Inability of Guanosine to Act as a Precursor of Polynucleotides

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Recent work from this laboratory [1] has shown that the pyrimidineribosides, which contain ribose bound to cytosine or uracil are metabollically different from free pyrimidines. Isotope experiments with the latter [2, 3] proved that these compounds cannot be utilized for the synthesis of polynucleotides while isotopic cytidine and also to some extent uridine can be used by the rat for the synthesis of pyrimidines of both ribonucleic acid and desoxyrinucleic acid [1]. It was thought that perhaps in the same way guanine coupled to ribose might be a precursor for purines while free guanine is not [2]. For that reason guanosine containing N^{15} was prepared by allowing *B. coli* to grow in a $N^{15}H_4^+$ containing medium. After isolation of PNA from the bacteria [4] guanosine was prepared and purified by starch chromatography [5]. It had an excess of N^{15} of 4.20 atom per cent. After cristallisation from water the N^{15}-guanosine was injected subcutanously into rats at a level of 10 mg/100 g of body weight per day. The injections were carried out twice daily and over a period of 3 days. After that the rats were killed, the polynucleotides prepared and separated. Purines and pyrimidines were prepared from each fraction and analyzed for N^{15} (5). None of the fractions contained any significant amount of N^{15}. It is thus concluded that guanosine does not act as a precursor for the synthesis of polynucleotides.

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The general procedure used is as follows:

30 ml of pure *p*-cymene (B. P. 175.5—176.5°) were added to a mixture of 1500 ml conc. HNO_3 (d. 1.40) and 18 g MnO_2. This mixture was then refluxed for approximately one hour. Care must be taken to dispose of the oxides of nitrogen liberated during the reaction. The clear yellow solution was allowed to cool, whereupon pale yellow crystals separated. These were removed by filtration through a sintered glass filter and washed with cold water. If this wash water is added to the filtrate a further amount of slightly less pure 3-nitro-*p*-toluic acid separates.

The precipitate was then dissolved in dilute ammonia, filtered, and reprecipitated by neutralization with conc. HCl. This precipitate was removed, after cooling, and recrystallized from boiling water.

M. p. (lit.)	189°
M. p. (found)	188°—189°
N (calc.)	7.73 %
N (found)	7.70 »

The methyl ester was prepared by means of methanol and hydrochloric acid.

M. p. (lit.)	49°
M. p. (found)	48°—49°

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