

TABLE 1 Composition of an average *E. coli* B/r cell<sup>a</sup>

Components	% Total dry wt <sup>b</sup>	Amt (g, 10 <sup>-15</sup> ) per cell <sup>c</sup>	Mol wt	Molecules per cell	No. of different kinds of molecules <sup>d</sup>
Protein	55.0	156	4.0 × 10 <sup>4</sup>	2,350,000	1,850
RNA	20.5	58			
23S rRNA		31.0	1.0 × 10 <sup>6</sup>	18,700	1
16S rRNA		15.5	5.0 × 10 <sup>5</sup>	18,700	1
5S rRNA		1.2	3.9 × 10 <sup>4</sup>	18,700	1
tRNA		8.2	2.5 × 10 <sup>4</sup>	198,000	60
mRNA		2.3	1.0 × 10 <sup>6</sup>	1,380	600
DNA	3.1	8.8	2.5 × 10 <sup>9</sup>	2.1	1
Lipid	9.1	25.9	705	22,000,000	
Lipopolysaccharide	3.4	9.7	4,070	1,430,000	1
Peptidoglycan	2.5	7.1	(904) <sub>n</sub>	1	1
Glycogen	2.5	7.1	1.0 × 10 <sup>6</sup>	4,300	1
Polyamines	0.4	1.1			
Putrescine		0.83	88	5,600,000	1
Spermidine		0.27	145	1,100,000	
Metabolites, cofactors, ions	3.5	9.9			800+

<sup>a</sup>Calculated for an average cell in a population of *E. coli* B/r in balanced growth at 37°C in aerobic glucose minimal medium with a mass doubling time of 40 min. The cell is defined by dividing the total biomass, or the amount of any of its measured components, by the total number of cells in the population. This average cell, therefore, is approximately 44% through its division cycle (see reference 11 for the function describing the distribution of cell ages in an asynchronous, steady-state population) and, assuming that increase in cell mass is exponential, is approximately 33% larger than when it was born. This table is modified from data in Table 1 of reference 10.

<sup>b</sup>Relative amounts of the major components based on information in references 3, 12, and 16 and on unpublished experiments of the author (F.C.N.; see text). In some cases, data from strains other than B/r, from growth conditions other than the reference one, or from both had to be used (see references concerning glycogen [5], polyamine [9], and lipid [16]).

<sup>c</sup>Based on measurements of the total dry mass and the number of cells measured in portions of a reference culture (unpublished observations). The wet weight is calculated from the assumption that 70% of *E. coli* protoplasm is water. The total dry weight per cell is  $2.8 \times 10^{-13}$  g; the water content (assuming that 70% of the cell is water [3]) is  $6.7 \times 10^{-13}$  g; the total weight of one cell is  $9.5 \times 10^{-13}$  g.

<sup>d</sup>Based on the following information sources: protein, examination of two-dimensional polyacrylamide gels (unpublished observations); stable RNA, chapter 88; mRNA, assuming three genes per average transcriptional unit; lipid, an indeterminate number of species because of the variety of fatty acids associated with the four major types of phospholipids exclusive of lipopolysaccharide (i.e., 76% phosphatidylethanolamine, 20% phosphatidylglycerol, and small amounts of cardiolipin and an unidentified species) (1, 12); and metabolites, cofactors, and ions, roughly estimated as described in Table 3 of reference 10.