# Supplementary Materials: The First Data on the Complete Genome of a Tetrodotoxin-Producing Bacterium

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**Table S1.** KEGG categories of *Bacillus* sp. 1839.

| No. | Value | Function Description |
|---|---|---|
| | | METABOLISM |
| 01100 | 547 | Metabolic pathways |
| 01110 | 254 | Biosynthesis of secondary metabolites |
| 01120 | 129 | Microbial metabolism in diverse environments |
| 01200 | 81 | Carbon metabolism |
| 01210 | 20 | 2-Oxocarboxylic acid metabolism |
| 01212 | 17 | Fatty acid metabolism |
| 01230 | 104 | Biosynthesis of amino acids |
| 01240 | 112 | Biosynthesis of cofactors |
| 01220 | 5 | Degradation of aromatic compounds |
| | | **Carbohydrate metabolism** |
| 00010 | 31 | Glycolysis / Gluconeogenesis |
| 00020 | 22 | Citrate cycle (TCA cycle) |
| 00030 | 23 | Pentose phosphate pathway |
| 00040 | 12 | Pentose and glucuronate interconversions |
| 00051 | 17 | Fructose and mannose metabolism |
| 00052 | 12 | Galactose metabolism |
| 00053 | 6 | Ascorbate and aldarate metabolism |
| 00500 | 25 | Starch and sucrose metabolism |
| 00520 | 26 | Amino sugar and nucleotide sugar metabolism |
| 00620 | 33 | Pyruvate metabolism |
| 00630 | 29 | Glyoxylate and dicarboxylate metabolism |
| 00640 | 27 | Propanoate metabolism |
| 00650 | 25 | Butanoate metabolism |
| 00660 | 7 | C5-Branched dibasic acid metabolism |
| 00562 | 4 | Inositol phosphate metabolism |
| | | **Energy metabolism** |
| 00190 | 30 | Oxidative phosphorylation |
| 00195 | 8 | Photosynthesis |
| 00710 | 11 | Carbon fixation in photosynthetic organisms |
| 00720 | 24 | Carbon fixation pathways in prokaryotes |
| 00680 | 18 | Methane metabolism |
| 00910 | 10 | Nitrogen metabolism |
| 00920 | 11 | Sulfur metabolism |
| | | **Lipid metabolism** |
| 00061 | 12 | Fatty acid biosynthesis |
| 00071 | 9 | Fatty acid degradation |
| 00072 | 4 | Synthesis and degradation of ketone bodies |
| 00100 | 1 | Steroid biosynthesis |
| 00561 | 9 | Glycerolipid metabolism |
| 00564 | 13 | Glycerophospholipid metabolism |
| 00600 | 1 | Sphingolipid metabolism |
| 00590 | 1 | Arachidonic acid metabolism |
| 00592 | 1 | alpha-Linolenic acid metabolism |
| | | **Nucleotide metabolism** |

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|---|---|---|
| 00230 | 44 | Purine metabolism |
| 00240 | 33 | Pyrimidine metabolism |
| | | **Amino acid metabolism** |
| 00250 | 22 | Alanine, aspartate and glutamate metabolism |
| 00260 | 27 | Glycine, serine and threonine metabolism |
| 00270 | 35 | Cysteine and methionine metabolism |
| 00280 | 18 | Valine, leucine and isoleucine degradation |
| 00290 | 11 | Valine, leucine and isoleucine biosynthesis |
| 00300 | 15 | Lysine biosynthesis |
| 00310 | 9 | Lysine degradation |
| 00220 | 15 | Arginine biosynthesis |
| 00330 | 17 | Arginine and proline metabolism |
| 00340 | 15 | Histidine metabolism |
| 00350 | 5 | Tyrosine metabolism |
| 00360 | 7 | Phenylalanine metabolism |
| 00380 | 7 | Tryptophan metabolism |
| 00400 | 20 | Phenylalanine, tyrosine and tryptophan biosynthesis |
| 00410 | 6 | beta-Alanine metabolism |
| 00430 | 6 | Taurine and hypotaurine metabolism |
| 00450 | 8 | Selenocompound metabolism |
| 00460 | 5 | Cyanoamino acid metabolism |
| 00471 | 4 | D-Glutamine and D-glutamate metabolism |
| 00472 | 1 | D-Arginine and D-ornithine metabolism |
| 00473 | 3 | D-Alanine metabolism |
| 00480 | 8 | Glutathione metabolism |
| | | **Glycan biosynthesis and metabolism** |
| 00531 | 2 | Glycosaminoglycan degradation |
| 00540 | 1 | Lipopolysaccharide biosynthesis |
| 00541 | 9 | O-Antigen nucleotide sugar biosynthesis |
| 00550 | 24 | Peptidoglycan biosynthesis |
| 00511 | 1 | Other glycan degradation |
| 00572 | 1 | Arabinogalactan biosynthesis - Mycobacterium |
| | | **Metabolism of cofactors and vitamins** |
| 00730 | 15 | Thiamine metabolism |
| 00740 | 7 | Riboflavin metabolism |
| 00750 | 5 | Vitamin B6 metabolism |
| 00760 | 9 | Nicotinate and nicotinamide metabolism |
| 00770 | 16 | Pantothenate and CoA biosynthesis |
| 00780 | 5 | Biotin metabolism |
| 00785 | 4 | Lipoic acid metabolism |
| 00790 | 21 | Folate biosynthesis |
| 00670 | 11 | One carbon pool by folate |
| 00830 | 1 | Retinol metabolism |
| 00860 | 19 | Porphyrin and chlorophyll metabolism |
| 00130 | 10 | Ubiquinone and other terpenoid-quinone biosynthesis |
| | | **Metabolism of terpenoids and polyketides** |
| 00900 | 13 | Terpenoid backbone biosynthesis |
| 00909 | 1 | Sesquiterpenoid and triterpenoid biosynthesis |
| 00906 | 5 | Carotenoid biosynthesis |
| 00981 | 1 | Insect hormone biosynthesis |
| 00908 | 1 | Zeatin biosynthesis |
| 00903 | 1 | Limonene and pinene degradation |
| 00281 | 2 | Geraniol degradation |
| 01051 | 1 | Biosynthesis of ansamycins |
| 00523 | 1 | Polyketide sugar unit biosynthesis |

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|---|---|---|
| 01054 | 1 | Nonribosomal peptide structures |
| 01053 | 1 | Biosynthesis of siderophore group nonribosomal peptides |
| | | **Biosynthesis of other secondary metabolites** |
| 00940 | 1 | Phenylpropanoid biosynthesis |
| 00950 | 1 | Isoquinoline alkaloid biosynthesis |
| 00960 | 2 | Tropane, piperidine and pyridine alkaloid biosynthesis |
| 00966 | 2 | Glucosinolate biosynthesis |
| 00311 | 1 | Penicillin and cephalosporin biosynthesis |
| 00261 | 4 | Monobactam biosynthesis |
| 00521 | 4 | Streptomycin biosynthesis |
| 00524 | 1 | Neomycin, kanamycin and gentamicin biosynthesis |
| 00401 | 3 | Novobiocin biosynthesis |
| 00405 | 2 | Phenazine biosynthesis |
| 00333 | 3 | Prodigiosin biosynthesis |
| 00998 | 1 | Biosynthesis of various secondary metabolites - part 2 |
| | | **Xenobiotics biodegradation and metabolism** |
| 00362 | 7 | Benzoate degradation |
| 00627 | 4 | Aminobenzoate degradation |
| 00625 | 3 | Chloroalkane and chloroalkene degradation |
| 00361 | 1 | Chlorocyclohexane and chlorobenzene degradation |
| 00622 | 2 | Xylene degradation |
| 00642 | 1 | Ethylbenzene degradation |
| 00643 | 2 | Styrene degradation |
| 00621 | 1 | Dioxin degradation |
| 00626 | 2 | Naphthalene degradation |
| 00980 | 1 | Metabolism of xenobiotics by cytochrome P450 |
| 00982 | 1 | Drug metabolism - cytochrome P450 |
| 00983 | 7 | Drug metabolism - other enzymes |
| | | GENETIC INFORMATION PROCESSING |
| | | **Transcription** |
| 03020 | 5 | RNA polymerase |
| | | **Translation** |
| 03010 | 55 | Ribosome |
| 00970 | 27 | Aminoacyl-tRNA biosynthesis |
| 03013 | 2 | RNA transport |
| 03008 | 1 | Ribosome biogenesis in eukaryotes |
| | | **Folding, sorting and degradation** |
| 03060 | 14 | Protein export |
| 04141 | 2 | Protein processing in endoplasmic reticulum |
| 04122 | 12 | Sulfur relay system |
| 03018 | 13 | RNA degradation |
| | | **Replication and repair** |
| 03030 | 15 | DNA replication |
| 03410 | 12 | Base excision repair |
| 03420 | 7 | Nucleotide excision repair |
| 03430 | 16 | Mismatch repair |
| 03440 | 19 | Homologous recombination |
| 03450 | 2 | Non-homologous end-joining |
| | | ENVIRONMENTAL INFORMATION PROCESSING |
| | | **Membrane transport** |
| 02010 | 90 | ABC transporters |
| 02060 | 22 | Phosphotransferase system (PTS) |
| 03070 | 12 | Bacterial secretion system |
| | | **Signal transduction** |
| 02020 | 91 | Two-component system |

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|---|---|---|
| 04013 | 1 | MAPK signaling pathway - fly |
| 04016 | 3 | MAPK signaling pathway - plant |
| 04011 | 1 | MAPK signaling pathway - yeast |
| 04066 | 7 | HIF-1 signaling pathway |
| 04068 | 2 | FoxO signaling pathway |
| 04070 | 2 | Phosphatidylinositol signaling system |
| 04151 | 1 | PI3K-Akt signaling pathway |
| 04152 | 1 | AMPK signaling pathway |
| | | CELLULAR PROCESSES |
| | | **Transport and catabolism** |
| 04142 | 3 | Lysosome |
| 04146 | 7 | Peroxisome |
| 04138 | 1 | Autophagy - yeast |
| | | **Cell growth and death** |
| 04112 | 11 | Cell cycle - Caulobacter |
| 04216 | 2 | Ferroptosis |
| 04217 | 3 | Necroptosis |
| | | **Cellular community - prokaryotes** |
| 02024 | 35 | Quorum sensing |
| 05111 | 11 | Biofilm formation - Vibrio cholerae |
| 02025 | 7 | Biofilm formation - Pseudomonas aeruginosa |
| 02026 | 9 | Biofilm formation - Escherichia coli |
| | | **Cell motility** |
| 02030 | 15 | Bacterial chemotaxis |
| 02040 | 34 | Flagellar assembly |
| | | OTHERS |
| 04621 | 3 | NOD-like receptor signaling pathway |
| 04612 | 1 | Antigen processing and presentation |
| 04659 | 1 | Th17 cell differentiation |
| 04657 | 1 | IL-17 signaling pathway |
| 04910 | 2 | Insulin signaling pathway |
| 04922 | 7 | Glucagon signaling pathway |
| 04920 | 1 | Adipocytokine signaling pathway |
| 03320 | 2 | PPAR signaling pathway |
| 04915 | 1 | Estrogen signaling pathway |
| 04914 | 1 | Progesterone-mediated oocyte maturation |
| 04918 | 1 | Thyroid hormone synthesis |
| 04919 | 1 | Thyroid hormone signaling pathway |
| 04975 | 1 | Fat digestion and absorption |
| 04978 | 2 | Mineral absorption |
| 04724 | 1 | Glutamatergic synapse |
| 04727 | 1 | GABAergic synapse |
| 04211 | 2 | Longevity regulating pathway |
| 04212 | 5 | Longevity regulating pathway - worm |
| 04213 | 4 | Longevity regulating pathway - multiple species |
| 04714 | 3 | Thermogenesis |
| 04626 | 4 | Plant-pathogen interaction |
| 05200 | 2 | Pathways in cancer |
| 05206 | 1 | MicroRNAs in cancer |
| 05205 | 1 | Proteoglycans in cancer |
| 05204 | 1 | Chemical carcinogenesis |
| 05203 | 1 | Viral carcinogenesis |
| 05230 | 8 | Central carbon metabolism in cancer |
| 05211 | 1 | Renal cell carcinoma |
| 05215 | 1 | Prostate cancer |

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|---|---|---|
| 05340 | 1 | Primary immunodeficiency |
| 05010 | 1 | Alzheimer disease |
| 05012 | 1 | Parkinson disease |
| 05014 | 3 | Amyotrophic lateral sclerosis |
| 05016 | 3 | Huntington disease |
| 05020 | 1 | Prion disease |
| 05022 | 3 | Pathways of neurodegeneration - multiple diseases |
| 05418 | 3 | Fluid shear stress and atherosclerosis |
| 04930 | 1 | Type II diabetes mellitus |
| 04940 | 1 | Type I diabetes mellitus |
| 04931 | 2 | Insulin resistance |
| 04934 | 1 | Cushing syndrome |
| 05120 | 1 | Epithelial cell signaling in Helicobacter pylori infection |
| 05130 | 1 | Pathogenic Escherichia coli infection |
| 05132 | 4 | Salmonella infection |
| 05131 | 1 | Shigellosis |
| 05134 | 4 | Legionellosis |
| 05150 | 1 | Staphylococcus aureus infection |
| 05152 | 3 | Tuberculosis |
| 05165 | 1 | Human papillomavirus infection |
| 05146 | 2 | Amoebiasis |
| 05143 | 1 | African trypanosomiasis |
| 01501 | 11 | beta-Lactam resistance |
| 01502 | 12 | Vancomycin resistance |
| 01503 | 3 | Cationic antimicrobial peptide (CAMP) resistance |
| 01524 | 1 | Platinum drug resistance |
| 01523 | 4 | Antifolate resistance |