

## **Supporting Information Legends**

### **SuppInfo\_Biomass\_Composition.xlsx**

Detailed calculations of the biomass composition used in iVS1191.

### **SuppInfo\_Dissipation\_reactions.pdf**

Set of dissipation reactions used to identify the thermodynamically infeasible energy-generating cycles (EGCs).

### **SuppInfo\_Gene\_reannotation.xlsx**

List of manual gene re-annotation of all the included metabolic genes in iVS1191.

### **SuppInfo\_Figure\_1.txt**

MATLAB script used to reproduce Figure 1 in the main text of the article.

### **SuppInfo\_Figure\_1.xlsx**

Corresponding data used to reproduce Figure 1.

### **SuppInfo\_iCS1079.xml**

Model file of iCS1079 in xml format.

### **SuppInfo\_iCY1170\_DHA.xml**

Model file of iCY1170\_DHA in xml format.

### **SuppInfo\_iVS1191.xml**

Model file of iVS1191 in xml format.

### **SuppInfo\_draftModel.xml**

Model file of the T66 draft model in xml format.

**SuppInfo\_keggModel.xml**

Model file of the T66 KEGG model in xml format.

**SuppInfo\_Table\_2.txt**

MATLAB script used to reproduce Table 2 in the main text of the article.

**SuppInfo\_Table\_3.txt**

MATLAB script used to reproduce Table 3 in the main text of the article.

**SuppInfo\_Table\_4.txt**

MATLAB script used to reproduce Table 4 in the main text of the article.