chloride ions. The insolubility of thallous chloride in water and dilute solutions of thallic chloride, and the presence of free chlorine in concentrated thallic chloride solutions (3.5 *F*) in which thallous chloride has an appreciable solubility[3] prevented an exact spectrophotometric study of solutions having significant concentrations of thallous and thallic chlorides. We can report however that as successive portions of solid thallous chloride were added to a 3.4 *F* thallic chloride solution containing some (*ca.* 0.03 *F*) free chlorine, the optical density of the resulting solutions decreased (as the chlorine was removed) and became constant at the values: $\lambda = 380$ mμ, $D = 0.065$; $\mu = 360$ mμ, $D = 0.66$, for a solution that contained 0.04 *F* excess Tl(I). Since the optical densities of the solutions never increased as the TlCl was added, there was probably no significant interaction absorption in the solution.

This work has been supported by the Office of Naval Research. We are grateful to Dr. German Harbottle for communicating to us his excellent method of separating thallous and thallic ions.

CONTRIBUTION NO. 1307 FROM THE
GATES AND CRELLIN LABORATORIES OF CHEMISTRY
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA 4, CALIFORNIA RECEIVED JUNE 8, 1949

The Lactal Ring Structures of Some Synthetic Pyrimidine Nucleosides[1]

BY MARJORIE ZEIGER NEWMARK, IRVING GOODMAN AND KARL DITTMER[2]

The ribosyl, arabinosyl, glucosyl and galactosyl nucleosides of uracil and thymine and the corresponding 5-bromo-uracil derivatives were prepared in our laboratories[3,4] and tested for biological activity[5] on two strains of *Escherichia coli*, two strains of *Neurospora crassa*, a strain of *Lactobacillus casei*, and one of *Streptococcus faecalis* R.

A uracil-requiring mutant of *E. coli* was unaffected by any of the synthetic nucleosides although uracil or natural uridine produced good growth. A uracil-less mutant of *N. crassa* which was shown by Loring to grow well on uracil, uridine or uridylic acid was also unaffected by the synthetic products. Results of studies of *L. casei* and *S. faecalis* R showed a similar lack of biological activity. These studies emphasized the need for complete elucidation of the detailed structure of these synthetic nucleosides.

In order to establish the nature of a possible relationship between structure and activity, a number of naturally occurring and synthetic nucleosides were analyzed by the periodate method as adapted by Davoll, Lythgoe and Todd[6] to determine the ring structures of the sugar component of the nucleosides. In this method glycofuranosyl nucleosides of the pentoses require one mole of periodate per mole of nucleoside for oxidation, whereas glycopyranosides of this type require two moles of periodate. Aldohexoses in the pyranoside form require two moles of periodate for oxidation and liberate one mole of formic acid during the course of the reaction; aldohexoses in the furanoside form also require two moles of periodate for oxidation but liberate no formic acid.

Table I summarizes the results of the periodate oxidation of a number of synthetic pyrimidine nucleosides as well as the naturally occurring pyrimidine nucleosides, uridine and cytidine. All of the synthetic nucleosides here reported possess the pyranoside structure. These results would indicate in part that the known biological activity of uridine and cytidine are dependent upon the furanoside structure.

TABLE I

PERIODATE OXIDATION OF SOME PYRIMIDINE NUCLEOSIDES

N-Glycoside	Moles IO_4^- / Mole glycoside	Moles HCOOH / Mole glycoside
Uridine[a]	1.14	..
Cytidine[a]	1.20	..
1-D-Ribosyl uracil	2.02	..[b]
1-D-Arabinosyl uracil	2.07	..[b]
1-D-Xylosyl uracil	1.89	0.86
1-D-Glucosyl uracil	2.01	0.95
1-D-Galactosyl uracil	2.03	..[b]
1-D-Arabinosylthymine	2.03	..[b]
1-L-Arabinosylthymine	1.92	..[b]
1-D-Galactosylthymine	2.04	0.99
1-D-Glucosylcytosine	1.98	0.88

[a] We are indebted to Dr. H. S. Loring of Stanford University for the samples of uridine and cytidine. [b] The theoretical amount of formic acid expected is 1 mole, but due to limited amounts of material the determinations were not made.

(1) This work was supported in part by a research grant-in-aid from the National Institutes of Health.

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DEPARTMENT OF CHEMISTRY
UNIVERSITY OF COLORADO
BOULDER, COLO. RECEIVED JUNE 16, 1949

A Complex Praseodymium Fluoride Readily Soluble in Dilute Acids[1]

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The insolubility of praseodymium trifluoride in dilute mineral acids is well known. In the course of investigations concerning this compound a complex potassium–praseodymium–fluoride compound, possibly new, which was easily soluble in dilute acids was prepared.

(1) From the thesis for the M.S. degree of T. Perros, The George Washington University.