Register list for Asgardarchaeum abyssi gen. nov. sp. nov. and their lineage

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Table 1: Complete list of names proposed in the current register list.

Proposed Taxon	Etymology	Description	Parent Taxon	Type	Registry URL
Phylum *Asgardarchaeota*	[As.gar.dar.chae.o'ta] **N.L. neut. n.** *Asgardarchaeum*, referring to the type genus Asgardarchaeum; *-ota*, ending to denote a phylum; **N.L. neut. pl. n.** *Asgardarchaeota*, the Asgardarchaeum phylum	Asgardarchaeota, commonly referred to as Asgard archaea, are a candidatus phylum-level archaeal clade that includes the closest archaeal relatives of eukaryotes. Metagenomic discovery of new microbial life continues to expand our understanding of the diversity and evolutionary history of life on Earth. The Asgard archaea have garnered significant attention due to their close relatedness to the nucleocytoplasmic lineage of eukaryotes, offering invaluable insights into eukaryogenesis, i.e., the evolutionary transition from prokaryotic to eukaryotic cellular life (Zaremba-Niedzwiedzka et al., 2017; Williams et al., 2020; Eme et al., 2023; Vosseberg et al., 2024). Discovered first with environmental 16S rRNA sequencing in 1999 (Vetriani et al., 1999), the group was named Marine Benthic Group B (MBG-B) and later referred to as Deep-Sea Archaeal Group (DSAG) (Inagaki et al., 2003). The first draft genome was obtained 16 years later when a metagenomics survey recovered a metagenome assembled genome (MAG) from marine sediments sampled from the Arctic Ocean, next to a hydrothermal system named Loki's Castle (Spang et al., 2015), prompting the candidate name Lokiarchaeum as its first genus and Lokiarchaeota for its associated candidate phylum. Soon after, genomes of close relatives of Lokiarchaeum were obtained from multiple environments around the world, founding the candidate phyla Thorarchaeota (Seitz et al., 2016), Heimdallarchaeota and Odinarchaeota (Zaremba-Niedzwiedzka et al., 2017). These lineages formed a monophyletic group tentatively described as a superphylum, receiving the name Asgard archaea (Zaremba-Niedzwiedzka et al., 2017). More recently, efforts to align genome diversity within standardized taxonomic ranks (Rinke et al., 2021) led to a reclassification of the Asgard archaea as the phylum Asgardarchaeota and its constituent subgroups as classes.	*Archaea*	*Asgardarchaeum*	seqco.de/i:33331

Proposed Taxon	Etymology	Description	Parent Taxon	Type	Registry URL
Class *Asgardarchaeia*	[As.gar.dar.chae'i.a] **N.L. neut. n.** *Asgardarchaeum*, referring to the type genus Asgardarchaeum; *-ia*, ending to denote a class; **N.L. neut. pl. n.** *Asgardarchaeia*, the Asgardarchaeum class	Based on protein content and compositional features, we infer that Asgardarchaeia is an acetogenic chemoheterotroph, possibly a facultative lithoautotroph, and is adapted to a thermophilic lifestyle. Utilizing genomes from Asgard archaea, TACK, and Euryarchaea, we perform phylogenomic reconstructions using the GTDB archaeal marker genes, the current reference set for taxonomic classification. Calibrating relative evolutionary divergence (RED) values for Asgardarchaeota using established Thermoproteota lineages in the GTDB r207 reference tree, we establish a robust classification and propose Asgardarchaeum as the type genus for the family Asgardarchaeaceae, the order Asgardarchaeales, the class Asgardarchaeia and the phylum Asgardarchaeota.	*Asgardarchaeota*	*Asgardarchaeum*	seqco.de/i:44140
Order *Asgardarchaeales*	[As.gar.dar.chae.a'les] **N.L. neut. n.** *Asgardarchaeum*, referring to the type genus Asgardarchaeum; *-ales*, ending to denote an order; **N.L. fem. pl. n.** *Asgardarchaeales*, the Asgardarchaeum order	Based on protein content and compositional features, we infer that Asgardarchaeia is an acetogenic chemoheterotroph, possibly a facultative lithoautotroph, and is adapted to a thermophilic lifestyle. Utilizing genomes from Asgard archaea, TACK, and Euryarchaea, we perform phylogenomic reconstructions using the GTDB archaeal marker genes, the current reference set for taxonomic classification. Calibrating relative evolutionary divergence (RED) values for Asgardarchaeota using established Thermoproteota lineages in the GTDB r207 reference tree, we establish a robust classification and propose Asgardarchaeum as the type genus for the family Asgardarchaeaceae, the order Asgardarchaeales, the class Asgardarchaeia and the phylum Asgardarchaeota.	*Asgardarchaeia*	*Asgardarchaeum*	seqco.de/i:44141
Family *Asgardarchaeaceae*	[As.gar.dar.chae.a'ce.ae] **N.L. neut. n.** *Asgardarchaeum*, referring to the type genus Asgardarchaeum; *-aceae*, ending to denote a family; **N.L. fem. pl. n.** *Asgardarchaeaceae*, the Asgardarchaeum family	Based on protein content and compositional features, we infer that Asgardarchaeia is an acetogenic chemoheterotroph, possibly a facultative lithoautotroph, and is adapted to a thermophilic lifestyle. Utilizing genomes from Asgard archaea, TACK, and Euryarchaea, we perform phylogenomic reconstructions using the GTDB archaeal marker genes, the current reference set for taxonomic classification. Calibrating relative evolutionary divergence (RED) values for Asgardarchaeota using established Thermoproteota lineages in the GTDB r207 reference tree, we establish a robust classification and propose Asgardarchaeum as the type genus for the family Asgardarchaeaceae, the order Asgardarchaeales, the class Asgardarchaeia and the phylum Asgardarchaeota.	*Asgardarchaeales*	*Asgardarchaeum*	seqco.de/i:44142

Proposed Taxon	Etymology	Description	Parent Taxon	Type	Registry URL
Genus *Asgardarchaeum*	[As.gar.dar.chae'um] **N.L. neut. n.** *Asgard*, from the Old Norse Asgard, named after the Realm of Æsir goddesses and gods in Norse mythology; **N.L. neut. n.** *archaeum*, [from Gr. adj. archaios, -e, -on] ancient, archaeon; **N.L. neut. n.** *Asgardarchaeum*, an archaeal genus named for Asgard	Based on protein content and compositional features, we infer that Asgardarchaeia is an acetogenic chemoheterotroph, possibly a facultative lithoautotroph, and is adapted to a thermophilic lifestyle. Utilizing genomes from Asgard archaea, TACK, and Euryarchaea, we perform phylogenomic reconstructions using the GTDB archaeal marker genes, the current reference set for taxonomic classification. Calibrating relative evolutionary divergence (RED) values for Asgardarchaeota using established Thermoproteota lineages in the GTDB r207 reference tree, we establish a robust classification and propose Asgardarchaeum as the type genus for the family Asgardarchaeaceae, the order Asgardarchaeales, the class Asgardarchaeia and the phylum Asgardarchaeota.	*Asgardarchaeaceae*	*Asgardarchaeum abyssi*^{Ts}	seqco.de/i:41248
Species *Asgardarchaeum abyssi*^{Ts}	[a.bys'si] **L. gen. n.** *abyssi*, abyss of the Guaymas Basin.	Asgardarchaeum abyssi has a genome size of about 2.64 Mbp with average GC% of 33.96%. Metagenomic analyses indicate this novel archaeal class has been primarily extracted from the Guaymas Basin sediment and other deep-sea sites within the Gulf of California. Asgardarchaeum 16S shares only 63-83% 16S similarity with previously described Asgardarchaeota classes. A. abyssi is an acetogenic chemoheterotroph like other Asgardarchaeota, including Freyarchaeia and Sifarchaeia.	*Asgardarchaeum*	NCBI Assembly: GCA_040225955.1 ^{Ts}	seqco.de/i:44143