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TABLE 4 Numbers and metabolic diversity of microorganisms in vent environments

Samples	Number of microorganisms[a]	Metabolic and/or phylogenetic groups
Diffuse-flow fluids (2°C–80°C)	10^5–>10^9 ml^{-1}; high numbers from Galapagos particles	Extremely high diversity of bacteria and archaea and include aerobes and anaerobes (see Table 1)
Smoker fluids (250°C–400°C)	Not detected to 10^7 ml^{-1}; high numbers correlate with evidence of phase separation[b]	Hyperthermophilic methanogens and heterotrophic archaea isolated; evidence for other hyperthermophilic archaea and bacteria from molecular data[c]
Hydrothermal vent plume water (2°C in horizontal plume)	~10^5–>10^6 ml^{-1}	H_2-, CH_4-, and Mn^{2+}-oxidizing bacteria detected by activity measurements; *Halomonas* spp. isolated[d]
Deep SW surrounding vents (2°C)	10^3–<10^5 ml^{-1}	Limited diversity of bacteria and archaea detected and enumerated using molecular methods
Sulfide structures	>10^8 per gram of sulfide on outer layers; 10^5 per gram in interior	Outer layers have a mixture of archaea and bacteria and include metal oxidizers and methanogens; inner layers contain only archaea of unknown physiologies[e]
Subsurface crust	Numbers are unknown	Different thermal groups of bacteria and archae detected from new eruptions; unique archaea isolated from subsurface fluids[f]
Microbial mats	>10^8 bacteria per gram	High numbers of sulfur-oxidizing bacteria including *Beggiatoa* spp. and uncultured ε-proteobacteria[g]
Sediments	Surface of Guaymas sediments similar to microbial mats; numbers range from in sedimented ridges[h]	Same as for microbial mats in surface layer with sulfate-reducing bacteria and archaea dominating the deeper layers

(*Continued*)

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Samples	Number of microorganisms[a]	Metabolic and/or phylogenetic groups
Animal endosymbionts	$\sim 10^{10}$ per gram tissue	Sulfide-oxidizing bacteria most common in hydrothermal vent animals whereas methane-oxidizing bacteria found at some cold seeps
Outer surfaces of animals	Probably similar to microbial mats	Methane oxidizers found on surface shells of some limpets and worm tubes[i]; filamentous metal-oxidizing bacteria found on rear surfaces of Alvinella worms[j]

[a] Numbers usually determined by epifluorescence microscopy or quantitative lipid analyses.

[b]Baross & Deming 1995.

[c]Takai et al. 2000.

[d]Cowen et al. 1986, 1998; Lilley et al. 1995; Kaye & Baross 2000.

[e]Harmsen et al. 1997a, Schrenk et al. 1999a.

[f]Delaney et al. 1998; Summit & Baross 1998, 2001.

[g]Jannasch 1995, Longnecker & Reysenbach 2001, Nelson et al. 1989, Moyer et al. 1995.

[h]Parkes et al. 1994, Summit et al. 2000.

[i]De Angelis et al. 1991.

[j]Cary & Stein 1998.