

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

Component(s)	% Total dry wt <sup>b</sup>	Amt (g, 10 <sup>15</sup> )/cell <sup>c</sup>	Mol wt	Molecules/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			
23 S rRNA		31.0	1.0 × 10 <sup>6</sup>	18,700	1
16 S rRNA		15.5	5.0 × 10 <sup>5</sup>	18,700	1
5 S rRNA		1.2	3.9 × 10 <sup>4</sup>	18,700	1
Transfer		8.2	2.5 × 10 <sup>4</sup>	198,000	60
Messenger		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) <i>n</i>	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	1
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 10 for the function describing the distribution of cell ages in a population), and, if increase in cell mass is exponential, is approximately 33% larger than when it was born. This table is modified from data in reference 7, Table 1.

<sup>b</sup> Relative amounts of the major components based on information in references 3, 12, and 16 and on unpublished experiments of F. C. Neidhardt (see the text).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 [4], polyamine [9], and lipid [15]).

<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 Based on measurements of the total dry mass and the number of cells measured in portions of a reference culture (unpublished observations).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) 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the following components: protein, examination of two-dimensional O'Farrell gels (T. A. Phillips and F. C. Neidhardt, unpublished observations); stable RNA, chapter 85; mRNA, assuming three genes per average transcriptional unit; lipid, an indeterminate number of species because of the variety of fatty acids associated with the following four major types of phospholipids exclusive of lipopolysaccharide: 76% phosphatidylethanolamine, 20% phosphatidylglycerol, and small amounts of cardiolipin and unidentified species (1, 11); and metabolites, cofactors, and ions, roughly estimated as described in reference 7, Table 3.