

# Inhibition of the Fe<sub>4</sub>S<sub>4</sub> Cluster-containing Protein IspH (LytB): EPR, Metallacycles and Mechanisms

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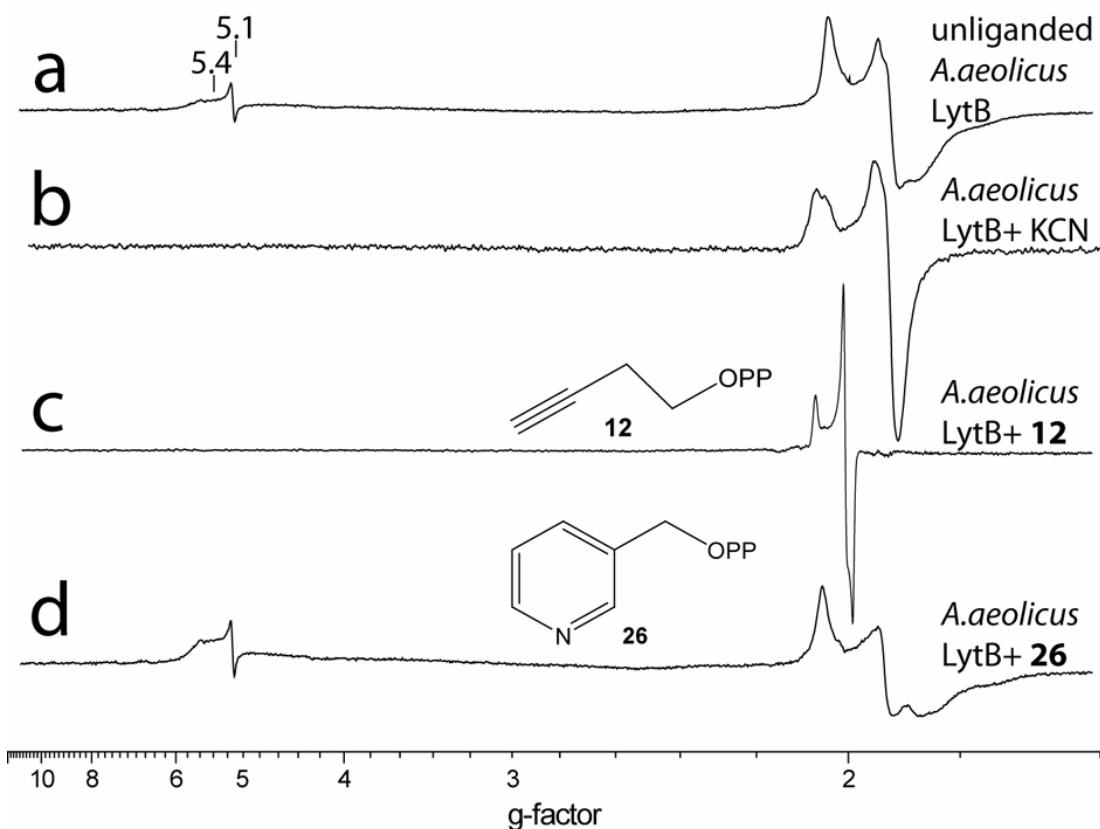
Sanders, J. M.; Song, Y.; Chan, J. M.; Zhang, Y.; Jennings, S.; Kosztowski, T.; Odeh, S.; Flessner, R.; Schwerdtfeger, C.; Kotsikorou, E.; Meints, G. A.; Gomez, A. O.; Gonzalez-Pacanowska, D.; Raker, A. M.; Wang, H.; van Beek, E. R.; Papapoulos, S. E.; Morita, C. T.; Oldfield, E., *J. Med. Chem.* **2005**, 48, 2957-63.

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**Table S1. g-values reported for Fe<sub>4</sub>S<sub>4</sub> proteins and those observed in this study.**

	g <sub>1</sub>	g <sub>2</sub>	g <sub>3</sub>
<i>E. coli</i> LytB Fe <sub>4</sub> S <sub>4</sub> <sup>1</sup>	2.038	1.927	1.889
<i>E. coli</i> GcpE Fe <sub>4</sub> S <sub>4</sub> <sup>2</sup>	2.04	1.90	-
Bovine heart aconitase (active form, Fe <sub>4</sub> S <sub>4</sub> ) <sup>3</sup>	2.06	1.93	1.86
Bovine heart aconitase (inactive form, Fe <sub>3</sub> S <sub>4</sub> ) <sup>3</sup>	-	2.016	-
<i>E. coli</i> GcpE Fe <sub>3</sub> S <sub>4</sub> <sup>4</sup>	2.032	2.003	-
Unliganded <i>A. aeolicus</i> LytB (Fig. 1a; only g values in the g=2 region are listed)	2.04	1.94; 1.92	1.87
Unliganded <i>E. coli</i> LytB (Fig. 1b). g value obtained by simulation.	2.043	1.915	1.901
<i>A. aeolicus</i> LytB with KCN (Fig. 1a)	2.08; 2.05	1.94; 1.93	-
<i>A. aeolicus</i> LytB with <b>12</b> (Fig. 1a). g value obtained by simulation.	2.087	2.012	1.992
<i>P. furiosus</i> ferredoxin <sup>5</sup>	2.12	1.86	1.79
<i>P. furiosus</i> ferredoxin with KCN <sup>5</sup>	2.09	1.95	1.92



**Figure S1. Wide scan X-band GHz EPR spectra of IspH at 15K, reduced with  $\text{Na}_2\text{S}_2\text{O}_4$ .** a) *A. aeolicus* IspH, no added ligands, microwave power = 1 mW. b) *A. aeolicus* IspH + KCN, 10 equivalents, microwave power = 1 mW; c) *A. aeolicus* IspH + **12**, 20 equivalents, microwave power = 0.05 mW; d) *A. aeolicus* IspH + **26**, 20 equivalents, microwave power = 1 mW.

#### References

1. Wolff, M.; Seemann, M.; Bui, B.T.S.; Frapart, Y.; Tritsch, D.; Garcia Estrabot, A.; Rodriguez-Concepcion, M.; Boronat, A.; Marquet, A.; Rohmer, M., *FEBS Lett.* **2003**, 541, 115.
2. Xiao, Y.; Zahariou, G.; Sanakis, Y.; Liu, P., *Biochemistry* **2009**, 48, 10483.
3. Beinert, H.; Kennedy, M. C.; Stout, C. D., *Chem. Rev.* **1996**, 96, 2335.
4. Grawert, T.; Kaiser, J.; Zepeck, F.; Laupitz, R.; Hecht, S.; Amslinger, S.; Schramek, N.; Schleicher, E.; Weber, S.; Haslbeck, M.; Buchner, J.; Rieder, C.; Arigoni, D.; Bacher, A.; Eisenreich, W.; Rohdich, F., *J. Am. Chem. Soc.* **2004**, 126, 12847.
5. Telser, J.; Smith, E. T.; Adams, M. W. W.; Conover, R. C.; Johnson, M. K.; Hoffman, B. M., *J. Am. Chem. Soc.* **1995**, 117, 5133.