



Data in Brief

Metagenomic investigation of the microbial diversity in a chrysotile asbestos mine pit pond, Lowell, Vermont, USA



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ABSTRACT

Here we report on a metagenomics investigation of the microbial diversity in a serpentine-hosted aquatic habitat created by chrysotile asbestos mining activity at the Vermont Asbestos Group (VAG) Mine in northern Vermont, USA. The now-abandoned VAG Mine on Belvidere Mountain in the towns of Eden and Lowell includes three open-pit quarries, a flooded pit, mill buildings, roads, and >26 million metric tons of eroding mine waste that contribute alkaline mine drainage to the surrounding watershed. Metagenomes and water chemistry originated from aquatic samples taken at three depths (0.5 m, 3.5 m, and 25 m) along the water column at three distinct, offshore sites within the mine's flooded pit (near 44°46'00.7673", -72°31'36.2699"; UTM NAD 83 Zone 18 T 0695720 E, 4960030 N). Whole metagenome shotgun Illumina paired-end sequences were quality trimmed and analyzed based on a translated nucleotide search of NCBI-NR protein database and lowest common ancestor taxonomic assignments. Our results show strata within the pit pond water column can be distinguished by taxonomic composition and distribution, pH, temperature, conductivity, light intensity, and concentrations of dissolved oxygen. At the phylum level, metagenomes from 0.5 m and 3.5 m contained a similar distribution of taxa and were dominated by Actinobacteria (46% and 53% of reads, respectively), Proteobacteria (45% and 38%, respectively), and Bacteroidetes (7% in both). The metagenomes from 25 m showed a greater diversity of phyla and a different distribution of reads than the two upper strata: Proteobacteria (60%), Actinobacteria (18%), Planctomycetes, (10%), Bacteroidetes (5%) and Cyanobacteria (2.5%), Armatimonadetes (<1%), Verrucomicrobia (<1%), Firmicutes (<1%), and Nitrospirae (<1%). Raw metagenome sequence data from each sample reside in NCBI's Short Read Archive (SRA ID: SRP056095) and are accessible through NCBI BioProject PRJNA277916.

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Specifications

Organism/cell line/tissue	Mine drainage metagenome
Sex	Not applicable
Sequencer or array type	Illumina HiSeq 2000
Data format	Raw data: FASTQ files
Experimental factors	Environmental samples
Experimental features	Whole metagenome shotgun sequencing followed by taxonomic profiling using RASearch2, MEGAN, and STAMP
Consent	Not applicable
Sample source location	Eight aquatic samples from three adjacent sites, Lowell Mine it Pond, Vermont Asbestos Group Mine, Lowell, Vermont, USA (44°46'00.7673", -72°31'36.2699"; UTM NAD 83 Zone 18 T, 0695720 E, 4960030 N)

1. Direct link to deposited data

NCBI BioProject PRJNA277916 includes raw data and sample metadata, including water chemistry: <http://www.ncbi.nlm.nih.gov/bioproject/PRJNA277916>.

2. Experimental Design, Materials and Methods

2.1. Study site description

The Vermont Asbestos Group (VAG) Mine, situated on a chrysotile asbestos-bearing ultramafic rock outcrop located within the Lamoille and Missisquoi River watersheds in northern Vermont, USA, is an abandoned asbestos mine and mill that ceased operation in 1993. High levels of chrysotile asbestos fibers and elevated concentrations of magnesium, nickel, chromium, and arsenic have been recorded at several aquatic and terrestrial sites within the VAG Mine area [1]. The site of sample collection within the VAG Mine area was the Lowell mine pit pond, a flooded open pit quarry adjacent to massive tailings piles (Fig. 1). The

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Fig. 1. Vermont Asbestos Group Mine area: A) Aerial map with sample collection sites and Burgess Branch stream colored blue (map source: <http://anrmaps.vermont.gov/websites/anra5/>). B) Lowell tailings piles adjacent to the pit pond and sample collection site (photo source: Steve Schlipf, steveschlipfphotography.com).

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