

Supplementary information E. Supplementary results of metaproteome (BISR) and proteomes (SR-BC, CoPPIX-BC) analyses

Table S4. Numbers of sequences of enzymes involved in heme biosynthesis and uptake and cobalt insertion/disconnection detected in the metaproteome (BISR) and proteomes (SR-BC, CoPPIX-BC); EC – enzyme catalogue

Enzyme	Meta/proteome		
	BISR	SR-BC	PPIXCo-BC
Heme biosynthesis			
5-aminolevulinate synthase EC: 2.3.1.37	-	-	-
prophobilinogen synthase EC: 4.2.1.24	gi491027513, WP_004889204.1, CAA35467.1, WP_004889204.1, WP_002458905.1	WP_171700908.1, NNU91633.1, WP_012574296.1, WP_077427980.1, WP_164970121.1, QAV27410.1, WP_064220470.1, WP_192953941.1, WP_091704482.1, WP_162829819.1, GAC90775.1, WP_043967315.1, MBA2878521.1, WP_181520405.1, WP_171334820.1, WP_183241280.1, WP_183249665.1, WP_081977254.1, KIQ93786.1, KFZ41698.1, WP_099668858.1, WP_141653475.1, WP_143255537.1, CUA78709.1, OSX54462.1, WP_003396409.1, WP_163150307.1, EPZ39665.1, EMI10609.1, WP_026011514.1 WP_035065471.1, WP_132947612.1, WP_183253443.1, WP_111644614.1, WP_044894615.1, WP_181537467.1, WP_066326516.1, WP_183183572.1, WP_027409488.1, WP_044742938.1, WP_080862119.1, WP_090947548.1, WP_159720222.1, WP_181554598.1, WP_043905655.1, WP_064549662.1, WP_154709999.1, WP_098305099.1, WP_035431564.1, WP_143415105.1, WP_015864684.1, WP_090918682.1, WP_012095637.1, WP_017435491.1, WP_097354818.1, WP_098914060.1, WP_090996694.1, WP_003248840.1, WP_042406500.1, WP_062753092.1, WP_089097970.1, WP_129727881.1, WP_013400298.1	GGE75935.1, WP_188389021.1, WP_020059980.1, WP_149178124.1, WP_174098839.1, WP_166910561.1, WP_097849105.1, WP_016092374.1, WP_098337914.1, WP_017150631.1, WP_087985328.1, WP_006096072.1
hydroxymethylbilane synthase EC: 2.5.1.61	AAA67601.1, WP_006599024.1, WP_011275555.1, EDN66896.1, WP_007473976.1, gi493647429, WP_006599024.1, SEA14390.1, WP_038352255.1	WP_013379107.1, WP_090410885.1, RRF93330.1, WP_133964473.1	WP_118518172.1, WP_096920133.1, WP_074617978.1, WP_082669377.1, WP_014357354.1, WP_186841531.1, WP_070369550.1
uroporphyrinogen III synthase EC: 4.2.1.75	-	WP_104683532.1, WP_057456053.1, WP_122259343.1, WP_005781282.1, WP_002551372.1, WP_135003685.1, WP_122280121.1, WP_058974945.1	WP_058402446.1, WP_011167310.1, WP_134941604.1, WP_057433961.1, WP_044324127.1

uroporphyrinogen decarboxylase EC: 4.1.1.37	gi 652459094, WP_026853903.1, WP_002472704.1, WP_011275429.1	EFQ0483577.1, WP_024233173.1, WP_158120995.1	WP_046082250.1, WP_112044854.1, EGE0862999.1, HAI6559394.1, WP_032247939.1, WP_000137653.1, EEQ3568864.1, EFG5749303.1, WP_023308555.1, WP_130570441.1, WP_000137634.1, WP_072665359.1
coproporphyrinogen III oxidase EC: 1.3.3.3	OKQ85218.1	-	KJJ14657.1, OKR61434.1, OKQ85218.1, SQK83851.1, CDH74354.1
oxygen-independent coproporphyrinogen III oxidase EC: 1.3.98.3	gi659868130, WP_029915001.1, gi684178909, gbEAQ38129.3	WP_119522890.1	WP_113886989.1, WP_134302878.1, WP_171889427.1, WP_070339703.1, WP_023089009.1, WP_115759736.1, WP_070338550.1, WP_023518539.1, PXC07943.1, WP_160511252.1, WP_124141246.1, WP_181261645.1, WP_116830028.1, WP_126862502.1, WP_134310010.1, WP_089034942.1, WP_128538975.1
protoporphyrin/ coproporphyrin III oxidase EC: 1.3.3.4	-	-	-
menaquinone-dependent protoporphyrinogen III oxidase EC: 1.3.5.3	-	-	-
protoporphyrinogen IX oxidase EC: 1.3.99	-	-	-
protoporphyrin/coproporphyrin ferrochelatase EC: 4.99.1.1	WP_011275430.1, WP_027696985.1, WP_003099324.1, WP_021264089.1, AAT51432.1	WP_121784350.1, WP_031686597.1, WP_136310185.1, WP_174218239.1, WP_058202634.1, WP_094776821.1, WP_132457701.1	WP_126475982.1, WP_160518319.1, WP_033877308.1, WP_094776821.1, WP_132457701.1, WP_121784350.1, WP_031686597.1
Heme uptake			
heme acquisition protein HasA	-	-	-
periplasmic protein TonB	WP_197862675.1	WP_138407792, WP_138411937.1, WP_148924790.1, WP_181112699.1, WP_152489604.1, WP_102834729.1, WP_138486174.1	WP_148924790.1, WP_181112699.1, WP_152489604.1, WP_102834729.1

hemoglobin/transferrin/lactoferrin receptor protein (hemr)	WP_058169809.1, WP_182150463.1, WP_128672018.1, WP_003095535.1, WP_022580007.1	WP_128672018.1, WP_003095535.1, WP_022580007.1, WP_058159931.1, WP_033990026.1, WP_132444818.1, WP_003135463.1, WP_134572733.1, WP_134633887.1, WP_009314330.1, WP_033954696.1, WP_058150557.1, WP_034021499.1, WP_132868020.1, WP_116820038.1, WP_033963567.1, WP_024947020.1, WP_121382417.1, WP_034036579.1, WP_132497680.1, WP_126896166.1, WP_124988305.1, WP_126861255.1, WP_096069494.1	WP_058169809.1, WP_182150463.1, WP_124133528.1, WP_125909932.1, WP_033990026.1, WP_132444818.1, WP_003135463.1
biopolymer transport protein ExbB	WP_164634537.1	WP_197962956.1, WP_152102413.1, TAI63057.1, WP_158669561.1, WP_028140254.1, WP_194471296.1, WP_027278412.1, WP_066509674.1, OCX26818.1, WP_094194199.1, WP_035998843.1, OIM94023.1, WP_100952068.1, WP_152977387.1	WP_022724321.1, WP_107346470.1, WP_107357418.1, WP_142882041.1, WP_041798587.1, ABE41223.1, WP_182746610.1, WP_092686109.1, MBI5130876.1, WP_054162619.1, WP_114357654.1, OPF91494.1, WP_110788226.1, WP_119855070.1, NVN85044.1, WP_089025497.1, WP_139486359.1, VIO80036.1, WP_139864777.1, WP_106326951.1, WP_194471296.1, WP_027278412.1, WP_066509674.1, OCX26818.1, WP_094194199.1, WP_035998843.1, OIM94023.1, WP_100952068.1, WP_152977387.1, WP_036041101.1, WP_095736165.1, RZN28968.1
biopolymer transport protein ExbD	WP_072840788.1	WP_012071749.1, WP_111608707.1, WP_113918029.1, WP_112135015.1, WP_176336467.1, WP_111639718.1, WP_024025681.1, WP_123095856.1	WP_113918029.1
Cobalt insertion/disconnection			
sirohydrochlorin cobaltochelatase/sirohydrochlorin cobalt-lyase EC: 4.99.1.3	WP_060613678.1, WP_100263700.1, WP_149632279.1, WP_042956680.1, WP_027912619.1, WP_028237679.1, WP_024616339.1, WP_092412700.1, WP_114731145.1	WP_003199795.1, WP_053183376.1, WP_092462015.1, WP_039011076.1, WP_043041964.1, WP_186728245.1, WP_053120776.1	WP_092145369.1, WP_063322157.1, WP_043041964.1, WP_186728245.1, WP_092223853.1, WP_053178647.1

Table S5. Numbers of hemoprotein sequences detected in the metaproteome (BISR) and proteomes (SR-BC, CoPPIX-BC)

Hemoprotein	Meta/proteome		
	BISR	SR-BC	CoPPIX-BC
Cytochromes	gi 499245897, gi 493924522, gi 330949201, gi 268584477, gi 499630345, gi 498185039, gi 499630342, gi 517333069, gi 519012058, gi 488713780, gi 490102597, gi 671493207, gi 631847638, gi 497318490, gi 519020998, gi 353255924, gi 504263092, gi 124514988, gi 344169056, gi 503795255, gi 504774832, gi 503795252, gi 495086913, gi 124515016, gi 320462, gi 329112144, gi 499595441, gi 653251020, gi 499595357, gi 494666478, gi 410732281, gi 76667604, gi 543962213, gi 302039157	gi 504667349, gi 489380605, gi 739667945, gi 648288579, EKG43499.1, gi 516498201, gi 392421384, gi 146284245, gi 489379413, gi 739176448	gi 602235550, gi 950761959, gi 1027764433, gi 545655965, gi 951276957, gi 521092032, gi 737997068, Q8KS19, gi 489068679, gi 501226912, gi 653577710, gi 489376117, gi 489376656, gi 489380605, gi 739667945, gi 648288579, gi 516498201, gi 392421384, gi 146284245, P81154, Q52369, gi 674642377, C1DN39, Q9I3M9, gi 739176448, gi 26988052, gi 489379413, gi 498175705, gi 504667349, gi 492990377, gi 737247626, gi 21702709
Catalases	gi 494666045, KXK49644.1, gi 1698550, gi 504938131, gi 491324047, gi 3927890, gi 520401, gi 500251659, gi 504938131, gi 499595129	gi 500260364, PYN24457.1, KPX01798.1, gi 516497823, CJL05199.1	gi 516497823, Q9I1W8, gi 500260364, A4VK13, B0TRN5
Peroxidases	gi 489375670, gi 515815228, gi 488371807, gi 503795169, gi 498325609	gi 692344295, KFJ89559.1, gi 489377300	gi 489378348, gi 692344295, gi 489377300, gi 514327837, gi 495264620