

TABLE 3. Surface-to-volume ratios of bacteria of different sizes and shapes

Organism	Diam ( $\mu\text{m}$ )	Length ( $\mu\text{m}$ )	Surface area ( $\mu\text{m}^2$ ) <sup>a</sup>	Vol ( $\mu\text{m}^3$ ) <sup>a</sup>	Surface/vol ratio ( $\mu\text{m}^2/\mu\text{m}^3$ )	<i>Pu</i> ratio <sup>b</sup>
<i>P. ubiquae</i>	0.2	0.5	0.31	0.014	22	1
Cocci	1		3.14	0.52	6	3.7
	2		12.56	4.2	3	7.3
	3		28.26	14.13	2	11
Rods						
<i>E. coli</i>	1	2	6.28	1.3	4.8	4.6
	1	8	25.12	6.02	4.2	5.3
<i>E. fishelsoni</i>	40	250	31,400	$3 \times 10^5$	0.10	220
	80	600	151,000	$3 \times 10^6$	0.05	440

<sup>a</sup> Calculations for symmetrical, spherical cocci: surface area =  $4\pi r^2$ ; volume =  $1.33\pi r^3$ . Calculations for rods, assumed to be capped by two equal and symmetrical hemispherical ends: surface area =  $4\pi r^2 + 2\pi rl$ ; volume =  $1.33\pi r^3 + \pi r^2 l$ .

<sup>b</sup> The “*Pu* ratio” is a multiplication factor that describes how much more volume one unit of cell surface area must support compared to the same unit of surface area in *P. ubiquae*.