

TITLE: MACROMOLECULAR-SYNTHESIS AND DEGRADATION IN ARTHROBACTER DURING PERIODS OF NUTRIENT DEPRIVATION

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Abstract: Cells of *Arthrobacter atrocyaneus* and *A. crystallopoietes*, harvested during their exponential phase, were starved in 0.03 M phosphate buffer (pH 7.0) for 28 days. During this time, the cells maintained 90 to 100% viability. Experimental results were similar for both organisms. Total cellular deoxyribonucleic acid was maintained. Measurable degradation rates for deoxyribonucleic acid as determined by radioisotope techniques were not observed, and only during the initial hours of starvation could a synthetic rate be determined. Total ribonucleic acid levels remained stable for the first 24 h of starvation, after which slow, continuous loss of orcinol-reactive material occurred. Synthetic and degradative rates of ribonucleic acid, as determined by radioisotope techniques, dropped quickly at the onset of starvation. Constant basal rates were attained after 24 h. In *A. atrocyaneus*, total cell protein was degraded continuously from the onset of starvation. In *A. crystallopoietes*, total cell protein remained stable for the first 24 h, after which slow continuous loss occurred. After 28 days, the total protein per cell was similar for both organisms. In the first week, amino acid pools stabilized at about 50% of the values characteristic of growth. Rates of degradation of protein decreased rapidly for the first 24 h for both organisms, but leveled to a constant basal rate thereafter. Rates of new protein synthesis dropped during the first 24 h and by 48 h achieved a constant basal rate.

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