

# Biosynthesis of the Central Piperidine Nitrogen Heterocycle in Series *a* Thiopeptides

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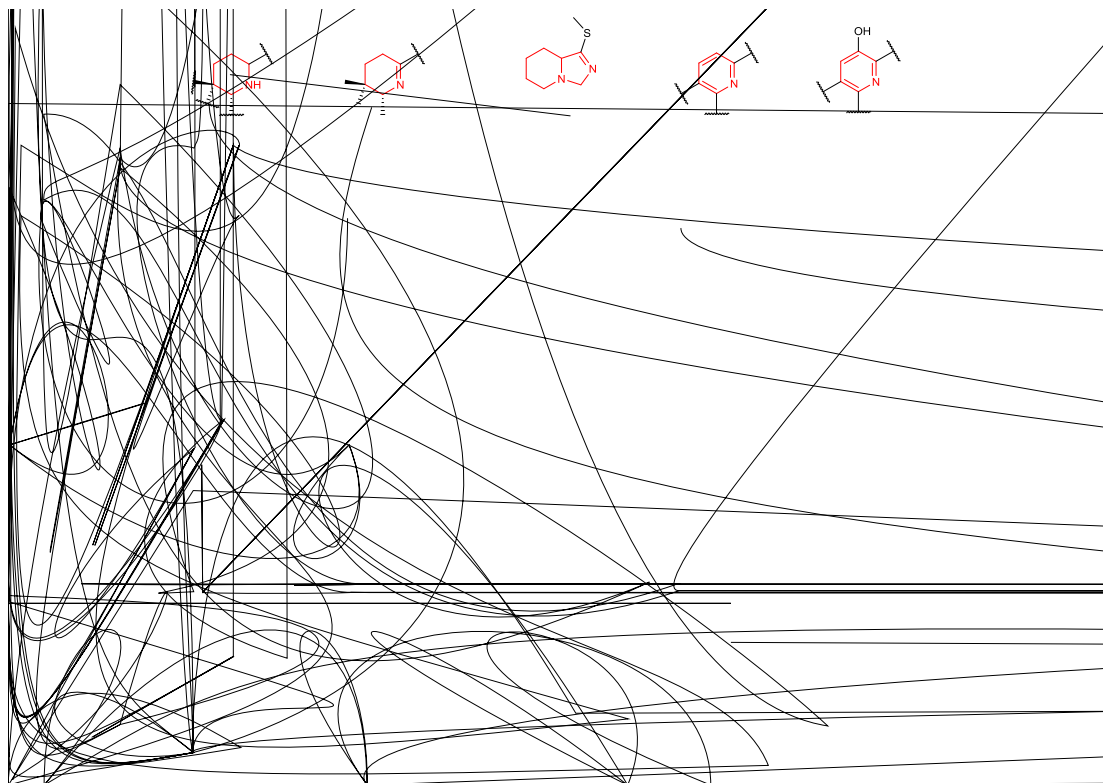
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## Background and Originality Content

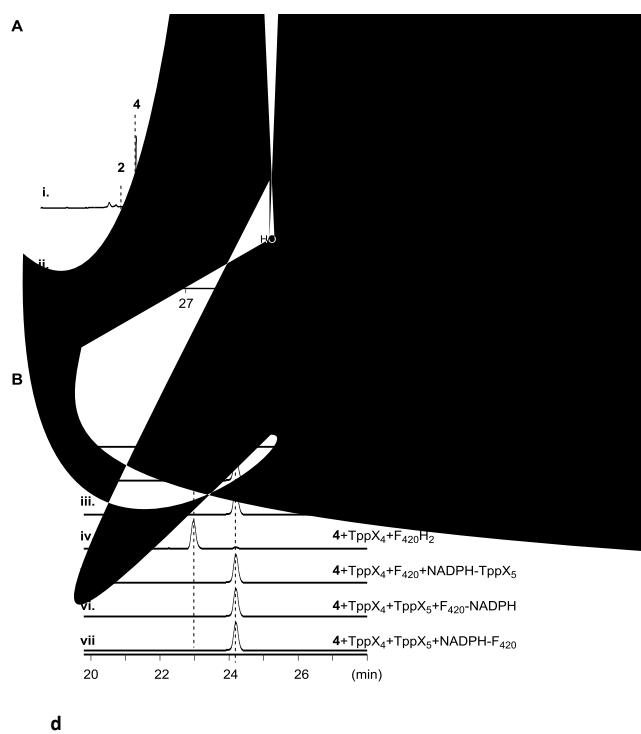
## Results and Discussion

Identification of the gene(s) responsible for the formation of piperidine in TPPs

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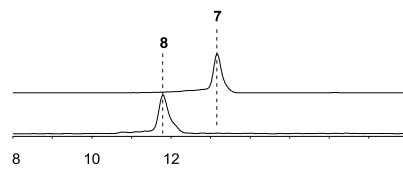


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Characterization of TppX<sub>4</sub> *in vivo*

TppX<sub>4</sub> is an F<sub>420</sub>H<sub>2</sub>-dependent dehydropiperidine reductase

Substrate scopes of TppX<sub>4</sub>



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## Conclusions

Gene inactivation of TppX<sub>4</sub>

Fermentation and isolation of F<sub>420</sub>

*In vitro* assays of TppX<sub>4</sub> activity

