

Table 1 | Energetics of bacteria and eukaryotes by cell and genome size

Parameter	Prokaryotes					Eukaryotes				
	Mean	S	M	L	XL	Mean	S	M	L	XL
Weight of cell ($\times 10^{-12}$ g)	2.6	0.2	1.2	4	1×10^6	40,100	250	7,000	33,000	1×10^6
Power ($W g^{-1}$)	0.19	0.07	0.3	0.11	0.0005	0.06	0.09	0.03	0.05	0.01
Power per cell (pW)	0.49	0.014	0.36	0.44	500	2,286	21.5	224	1,782	10,000
Ploidy level	4	1	6	4	10,000	2	2	2	100	3
Haploid genome size (Mb)	6	1.9	4.6	9	7.5	3,000	300	3,000	100	11,000
Power per haploid Mb (pW)	0.02	0.01	0.01	0.01	0.01	0.38	0.04	0.04	0.18	0.3
No. of haploid genes $\times 10^3$	5	2	4.4	6	6	20	12	20	25	15
Power per gene (fW)	0.03	0.01	0.01	0.02	0.01	57.15	0.90	5.6	0.71	222.2
Power per genome (fW)	0.12	0.01	0.06	0.11	0.05	1,143	10.75	112	17.8	3,333

For prokaryotes, the mean is from 55 values given in ref. 32; specific examples are derived from ref. 32, Supplementary data. For eukaryotes, the mean is from 12 values re-calculated independently from ref. 33; specific examples from data given in Table 1, ref. 33. We have converted from nl O₂ per cell per hour to watts using the same conversion factor as Makarieva et al.³¹ (complete aerobic oxidation of endogenous substrates yields 20 J per ml O₂). Metabolic rate for *Thiomargarita namibiensis* is from ref. 73. The standard deviations in metabolic rate per gram (given in main text) are not transformed further here, but the variance of around twice the mean falls significantly short of the differences calculated. There is an appreciable range of uncertainty in measurement for both cell mass and metabolic rates for microbes: values differing by one or two orders of magnitude might not be meaningfully different. Nonetheless, differences of four to six orders of magnitude, as calculated, certainly are. Power per gene depends partly on ploidy. Very high ploidy, as in *Thiomargarita* (Schulz-Vogt, personal communication) and to a lesser extent *Bresslaia insidiatrix*²⁴, lowers energy per gene. Genome sizes are from the Joint Genome Institute (<http://img.jgi.doe.gov/cgi-bin/pub/main.cgi>). For prokaryotes: S, small (*Streptococcus pyogenes*); M, medium-sized (*Escherichia coli*); L, large (*Azospirillum lipoferum*); XL, very large (*Thiomargarita namibiensis*). For eukaryotes: S, small (*Ochromonas sp.*); M, medium-sized (*Euglena gracilis*); L, large (*B. insidiatrix*); XL, very large (*Amoeba proteus*). Power per genome is power per haploid gene times haploid gene number.