plished by chromatography on columns of an anion exchanger. The fractions obtained containing the ultraviolet absorbing peaks were then rechromatographed on cellulose powder columns using an alcoholic borate solution as eluant. The analysis and the chromatographic behaviour of the six adenine compounds isolated suggest that they are AMP, adenosine diphosphate (ADP) and ATP, and their three deoxyribose analogues (deoxy-AMP, deoxy-ADP and deoxy-ATP, respectively).

The deoxy-ADP and deoxy-ATP were tested with some enzyme systems known to react with ADP or ATP. Deoxy-ADP was assayed spectrophotometrically with pyruvate kinase, using phosphopyruvate, reduced diphosphopyridine nucleotide and lactic dehydrogenase. It was found that deoxy-ADP reacted with a rate which was about 10 % of that of the same concentration of ADP. When both compounds were present in equimolar amounts, the reaction rate was reduced to about 80 % of that with ADP alone. When diphosphopyridine nucleotide (DPN) pyrophosphorylase from yeast⁴ was tested with deoxy-ATP and nicotinamide mononucleotide (NMN) in the presence of excess inorganic pyrophosphatase, it was found that two compounds were formed. One of them was ortho phosphate, and the other was a compound which in the presence of alcohol and alcohol dehydrogenase or glutamic acid and glutamic acid dehydrogenase gave rise to light absorption at 340 $m\mu$. It is therefore assumed that it is a dinucleotide of NMN and deoxy-AMP.

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Incorporation of ^{32}P into Nucleic Acids of Normal and Synchronized Protozoan Cultures

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Cultures of *Tetrahymena pyriformis* GL, grown under controlled conditions¹ were incubated with ^{32}P in different growth phases.

Three parallel cultures were grown up to a density of 5×10^4 cells per ml. They were

subjected to intermittent heat treatment to produce synchronized divisions¹. Each of these cultures was incubated for 20 minutes with ^{32}P at one of the three different growth steps: 1) During normal logarithmic multiplication; 2) after the last of the standard heat treatments, and 3) just prior to the first synchronous division. An acetone powder was prepared as described earlier², yielding dry weights of about 150–350 mg for each sample. Nucleic acids were separated and RNA was degraded according to the method of Schmidt-Thannhauser-Schneider. Special consideration was given to the removal of inorganic P. The amounts of DNA and of RNA-ribotides were determined by optical density λ_{260} in the Beckmann Spectrophotometer and the radioactivity per density unit ($\text{DU} = \text{Vol. (ml)} \times \text{extinction at } 260 \text{ m}\mu$) measured. This specific activity indicated the rate of incorporation of ^{32}P during the incubation period. The ribotides of RNA were chromatographed on paper in ammoniumsulphate-propanol solvent, the spots eluted and optical density similarly determined.

The dry weight follows closely the threefold volume increase during treatment, while the estimated content of both nucleic acids, expressed as DU per mg dryweight is almost constant. The specific activity of both nucleic acids is remarkably reduced during the treatment to about 7 % of the control logarithmic phase, but prior to the first synchronous division it rises to about 30–40 % of the values obtained in normal growth. While the overall picture of the specific activity of RNA shows a remarkable decrease after the heat-treatment, also the composition of the RNA, expressed as the ratios of the specific activities of AMP/GMP/UMP + CMP shows changes in the different steps. In Table 1 this is illustrated.

Table 1. Specific activity (SA) of the four ribotides of RNA in different growth phases. The numbers 1, 2 and 3 refer to the earlier mentioned steps of growth.

	1		2		3	
	SA	%	SA	%	SA	%
AMP	1 700	26.2	61	15.9	363	21.3
GMP	2 190	33.8	187	48.5	677	39.8
CMP + UMP	2 590	40.0	137	35.6	663	38.9
		100.0		100.0		100.0

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