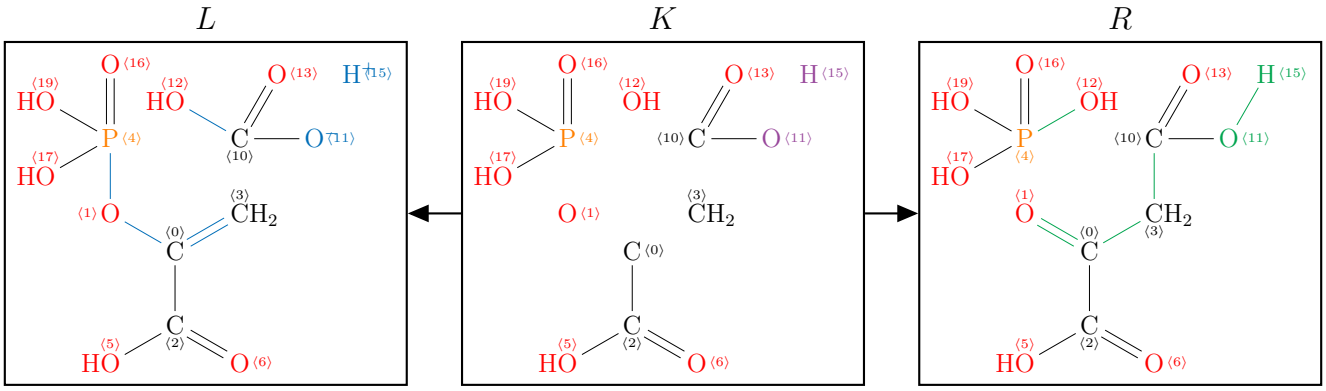
### 0.0.16 rTCA_carboxylation_IDH_01




Files: out/071_r_10_11300110_{L, K, R}

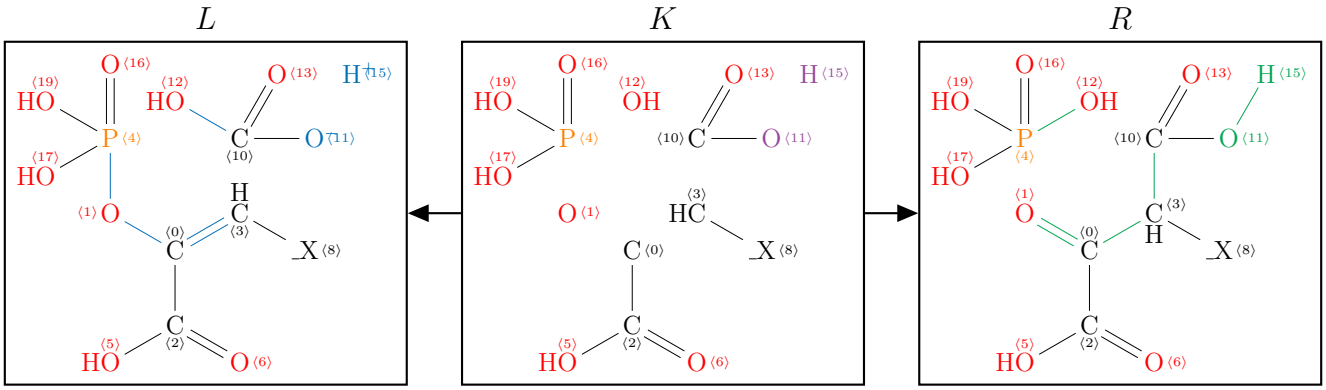
_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}
_Z ∈ {'C', 'H'}

### 0.0.17 rTCA_carboxylation_PEPC_01




Files: out/074_r_11_11300110_{L, K, R}

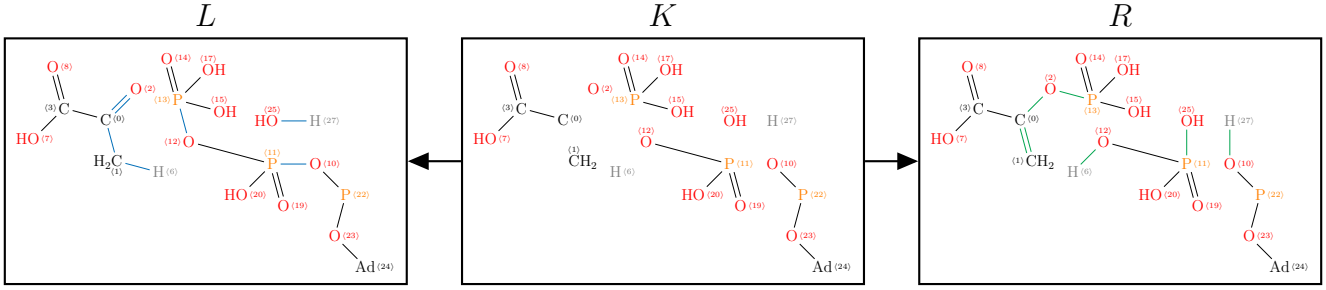
### 0.0.18 rTCA_carboxylation_PEPC_01_1




Files: out/077_r_12_11300110_{L, K, R}

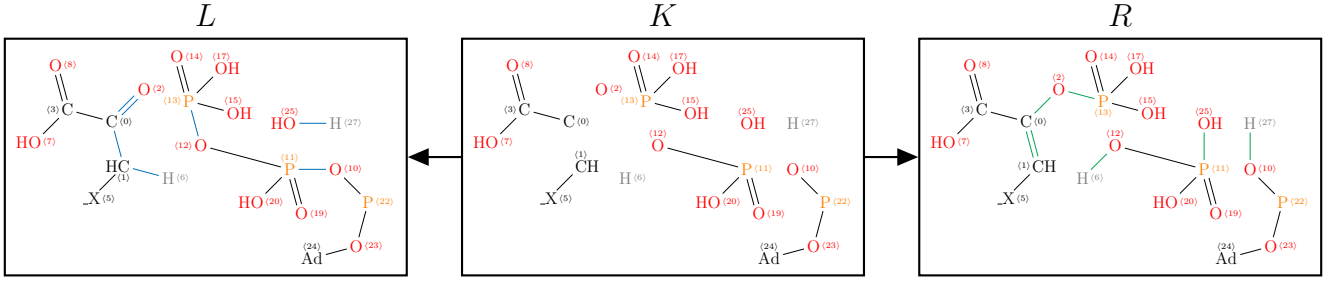
_X ∈ {'H', 'C'}

### 0.0.19 rTCA_activation_dikinase_01




Files: out/080_r_13_11300110_{L, K, R}

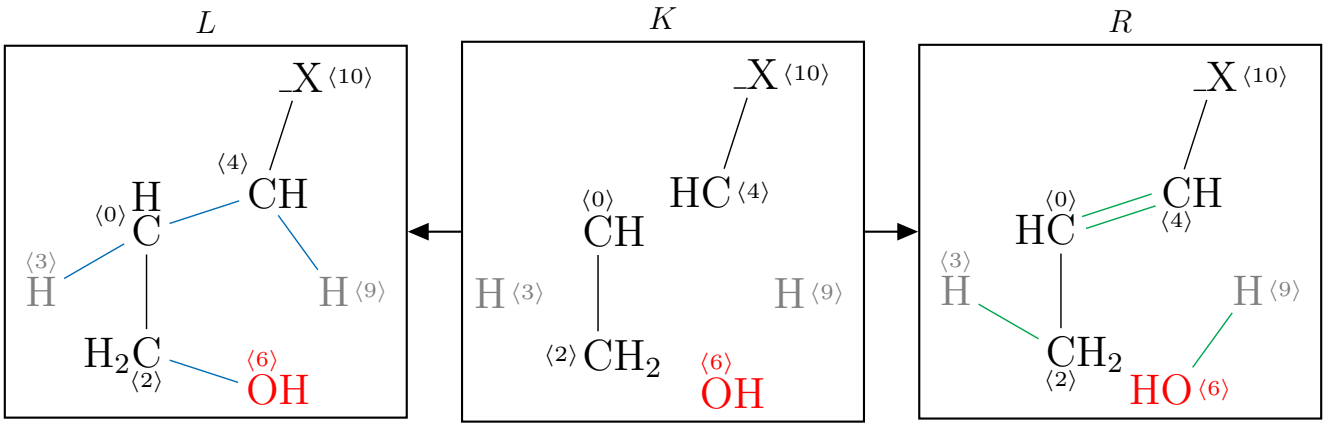
### 0.0.20 rTCA_activation_dikinase_01_1




Files: out/083_r_14_11300110_{L, K, R}

_X ∈ {'H', 'C'}

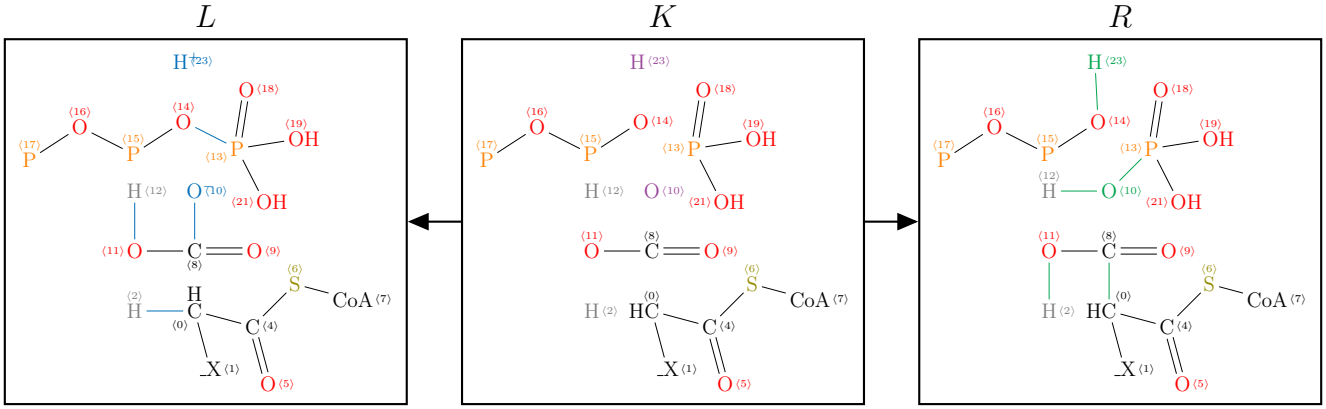
### 0.0.21 3HP4HB_dehydration_4HBCoA_dehydratase_01




Files: out/086_r_15_11300110_{L, K, R}

_X ∈ {'C'}

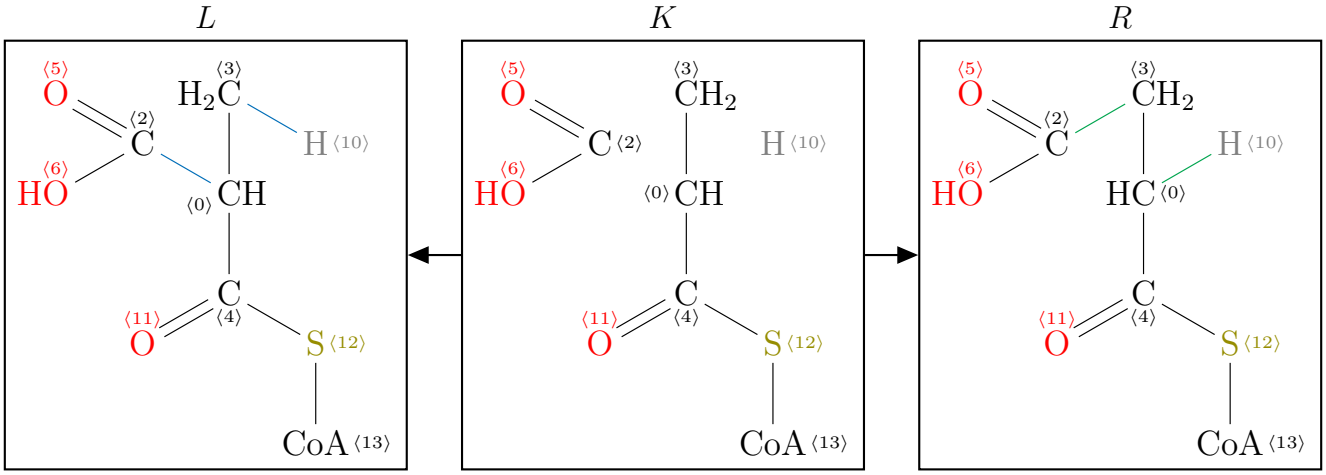
### 0.0.22 3HP4HB_carboxylation_acetyl-CoA_carboxylase_01




Files: out/089_r_16_11300110_{L, K, R}

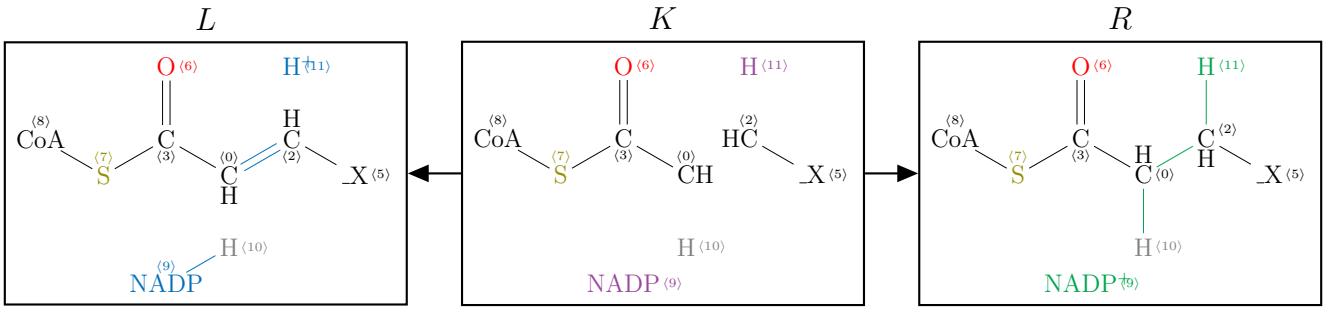
_X ∈ {'C', 'H'}

### 0.0.23 3HP4HB_rearrangement_methylmalonyl-CoA_mutase_01




Files: out/092_r_17_11300110_{L, K, R}

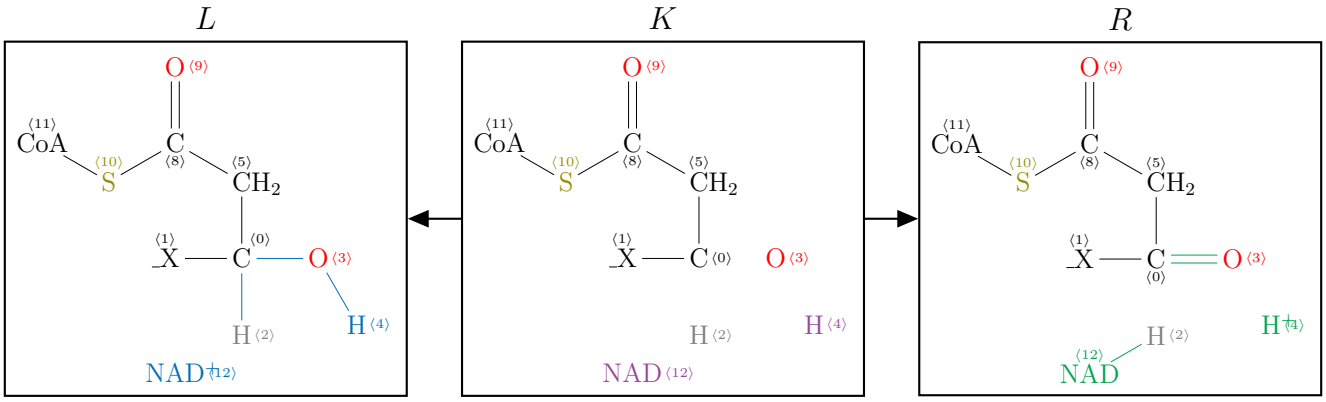
### 0.0.24 3HP4HB_reduction_acrylyl-CoA_reductase_01




Files: out/095_r_18_11300110_{L, K, R}

_X ∈ {'C', 'H'}

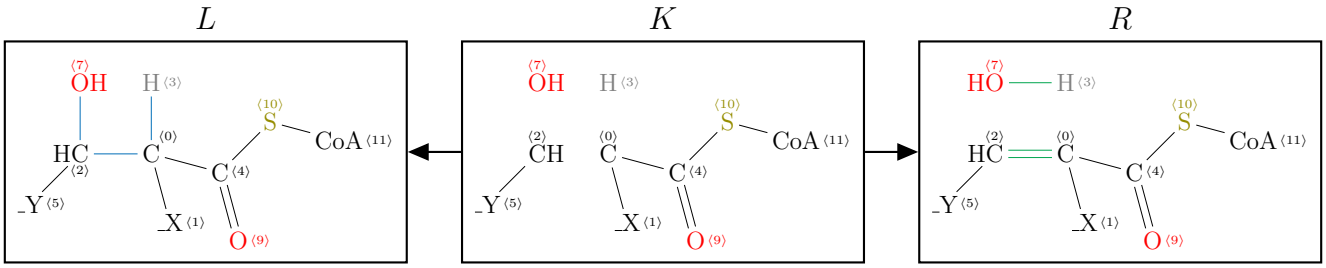
### 0.0.25 3HP4HB_oxidation_3-hydroxybutyryl-CoA_dehydrogenase_01




Files: out/098_r_19_11300110_{L, K, R}

_X ∈ {'C', 'H'}

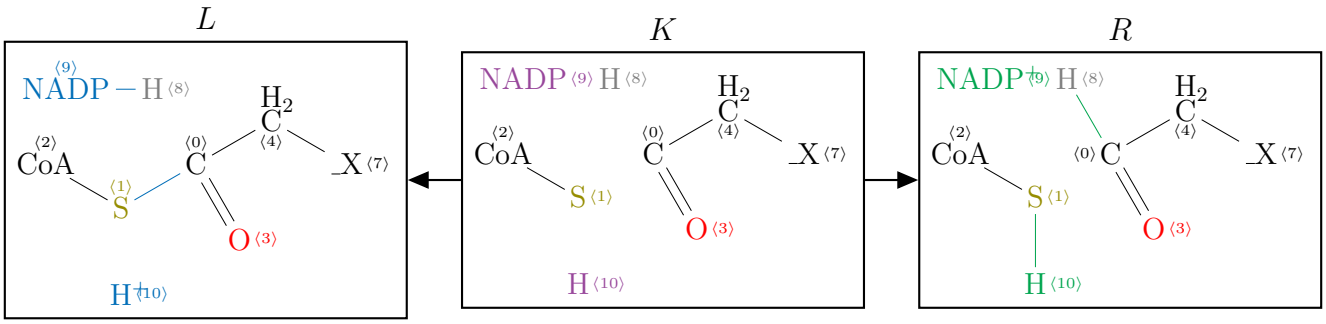
### 0.0.26 3HP4HB_dehydration_3HPCoA_dehydratase_01




Files: out/101_r_20_11300110_{L, K, R}

_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}

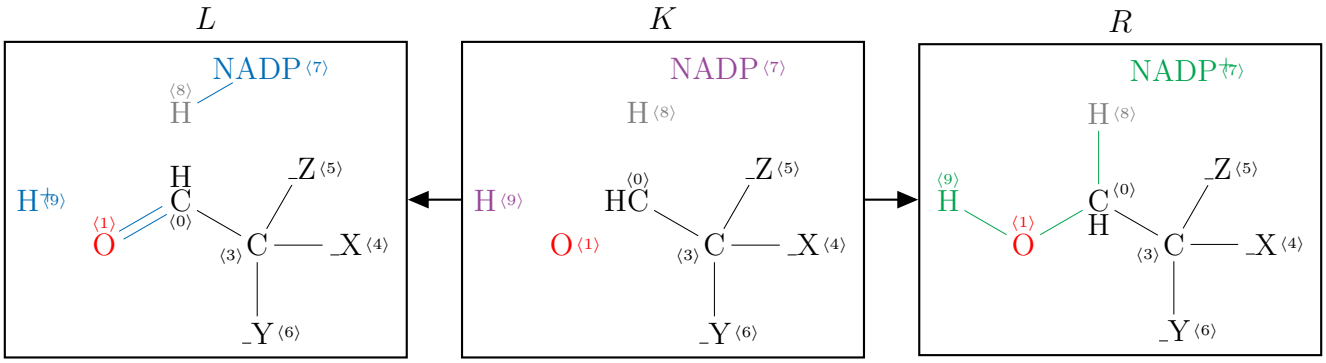
### 0.0.27 3HP4HB_reduction_succinyl-CoA_reductase_01




Files: out/104_r_21_11300110_{L, K, R}

_X ∈ {'C'}

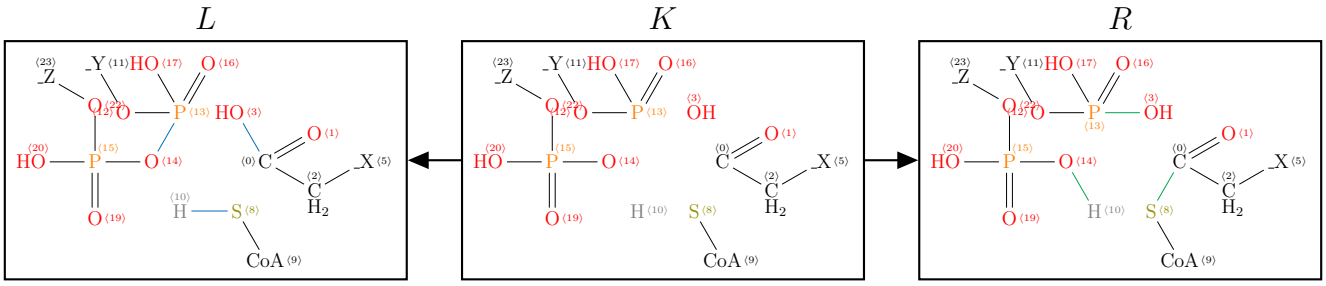
### 0.0.28 3HP4HB_reduction_3-hydroxypropionate_dehydrogenase_01




Files: out/107_r_22_11300110_{L, K, R}

_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}
_Z ∈ {'C', 'H'}

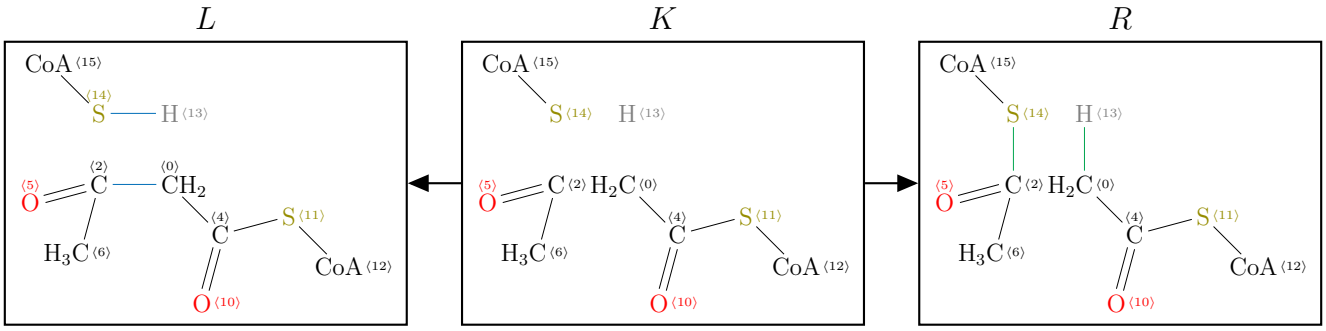
### 0.0.29 3HP4HB_activation_4HBCoA_synthetase_01




Files: out/110_r_23_11300110_{L, K, R}

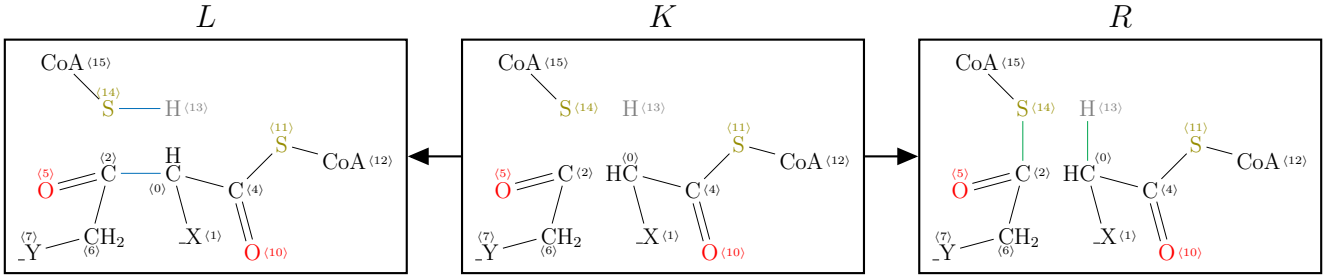
_X ∈ {'C'}
_Y ∈ {'H', 'P'}
_Z ∈ {'P', 'Ad'}

### 0.0.30 3HP4HB_transferase_acetyl-CoA_C-acyltransferase_01




Files: out/113_r_24_11300110_{L, K, R}

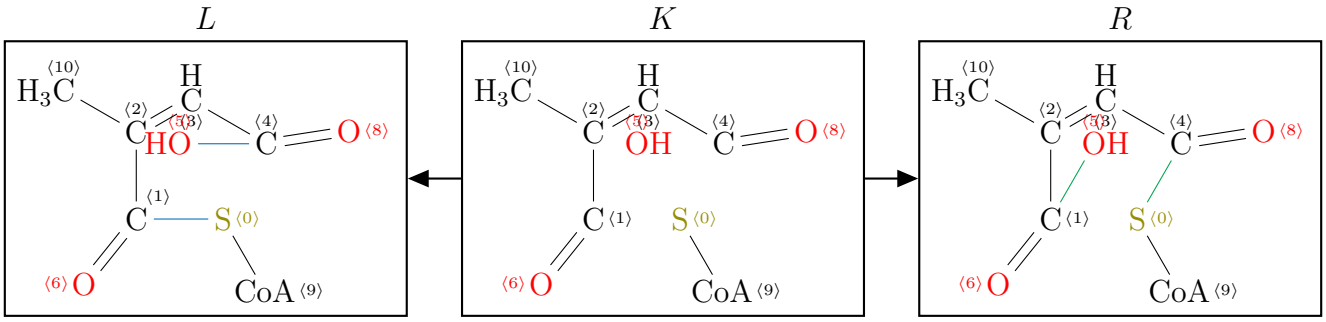
### 0.0.31 3HP4HB_transferase_acetyl-CoA_C-acyltransferase_01_1




Files: out/116_r_25_11300110_{L, K, R}

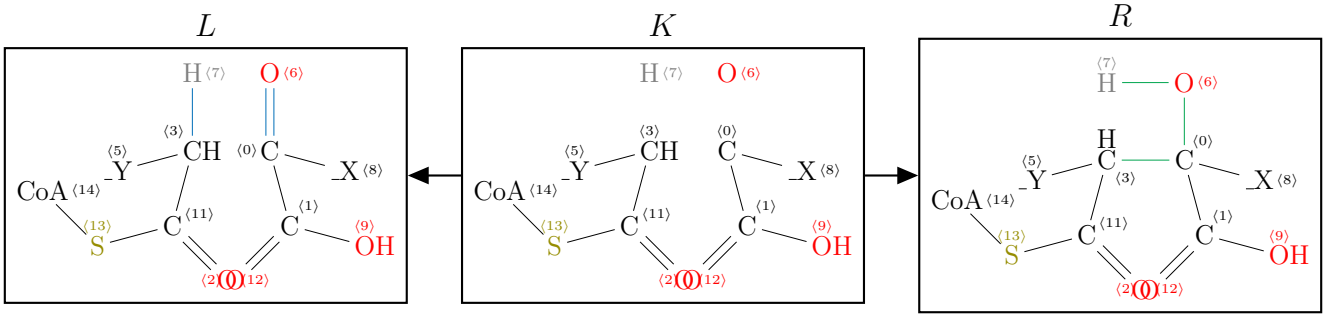
_X ∈ {'H', 'C'}
_Y ∈ {'H', 'C'}

### 0.0.32 3HPbicy_mesaconyl_C1_C4_CoA_transferase_01




Files: out/119_r_26_11300110_{L, K, R}

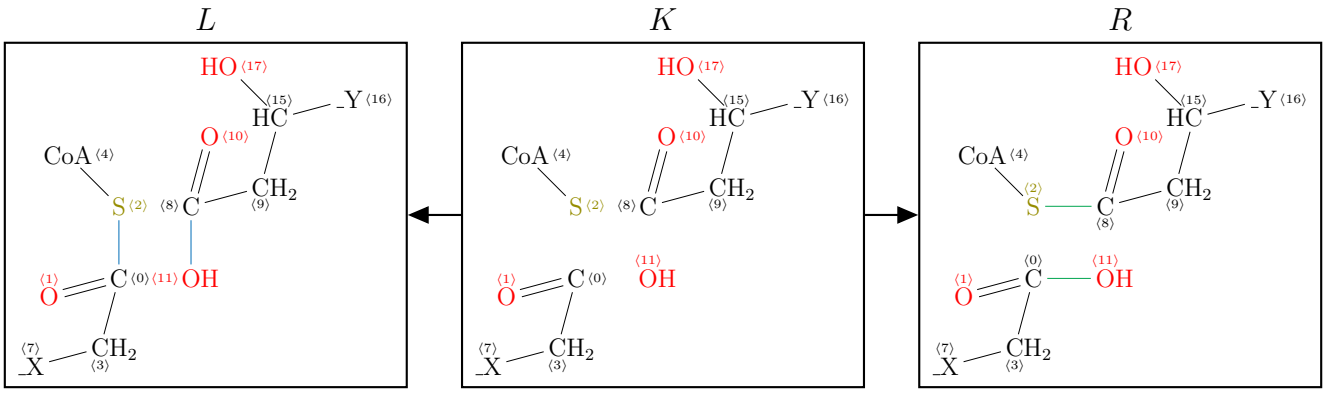
### 0.0.33 3HPbicy_activation_methylmalyl-CoA_lyase_01




Files: out/122_r_27_11300110_{L, K, R}

_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}

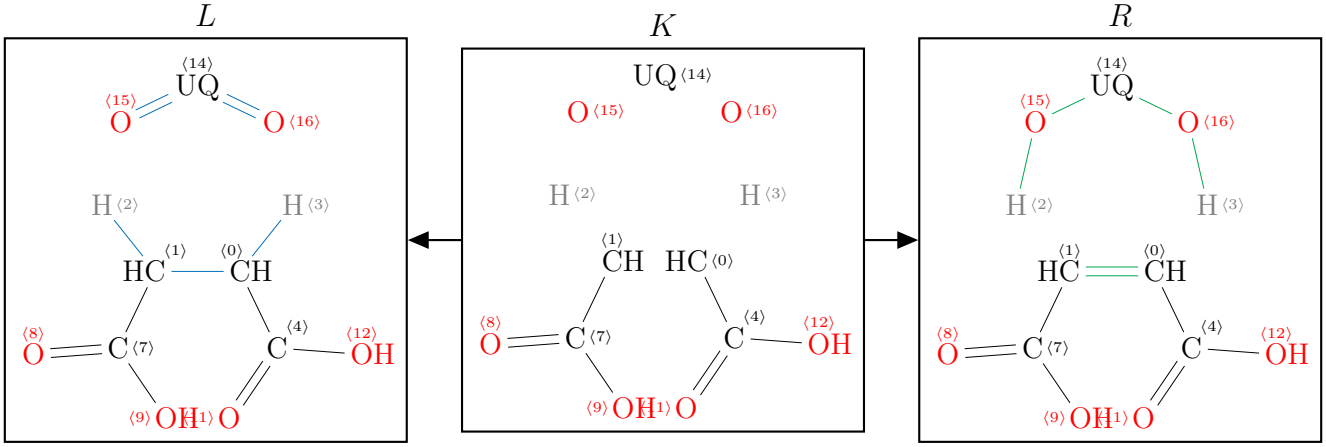
### 0.0.34 3HPbicy_transferase_succinyl-CoA_malate-CoA_transferase_01




Files: out/125_r_28_11300110_{L, K, R}

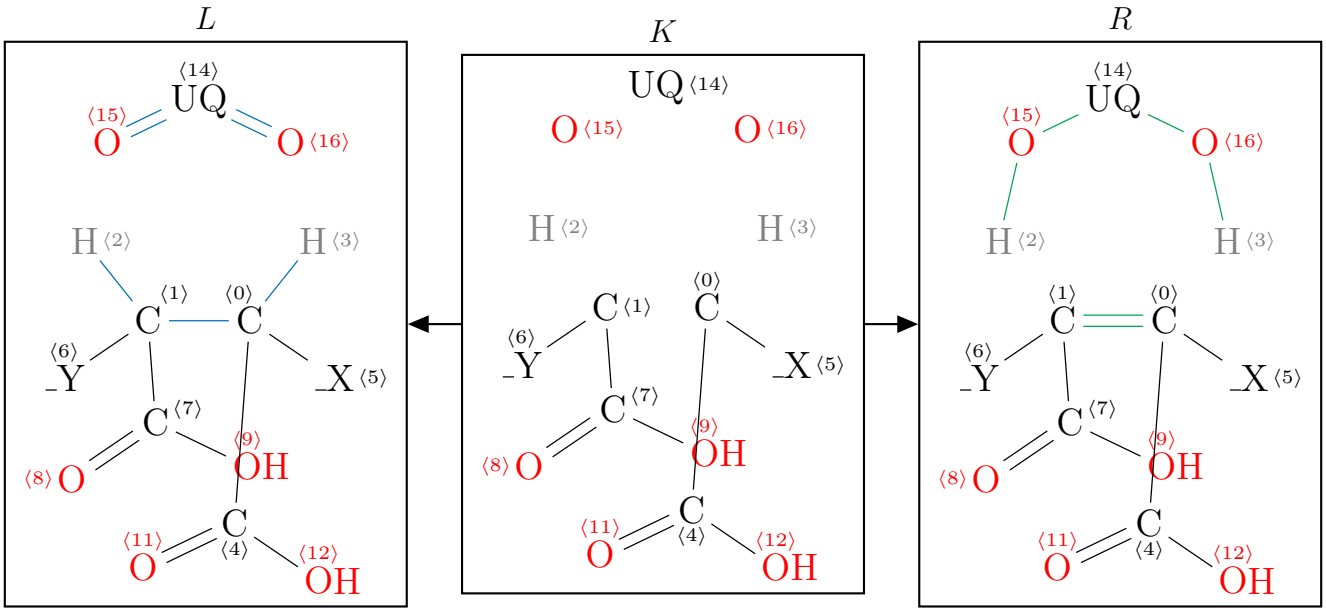
_X ∈ {'C'}
_Y ∈ {'C'}

### 0.0.35 3HPbicy_oxidation_succinate_dehydrogenase_01




Files: out/128_r_29_11300110_{L, K, R}

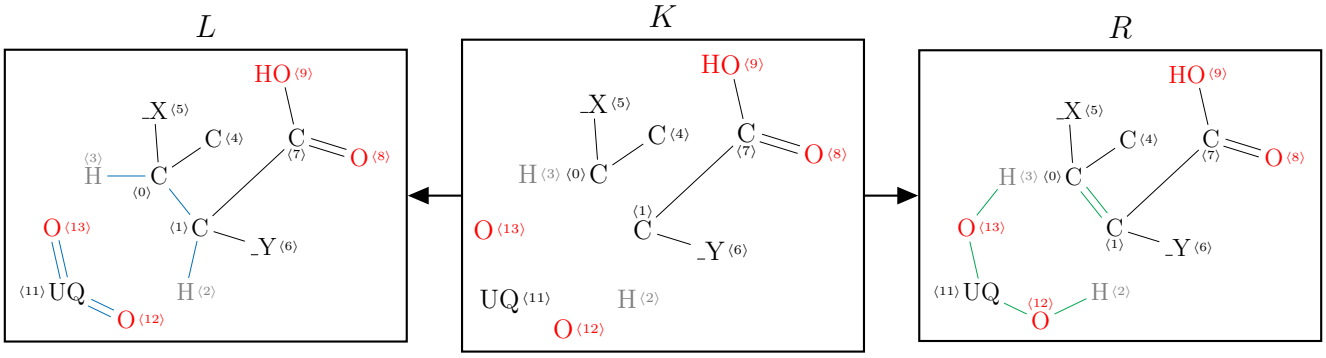
### 0.0.36 3HPbicy_oxidation_succinate_dehydrogenase_01_1




Files: out/131_r_30_11300110_{L, K, R}

_X ∈ {'H', 'C'}
_Y ∈ {'H', 'C'}

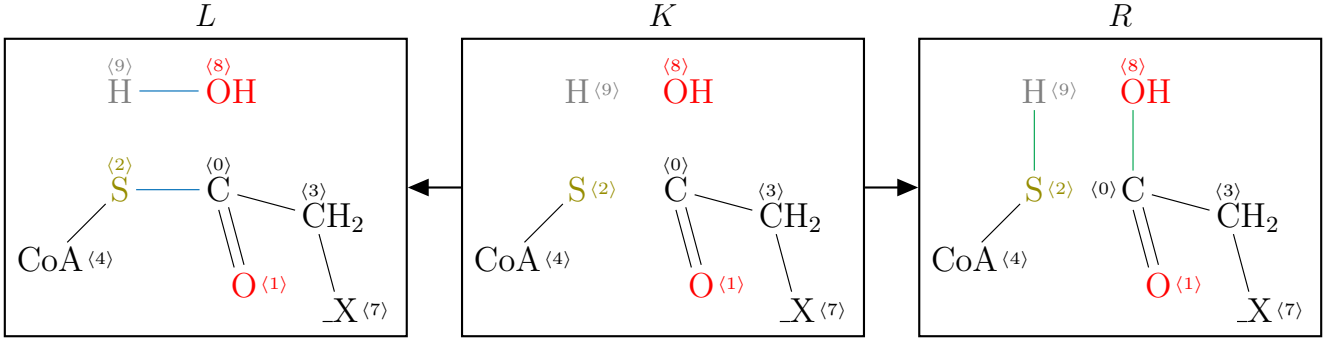
### 0.0.37 3HPbicy_oxidation_succinate_dehydrogenase_01_2




Files: out/134_r_31_11300110_{L, K, R}

_X ∈ {'H', 'C'}
_Y ∈ {'H', 'C'}

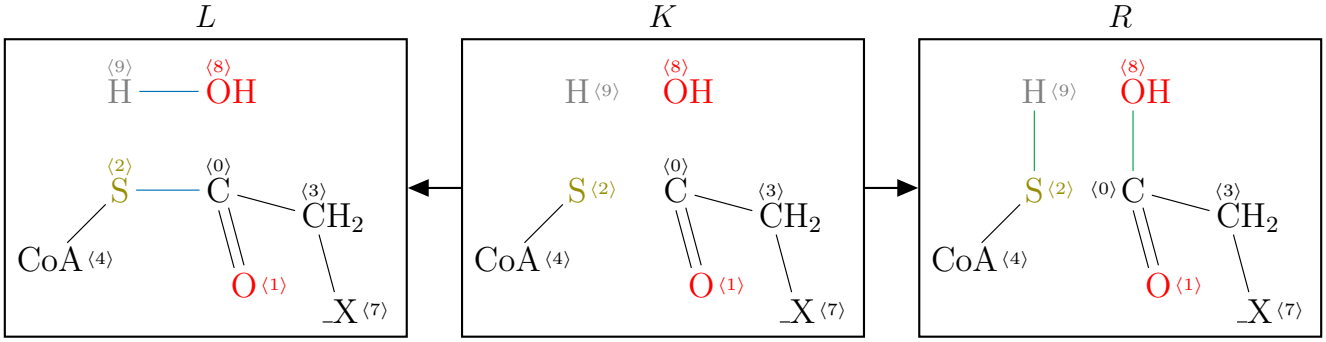
### 0.0.38 3HPbicy_transferase_succinyl-CoA_malate-CoA_transferase_a_01




Files: out/137_r_32_11300110_{L, K, R}

_X ∈ {'C'}

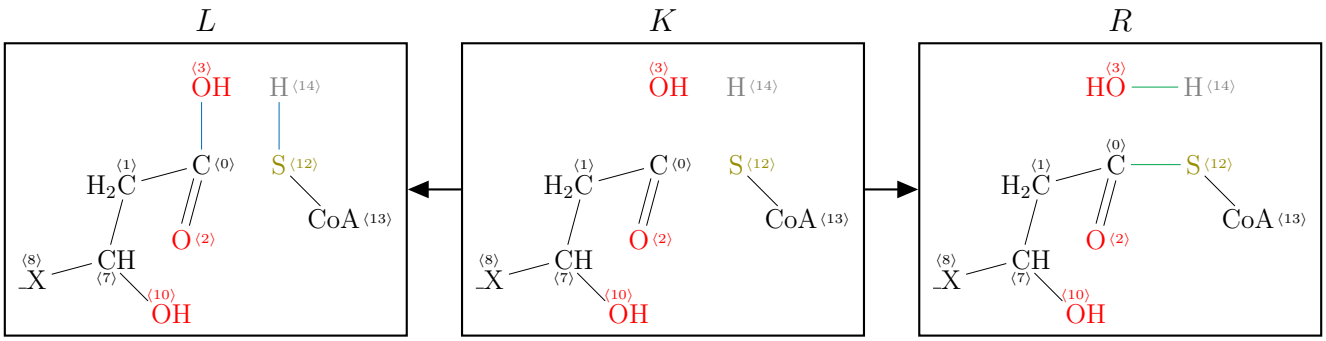
### 0.0.39 3HPbicy_transferase_succinyl-CoA_malate-CoA_transferase_a_01




Files: out/140_r_33_11300110_{L, K, R}

_X ∈ {'H', 'C'}

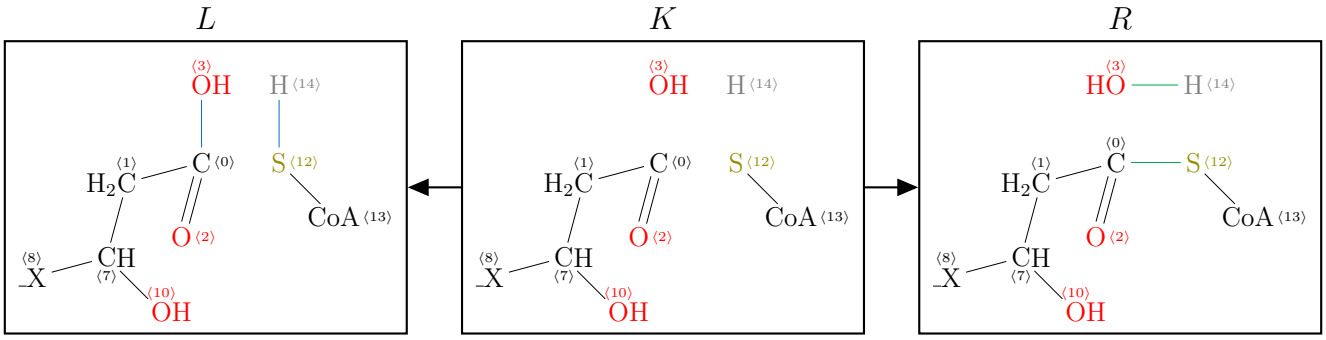
### 0.0.40 3HPbicy_transferase_succinyl-CoA_malate-CoA_transferase_b_01




Files: out/143_r_34_11300110_{L, K, R}

_X ∈ {'C'}

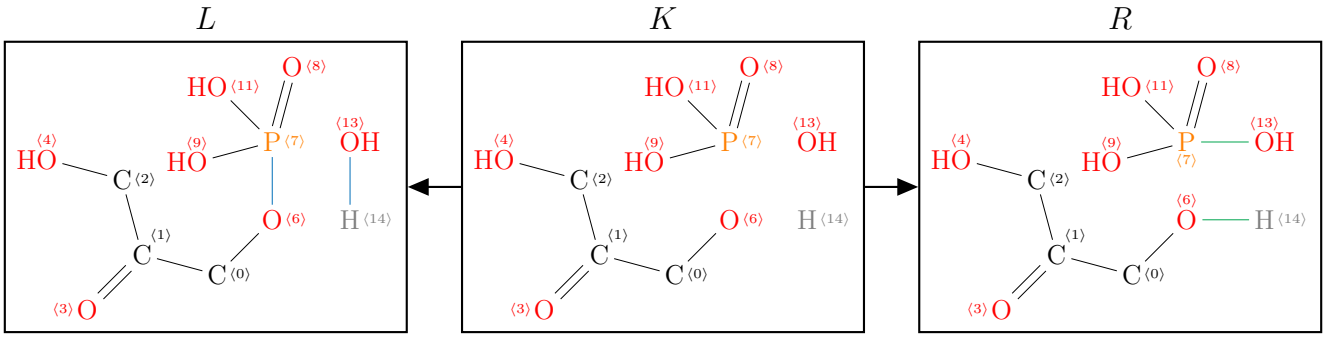
### 0.0.41 3HPbicy_transferase_succinyl-CoA_malate-CoA_transferase_b_01




Files: out/146_r_35_11300110_{L, K, R}

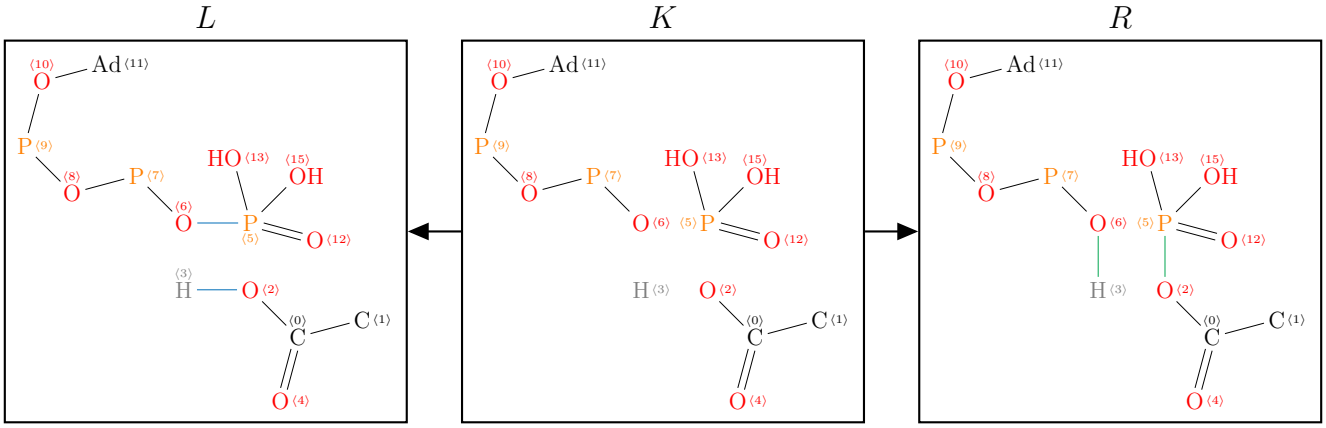
_X ∈ {'H', 'C'}

### 0.0.42 CBB_activation_s1,7p_f1,5p_bisphosphatase_01



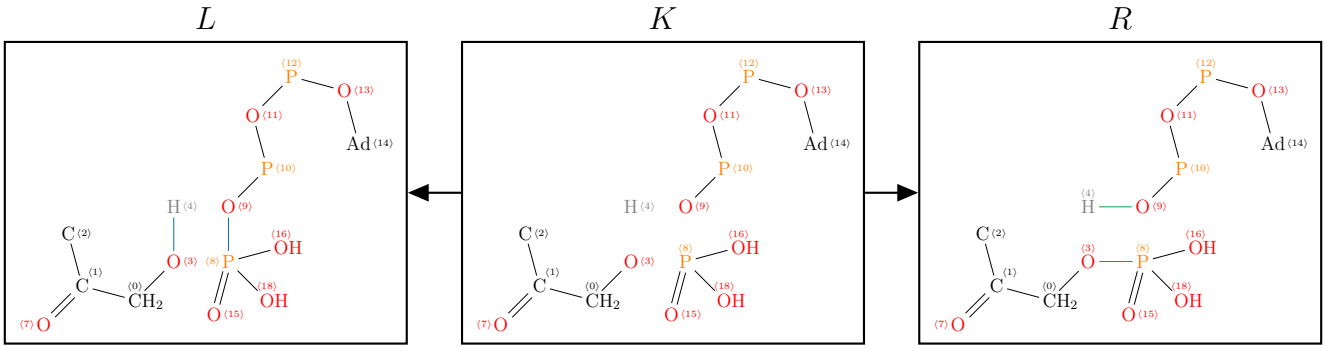

Files: out/149_r_36_11300110_{L, K, R}

### 0.0.43 CBB_phosphoglycerate_kinase_01



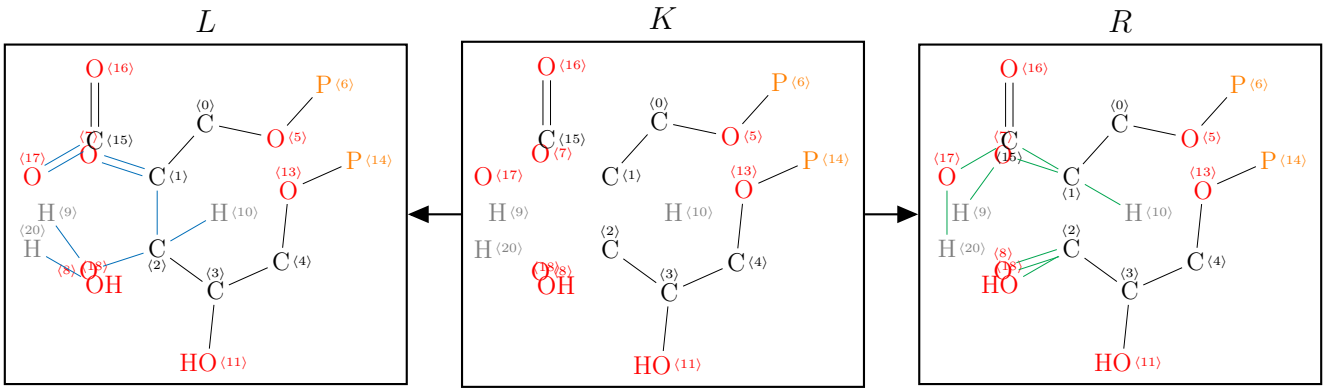

Files: out/152_r_37_11300110_{L, K, R}

### 0.0.44 CBB_ribulose-5-P_kinase_01



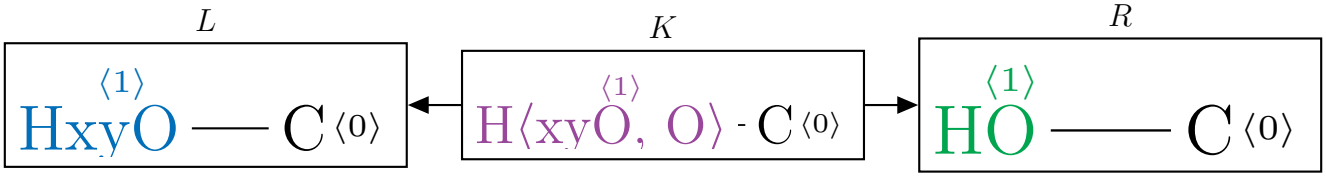

Files: out/155_r_38_11300110_{L, K, R}

### 0.0.45 CBB_RuBisCo_carboxylation_01



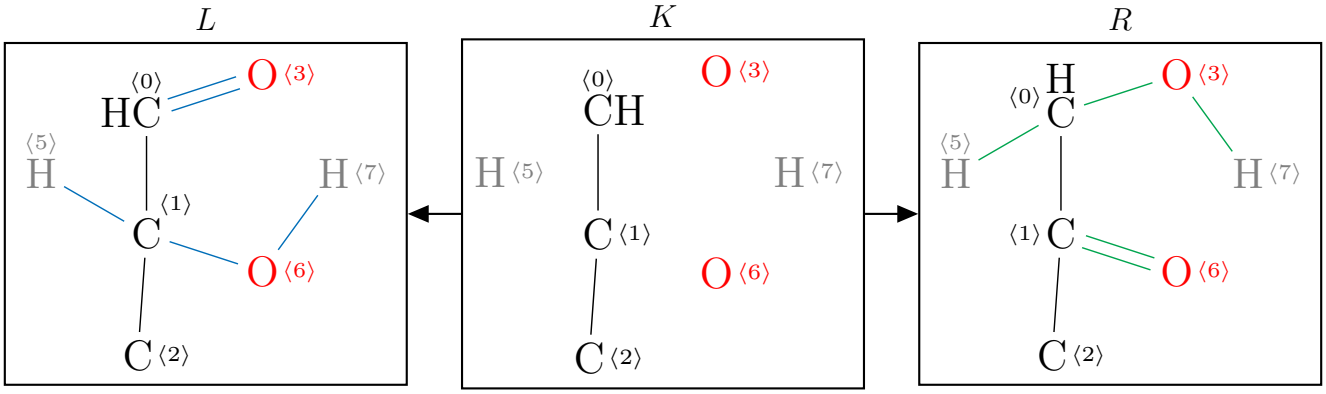

Files: out/158_r_39_11300110_{L, K, R}

### 0.0.46 CBB_ribulose-5-P_epimerase



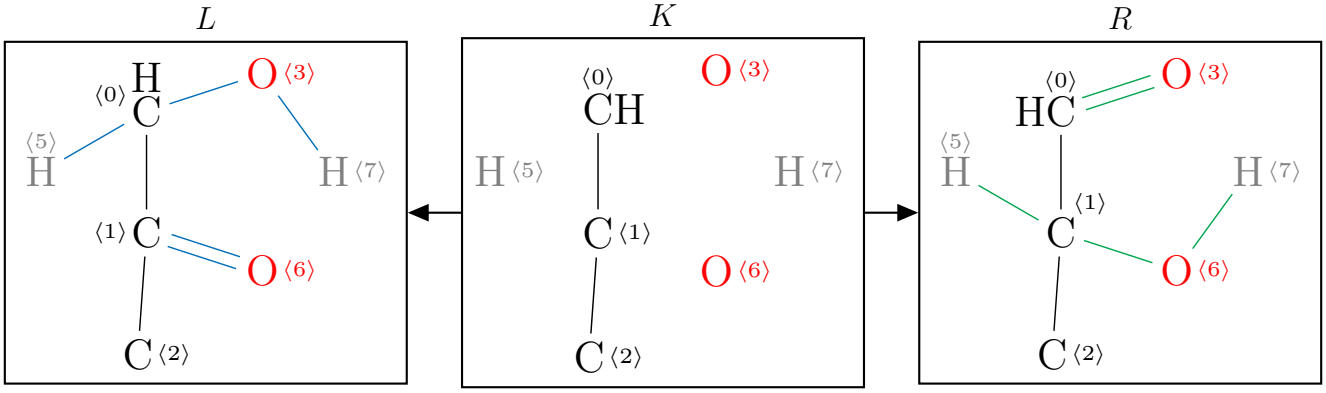

Files: out/161_r_40_11300110_{L, K, R}

### 0.0.47 CBB_ribose-5-P_isomerase_01



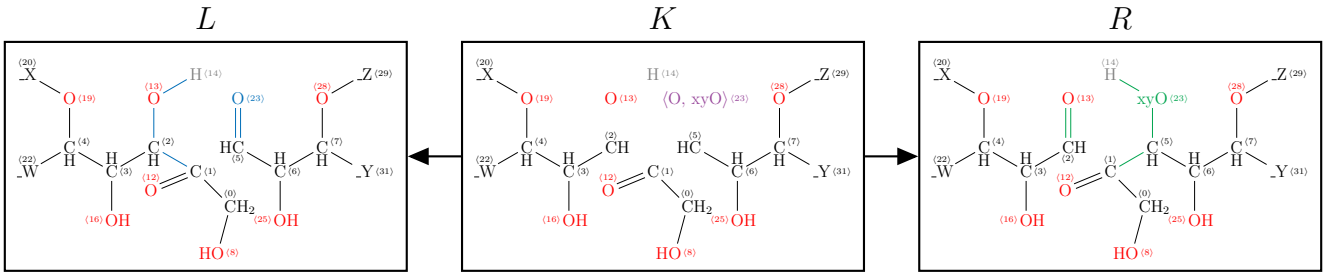

Files: out/164_r_41_11300110_{L, K, R}

### 0.0.48 CBB_ribose-5-P_isomerase_01




Files: out/167_r_42_11300110_{L, K, R}

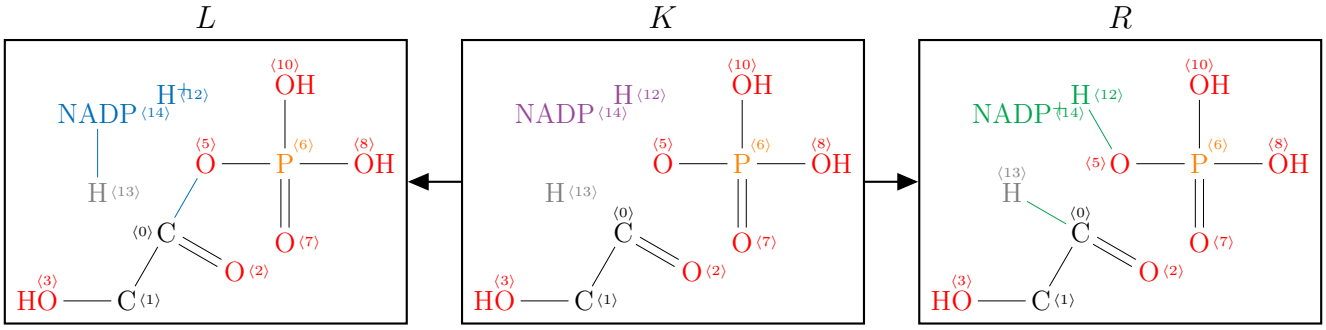
### 0.0.49 CBB_transketolase_01




Files: out/170_r_43_11300110_{L, K, R}

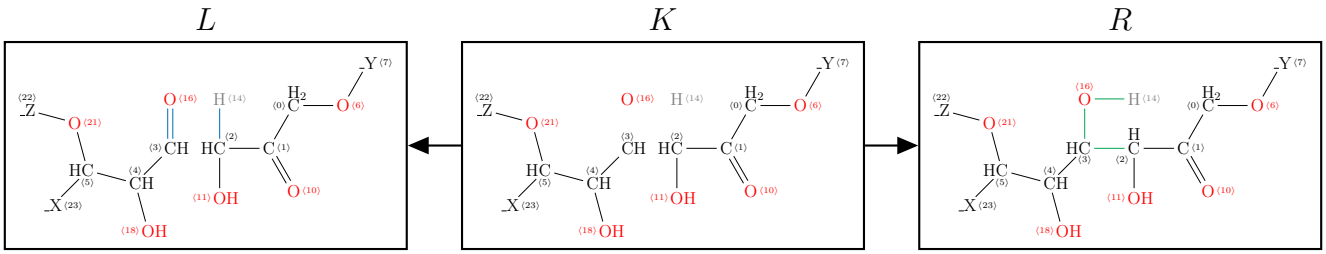
_W ∈ {'H', 'C'}
_X ∈ {'H', 'P'}
_Y ∈ {'H', 'C'}
_Z ∈ {'H', 'P'}

### 0.0.50 CBB_GAP_dehydrogenase_01




Files: out/173_r_44_11300110_{L, K, R}

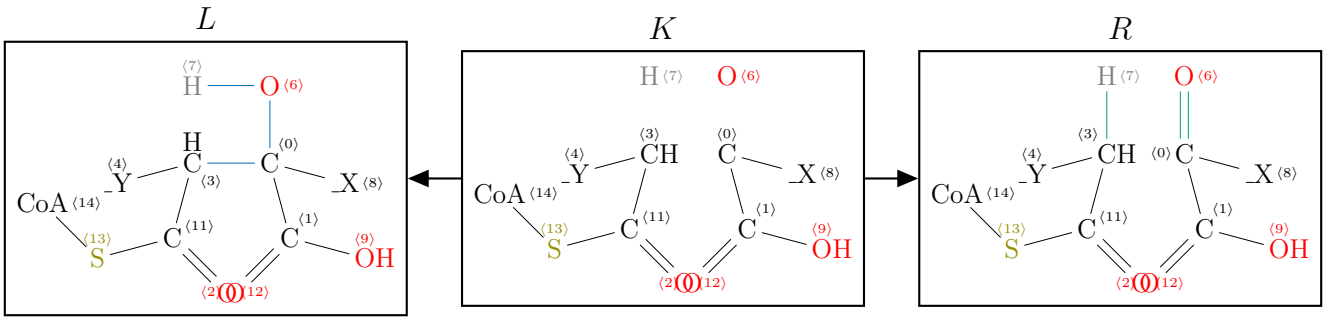
### 0.0.51 CBB_fructose-1,6-bisP_aldolase_01




Files: out/176_r_45_11300110_{L, K, R}

_X ∈ {'H', 'C'}
_Y ∈ {'P'}
_Z ∈ {'H', 'P'}

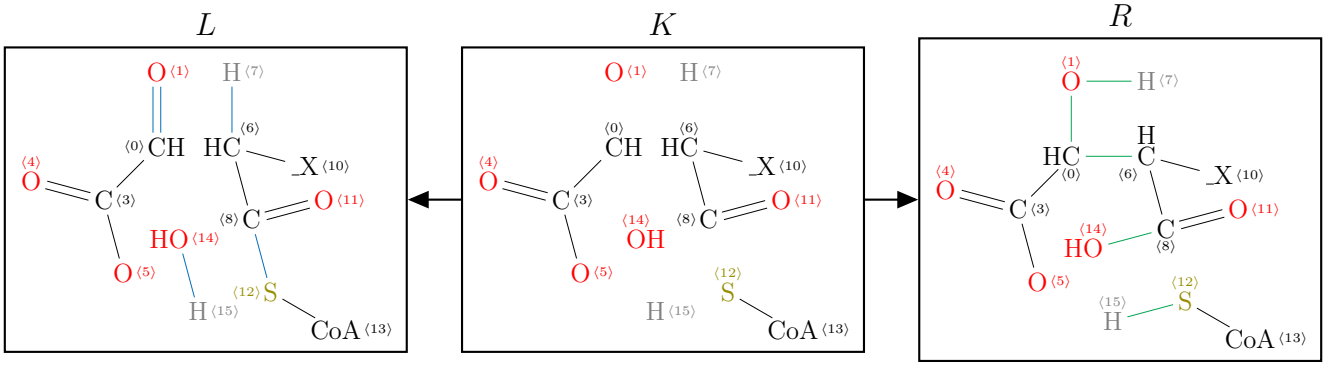
### 0.0.52 CETCH_activation_methylmalyl-CoA_lyase_01




Files: out/179_r_46_11300110_{L, K, R}

_Y ∈ {'C', 'H'}
_X ∈ {'C', 'H'}

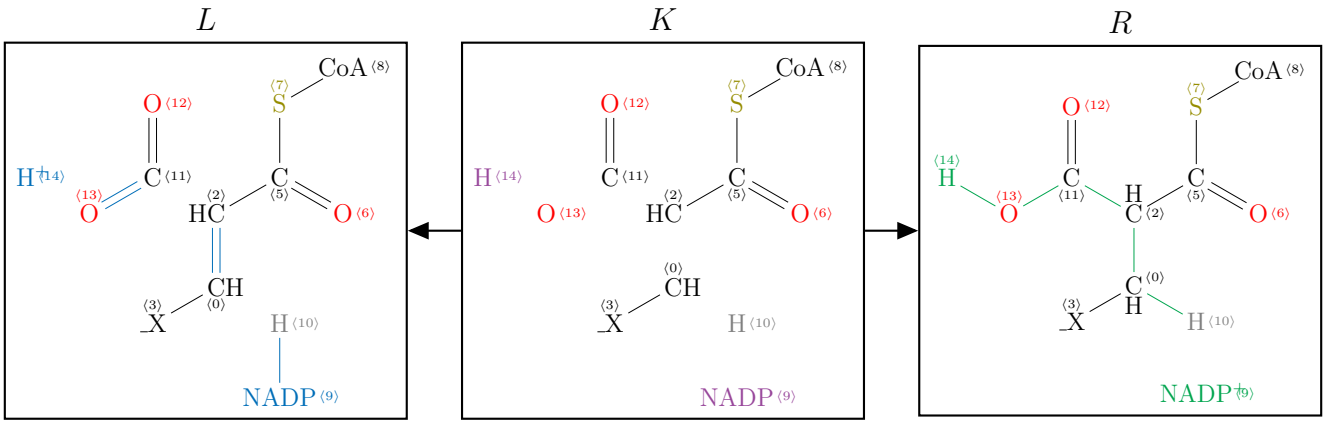
### 0.0.53 CETCH_activation_lysis_malate_synthase_02




Files: out/182_r_47_11300110_{L, K, R}

_X ∈ {'C', 'H'}

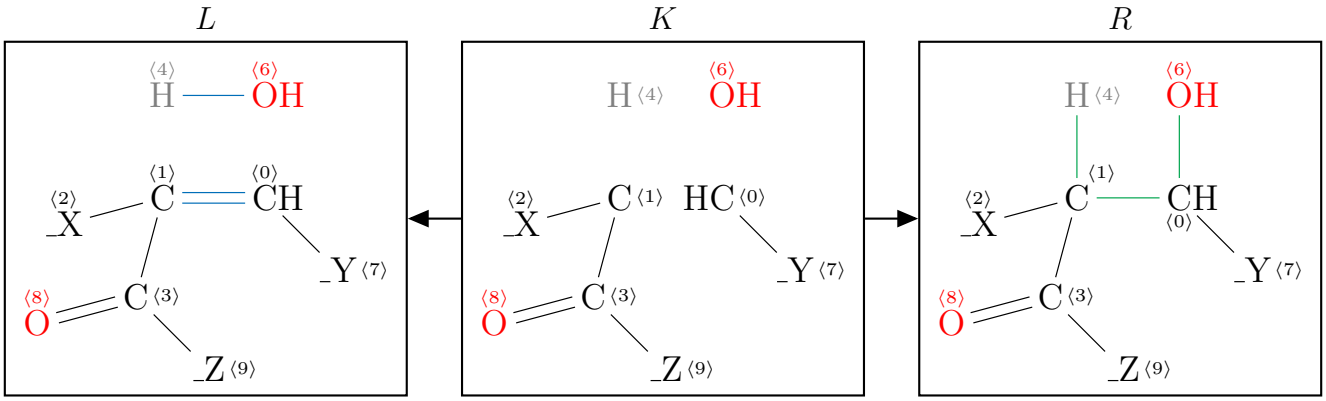
### 0.0.54 CETCH_carboxylation_ccr_carboxylase/reductase_01




Files: out/185_r_48_11300110_{L, K, R}

_X ∈ {'C', 'H'}

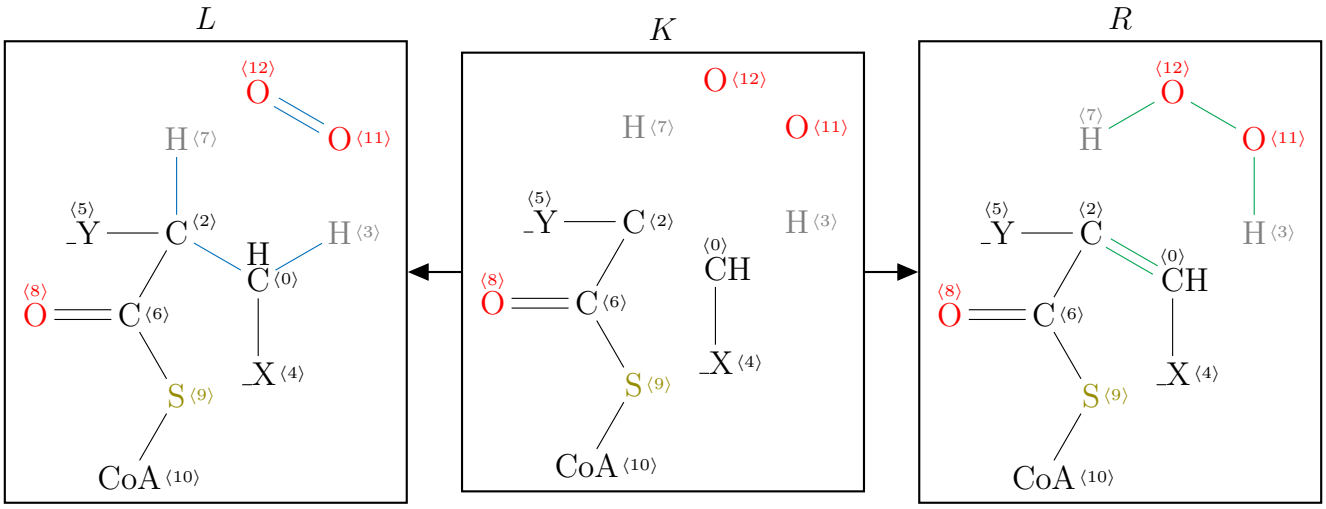
### 0.0.55 CETCH_dehydration_rehydration_mesCoA_hydratase_02_2




Files: out/188_r_49_11300110_{L, K, R}

_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}
_Z ∈ {'O', 'S'}

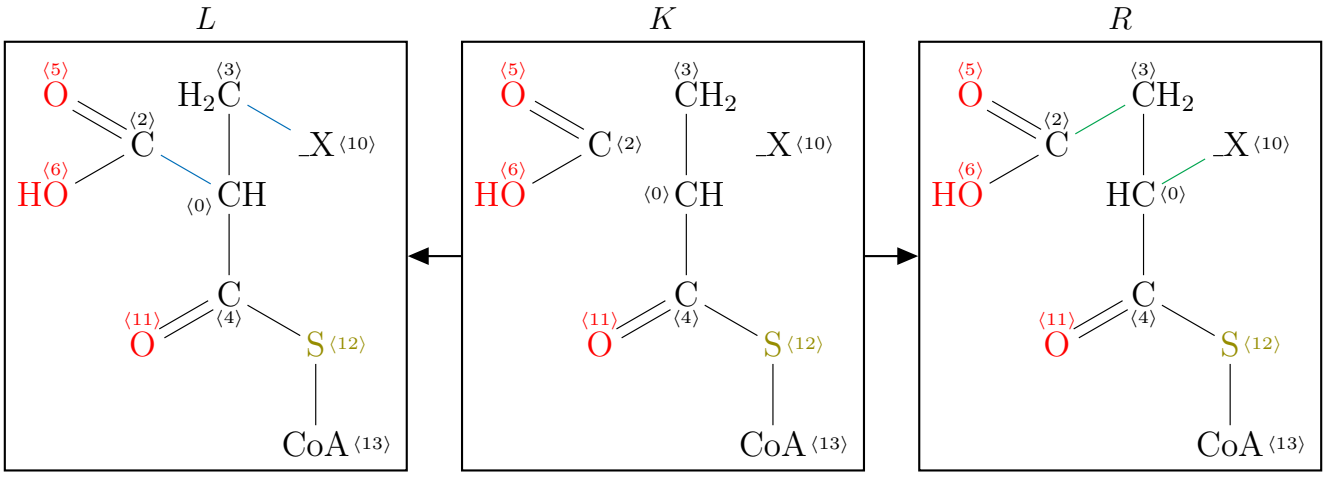
### 0.0.56 CETCH_oxidation_propionyl-CoA/methylsuccinyl-CoA_oxidase_01




Files: out/191_r_50_11300110_{L, K, R}

_X ∈ {'C', 'H'}
_Y ∈ {'C', 'H'}

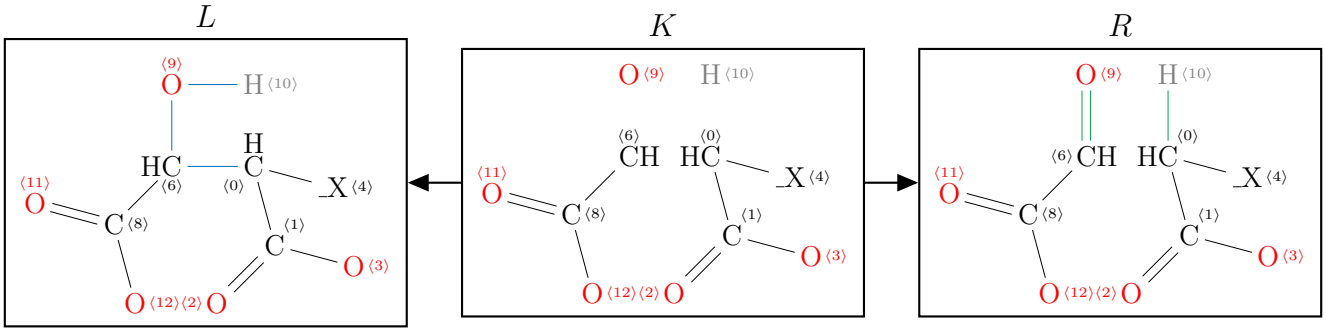
### 0.0.57 CETCH_rearrangement_ethylmalonyl-CoA_mutase_02




Files: out/194_r_51_11300110_{L, K, R}

_X ∈ {'C', 'H'}

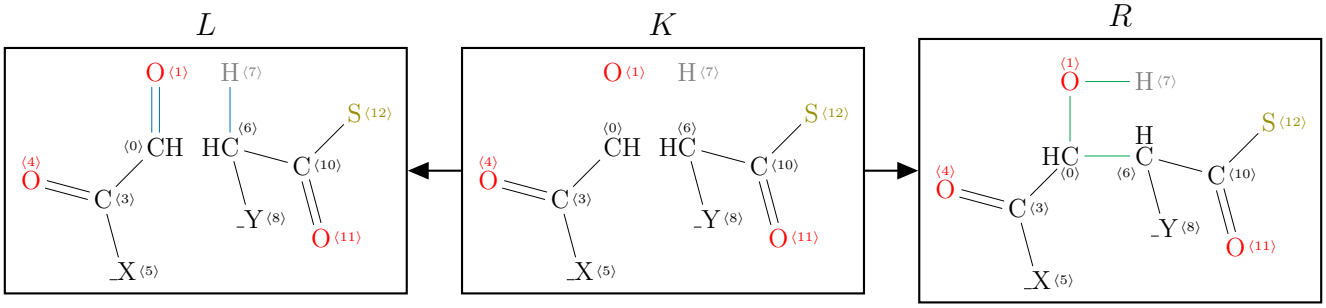
### 0.0.58 GLYOX_lysis_isocitrate_lyase_01




Files: out/197_r_52_11300110_{L, K, R}

_X ∈ {'H', 'C'}

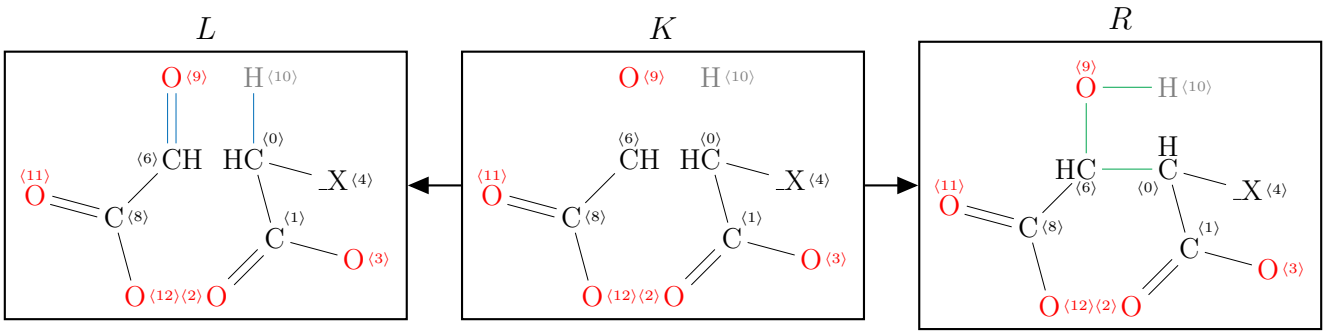
### 0.0.59 GLYOX_activation_malate_synthase_a_01




Files: out/200_r_53_11300110_{L, K, R}

_X ∈ {'O', 'S'}
_Y ∈ {'C', 'H'}

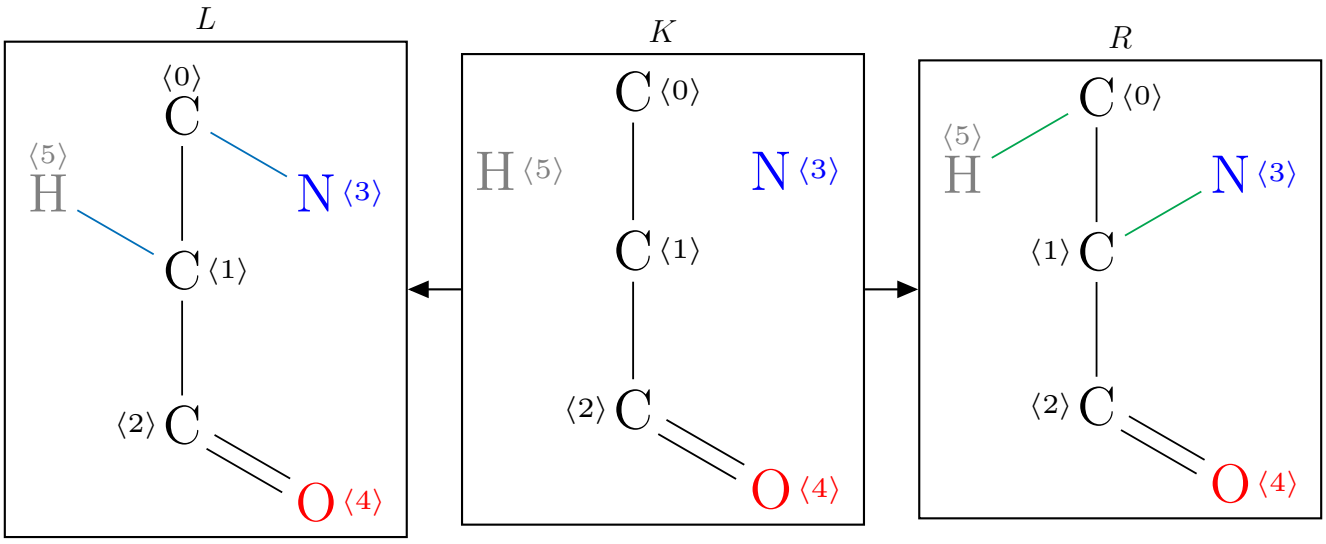
### 0.0.60 GLYOX_lysis_isocitrate_lyase_02_reverse




Files: out/203_r_54_11300110_{L, K, R}

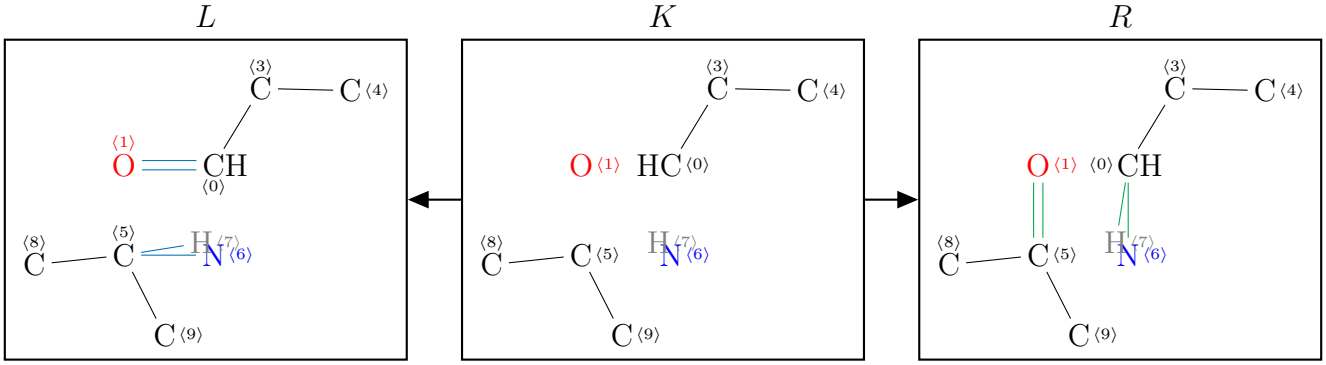
_X ∈ {'H', 'C'}

### 0.0.61 GLYOX_alanine_2,3_aminomutase_01



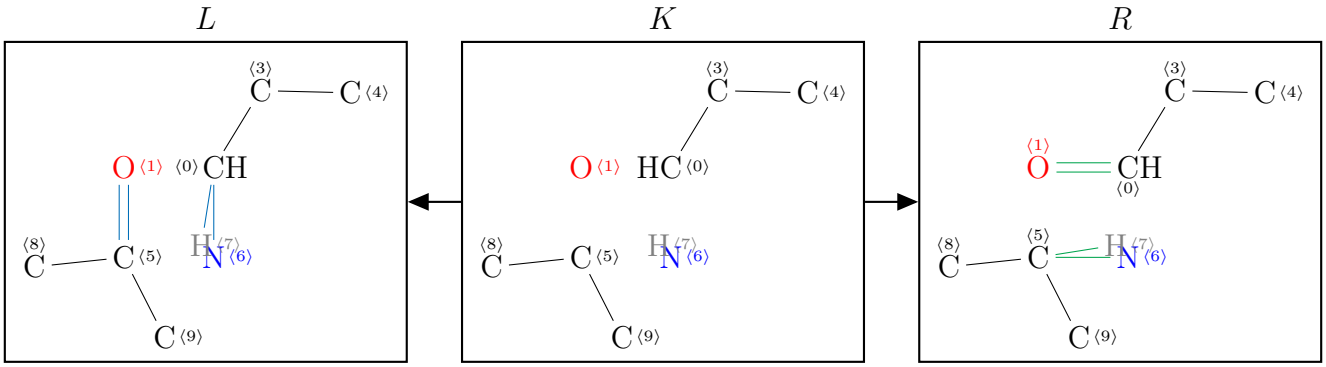

Files: out/206_r_55_11300110_{L, K, R}

### 0.0.62 GLYOX_transaminase_01



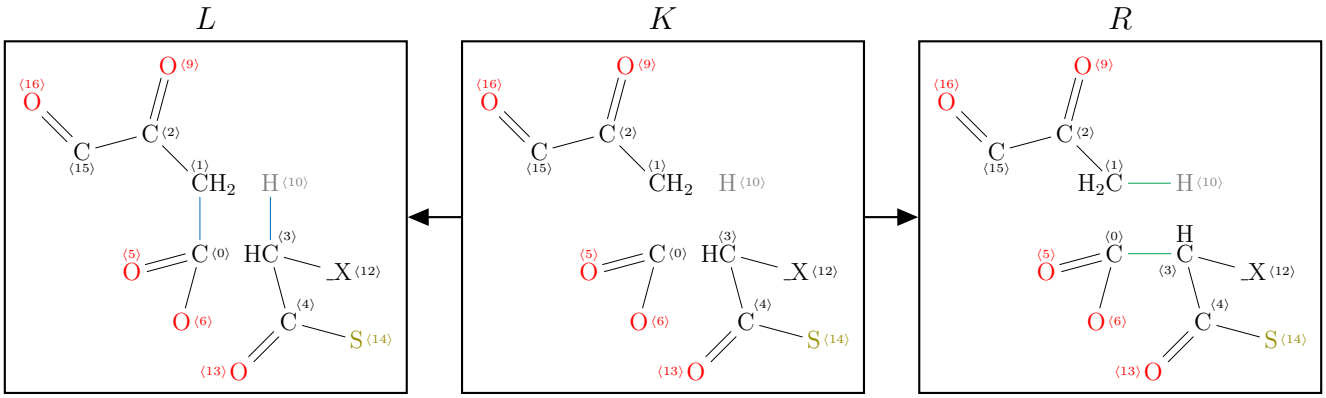

Files: out/209_r_56_11300110_{L, K, R}

### 0.0.63 GLYOX_transaminase_01




Files: out/212_r_57_11300110_{L, K, R}

### 0.0.64 GLYOX_methylmalonyl-CoA_carboxytransferase_01




Files: out/215_r_58_11300110_{L, K, R}

_X ∈ {'H', 'C'}