ening the period of hydrolysis has no effect on the amount of DNA precipitated (Table 2). This could be taken to support the interpretation that the degraded part of the DNA fraction is already in the alkali-soluble form before the material is treated with alkali. This finding does not necessarily contradict the finding of McIndoe and Davidson (*11*) that the repeated reprecipitation of DNA from isolated nuclei results in increasing degradation of the DNA which was at first precipitable.

It can be seen from Table 2 that there are some discrepancies between the total extractable phosphorus values given by direct phosphorus analysis and the amounts calculated on the basis of theoretical phosphorus contents of 9.8% and 9.5% for DNA and RNA respectively (Schneider, *7*). These can probably be accounted for on the basis of (a) a slight interference in the Mejbaum (*13*) orcinol reaction by DNA (von Euler and Hahn, *14*) and (b) high values on the Dische (*15*) diphenylamine reaction in the presence of protein (Dounce, *16*). In the experiments reported here, the standard solutions of nucleic acids used for calibration were made up in solvents of exactly the same composition as those used in the unknowns and were varied to correspond to the method of extraction or fractionation.

Data similar to those reported here have been obtained on occasion from mouse liver and from old mouse uterine tissue. It is suggested that, before the Schmidt-Thannhauser method is used as a method for the determination of DNA and RNA, a check should be made with another method to find out whether effective separation is achieved in the particular tissue being studied. Acid precipitation after alkaline hydrolysis of suitably prepared nucleic acid-containing tissue homogenates does not always result in complete separation of the deoxyribonucleic acids. For this reason, and because the acid-soluble fraction may also contain non-nucleotide organic phosphorus, it is unsafe to use phosphorus estimations on the acid-soluble and acid-insoluble fractions as the sole means of distinguishing the DNA and RNA.

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The Occurrence of Acquired Hemolytic Anemia in Subjects of Blood Group O

M. L. Hunt and S. P. Lucia

School of Medicine, University of California Medical Center, San Francisco

In a previous study of the blood groups of 26 patients suffering from hemolytic anemia (*1*), there was noted a slight increase in the incidence of blood group O. To investigate this trend in a larger sample, the blood groups of 58 subjects of hemolytic anemia were analyzed in relation to the type of hemolytic anemia involved, i.e., congenital or acquired.

Of the 58 cases of hemolytic anemia studied, 31 were diagnosed as congenital hemolytic anemia, and 27 as acquired hemolytic anemia. The diagnoses were made by competent hematologists and were verified by frequent references to the progress of the individual cases. All the patients who had acquired hemolytic anemia were unrelated; of those with congenital hemolytic anemia, 7 were members of 3 families (two instances of a father and daughter, and one of a father, daughter, and granddaughter), and the rest were unrelated.

In Table 1, the ABO blood group distribution among subjects of hemolytic anemia is presented, and the preponderance of group O among those with acquired hemolytic anemia is evident. The distribution of ABO blood groups in the 58 subjects of hemolytic anemia was compared with the normal distribution of the ABO blood groups in an unselected, white, population.

There was found to be a statistically significant increase in the incidence of blood group O among patients with acquired hemolytic anemia, whereas no significant deviation from the expected distribution of ABO blood groups occurred among patients with congenital hemolytic anemia.

TABLE 1

The Distribution of ABO Blood Groups in 58 Patients with Hemolytic Anemia

Type of hemolytic anemia	Total No.	%	ABO blood groups							
			O (N = 45%) (*2*)		A (N = 41%)		B (N = 10%)		AB (N = 4%)	
			No.	%	No.	%	No.	%	No.	%
All types total	58	100	36	62.1	13	22.4	9	15.5	0	0
Congenital	31	100	15	48.4	11	35.5	5	16.1	0	0
Acquired	27	100	21	77.8	2	7.4	4	14.8	0	0

The distribution of ABO blood groups among patients afflicted with *acquired hemolytic anemia* was found to parallel closely the distribution of ABO blood groups among individuals who are *non-secretors of type A group-specific substance*. Preliminary experiments in our laboratory have indicated a possibility that susceptibility to acquired hemoyltic anemia may be related to the status of nonsecretion of type A group-specific substance.

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Small-Volume Dosimeter for X-Rays and Gamma-Rays

James H. Schulman and Howard W. Etzel

Chemistry Branch, Metallurgy Division, Naval Research Laboratory, Washington, D. C.

A new system of x-ray and gamma-ray dosimetry for the monitoring of personnel exposed to A-bomb attack was proposed at this laboratory in 1947 and has since been described in a number of publications (*1–3*). This method of dosimetry employs the phenomenon of radiophotoluminescence (*4*), which may be defined as the creation of new, stable luminescent centers in a material by the photochemical action of ionizing radiations. Before exposure to such radiations, an ideal radiophotoluminescent material is nonluminescent under ultraviolet light; after exposure to ionizing radiations, it can be repeatedly or continuously excited to luminescence by ultraviolet light. It has been shown (*2, 3, 5*) that the luminescence intensity of a radiophotoluminescent material, under fixed conditions of ultraviolet light illumination, is proportional to the dosage of ionizing radiation to which the material has been exposed. Visual or photoelectric means may be used for measuring this luminescence and interpreting it in terms of dosage. Of the many synthetic materials found that show this effect (*5, 6*), the one selected as most economical and practical for large-scale manufacture was a silver-activated phosphate glass (*1–3, 5, 6*). This glass, prior to treatment with ionizing radiations, is almost devoid of luminescence under 3650A excitation; after x-ray or gamma-ray exposure, 3650A excitation produces an orange luminescence. The undosed glass retains its sensitivity to ionizing radiations apparently indefinitely, and the dosed glass retains its ability to luminesce under ultraviolet excitation for at least many months when stored in the dark. The response of the glass is linear with dosage, cumulative, and independent of dose rate over a wide range of dose rates. The temperature at which the dose is delivered has a measurable effect on the yield of luminescence centers, and the temperature at the time of measurement of the luminescence of the glass likewise has an effect on the intensity of luminescence. Both temperature effects are comparatively small and can be taken into account in estimating the dosage from the luminescence intensity.

With a $1 \times 1 \times 0.1$-cm plate of the sensitive glass, used in conjunction with a 100-watt C-H4 ultraviolet lamp and a photomultiplier tube, one can detect the luminescent centers produced by as little as 10R of radium gamma-rays (*2, 3*). In the dosimeter adopted for use by the U. S. Navy (*7*), a $\frac{3}{4} \times \frac{3}{4} \times 3/16$-in. rectangular parallelopiped of the glass is used as the sensitive element. With this larger block of glass it is easier to detect the fluorescence, hence the Navy instrument for measuring the brightness and interpreting it in terms of dosage contains a small 4-watt ultraviolet lamp (Type RP-12) instead of a 100-watt source.

In connection with radiation injury studies on small animals being conducted by the Biology Department, Boston University, it became of interest to explore the feasibility of reducing the size of the sensitive glass element, so that it might be possible to implant it in body tissue. This note presents the results of preliminary efforts toward such size reduction.

Although fine filaments of the glass, of the order of 0.20 mm diameter, gave a strong fluorescence after a dose of approximately 100 roentgens of soft (110 kvp) x-rays on visual inspection under a 100-watt C-H4 "blacklight" lamp, it was decided that specimens of somewhat larger size would be more suitable for measurement in a photoelectric fluorometer. A rod 1 mm in diameter and 6 mm in length was considered to be of satisfactory size. Random lengths of such rods, with diameters between 0.95 and 1.05 mm, were cut to proper length and the end terminations polished.[1]

A photoelectric fluorometer, shown schematically in Fig. 1, and basically identical with the fluorometers previously described (*2, 3, 7*), was constructed to accommodate the rods. A rod, held in any one of the holes in a movable slide, can be interposed between the 100-watt C-H4 ultraviolet lamp and the 1P21 photomultiplier tube, in such a way that the ultraviolet radiation impinges on the rod normal to its axis, while the photomultiplier collects fluorescent light emitted through one of the flat ends of the rod. Visible light from the lamp itself is excluded by an ultraviolet transmitting filter such as Corning 9863 placed between the lamp and the glass rod. Scattered ultraviolet light is excluded from the photomultiplier by an orange filter placed between it and the glass. Variable high voltage for the photomultiplier is provided by a regulated power supply or by batteries, and the photomultiplier current is measured with a suitable galvanometer.

[1] The glass rods were provided through the courtesy of Warren Beck, of the Minnesota Mining and Manufacturing Company, and Norbert Kreidl and Gerald Blair, of the Bausch & Lomb Optical Company.