A Manuscript Microscope 'Sentence Audit' of:

Protein allocation and utilization in the versatile chemolithoautotroph Cupriavidus necator

What is the Manuscript Microscope Sentence Audit?

The Manuscript Microscope Sentence Audit is a research paper introspection system that parses the text of your manuscript into minimal sentence components for faster, more accurate, enhanced proofreading.

Why use a Sentence Audit to proofread your manuscript?

- Accelerated Proofreading: Examine long technical texts in a fraction of the usual time.
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- Reliable Proofreading: Ensure every single word of your manuscript is correct.
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Bonus 1: Improved Productivity: Rapidly refine rough drafts to polished papers.
Bonus 2: Improved Authorship: Cultivate a clear, concise, consistent, writing style.
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Manuscript Source: https://www.biorxiv.org/content/10.1101/2021.03.21.436304v1

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Audit Date: 31/03/21 **Audit Identifier:** 9NIK6QXMYKF9F6W **Code Version:** 3.6

Features of the Sentence Audit:

The Sentence Audit combines two complementary proofreading approaches:

1. Each sentence of your text is parsed and displayed in isolation for focused inspection.
2. Each individual sentence is further parsed into Minimal Sentence Components for a deeper review of the clarity, composition and consistency of the language you used.

The Minimal Sentence Components shown are the smallest coherent elements of each sentence of your text as derived from it's conjunctions, prepositions and selected punctuation symbols (i.e. commas, semicolons, round and square brackets).

The combined approaches ensure easier, faster, more effective proofreading.

Comments and Caveats:

• The sentence parsing is achieved using a prototype natural language processing pipeline written in Python and may include occasional errors in sentence segmentation.

• Depending on the source of the input text, the Sentence Audit may contain occasional html artefacts that are parsed as sentences (E.g. "Download figure. Open in new tab").

• Always consult the original research paper as the true reference source for the text.

Contact Information:

To get a Manuscript Microscope Sentence Audit of any other research paper, simply forward any copy of the text to John.James@OxfordResearchServices.com.

All queries, feedback or suggestions are also very welcome.

Research Paper Sections:

The sections of the research paper input text parsed in this audit.

Section No.	Headings	Sentences
Section: 1	Summary	14
Section: 2	Introduction	13
N/A	--- --- --- --- --- --- ---	0
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The Sentence Audit Of The Research Paper

Title # Protein allocation and utilization in the versatile chemolithoautotroph Cupriavidus necator

S1 [001] Summary

S1 [002] Bacteria must balance the different needs for substrate assimilation, growth functions, and resilience in order to thrive in their environment.

Bacteria must balance the different needs ...

... for substrate assimilation, ...

... growth functions, ...

... and resilience ...

... in order ...

... to thrive ...

... in their environment.

S1 [003] Of all cellular macromolecules, the bacterial proteome is by far the most important resource and its size is limited.

Of all cellular macromolecules, ...

... the bacterial proteome is ...

... by far the most important resource ...

... and its size is limited.

S1 [004] Here, we investigated how the highly versatile ‘knallgas’ bacterium Cupriavidus necator reallocates protein resources when grown on different limiting substrates and with different growth rates.

Here, ...

... we investigated how the highly versatile ‘knallgas’ bacterium Cupriavidus necator reallocates protein resources ...

... when grown ...

... on different limiting substrates ...

... and with different growth rates.

S1 [005] We determined protein quantity by mass spectrometry and estimated enzyme utilization by resource balance analysis modeling.

We determined protein quantity ...

... by mass spectrometry ...

... and estimated enzyme utilization ...

... by resource balance analysis modeling.

S1 [006] We found that C. necator invests a large fraction of its proteome in functions that are hardly utilized.

We found ...

... that C. necator invests a large fraction ...

... of its proteome ...

... in functions ...

... that are hardly utilized.

S1 [007] Of the enzymes that are utilized, many are present in excess abundance.

Of the enzymes ...

... that are utilized, ...

... many are present ...

... in excess abundance.

S1 [008] One prominent example is the strong expression of CBB cycle genes such as Rubisco during growth on fructose.

One prominent example is the strong expression ...

... of CBB cycle genes ...

... such as Rubisco ...

... during growth ...

... on fructose.

S1 [009] Modeling and mutant competition experiments suggest that CO2-reassimilation through Rubisco does not provide a fitness benefit for heterotrophic growth, but is rather an investment in readiness for autotrophy.

Modeling ...

... and mutant competition experiments suggest ...

... that CO2-reassimilation ...

... through Rubisco does not provide a fitness benefit ...

... for heterotrophic growth, ...

... but is rather an investment ...

... in readiness ...

... for autotrophy.

S1 [010] Highlights

Highlights

S1 [011] A large fraction of the C. necator proteome is related to environmental readiness

A large fraction ...

... of the C. necator proteome is related ...

... to environmental readiness

S1 [012] Highly utilized enzymes are more abundant and less variable

Highly utilized enzymes are more abundant ...

... and less variable

S1 [013] Autotrophy related enzymes are largely underutilized

Autotrophy related enzymes are largely underutilized

S1 [014] Knockout of Calvin cycle genes increases growth rate on sugar but decreases affinity

Knockout ...

... of Calvin cycle genes increases growth rate ...
... on sugar ...
... but decreases affinity

S2 [015] Introduction

S2 [016] Cupriavidus necator (formerly Ralstonia eutropha) is a model aerobic lithoautotroph and formatotroph, and is notable for production of the storage polymer polyhydroxybutyrate (PHB) [Yishai et al., 2016, Brigham, 2019].

Cupriavidus necator ...
... (formerly Ralstonia eutropha) ...
... is a model aerobic lithoautotroph ...
... and formatotroph, ...
... and is notable ...
... for production ...
... of the storage polymer polyhydroxybutyrate ...
... (PHB) ...
... [Yishai et al., 2016, ...
... Brigham, 2019].

S2 [017] Cupriavidus necator H16 (hereafter abbreviated C. necator) is a soil-dwelling bacterium with a large genome (~6,600 genes) distributed on two chromosomes and one megaplasmid [Pohlmann et al, 2006].

Cupriavidus necator H16 ...
... (hereafter abbreviated C. necator) ...
... is a soil-dwelling bacterium ...
... with a large genome ...
... (~6,600 genes) ...
... distributed ...
... on two chromosomes ...
... and one megaplasmid ...
... [Pohlmann et al, 2006].

S2 [018] It features a wide arsenal of metabolic pathways for xenobiotics degradation, hydrogen and formate oxidation, carbon fixation via the Calvin-Bensson-Bassham (CBB) cycle, and utilization of nitrate/nitrite as alternative electron acceptors (de-nitrification) [Cramm, 2008].

It features a wide arsenal ...
... of metabolic pathways ...
... for xenobiotics degradation, ...
... hydrogen ...
... and formate oxidation, ...
... carbon fixation ...
... via the Calvin-Bensson-Bassham ...
... (CBB) ...
... cycle, ...
... and utilization ...
... of nitrate/nitrite ...

... as alternative electron acceptors ...
... (de-nitrification) ...
... [Cramm, 2008].

S2 [019] Several operons for substrate assimilation are present in multiple copies, often on different chromosomes (e.g. cbb operon, hydrogenases, formate dehydrogenases).

Several operons ...
... for substrate assimilation are present ...
... in multiple copies, ...
... often ...
... on different chromosomes ...
... (e.g. cbb operon, ...
... hydrogenases, ...
... formate dehydrogenases).

S2 [020] A detailed reconstruction of its metabolic network suggested that it can metabolize 229 compounds [Park et al., 2011].

A detailed reconstruction ...
... of its metabolic network suggested ...
... that it can metabolize 229 compounds ...
... [Park et al., 2011].

S2 [021] Interestingly, C. necator prefers organic acids as growth substrate over sugars.

Interestingly, ...
... C. necator prefers organic acids ...
... as growth substrate ...
... over sugars.

S2 [022] The only sugar that supports growth is fructose, which is metabolized via the Entner-Doudoroff (ED) pathway [Alagesan et al., 2018].

The ...
... only sugar ...
... that supports growth is fructose, ...
... which is metabolized ...
... via the Entner-Doudoroff ...
... (ED) ...
... pathway ...
... [Alagesan et al., 2018].

S2 [023] Although the metabolic versatility of C. necator is interesting from a biotechnological point of view, we wondered if it does not come at a considerable cost for the cell.

Although the metabolic versatility ...
... of C. necator is interesting ...
... from a biotechnological point ...
... of view, ...
... we wondered ...
... if it does not come ...
... at a considerable cost ...
... for the cell.

End of Sample Audit

This is a truncated Manuscript Microscope Sample Audit.

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