Table 1. Internal Specific Resistance ρ, Conductivity $\varkappa$ and Dielectric Constant ε of Red Blood Cells (Temperature, 25° C.)

Species	ρ [ohm cm.] 90 Mc./s.	$\varkappa$ [m.mho/cm.] 90 Mc./s.	ε (250 Mc./s.)
Man	193	5·18	50·1
Beef	230	4·35	51·3
Sheep	228	4·39	50·4
Dog	216	4·63	50·9
Cat	190	5·26	53·1
Rabbit	170	5·89	55·1
Chicken	204	4·90	52·1

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Synthetic Activity of Polynucleotide Phosphorylase from Sperm

Polynucleotide phosphorylases are enzymes that catalyse the synthesis of polyribonucleotides.

No evidence has yet been given for the presence of polynucleotide phosphorylase in extracts of animal tissues, although these enzymes have been found in extracts of aerobic or anaerobic Gram-positive or Gram-negative bacterial cells[1–4].

A polynucleotide phosphorylase was isolated and partially purified from the human sperm. The enzyme was prepared from vacuum-dried human sperm by the method of Littauer and Kornberg[5]. The preparation obtained was further purified by ammonium sulphate fractionation, and by zinc ethanol precipitation. The precipitate obtained, between 15 and 20 per cent, was adsorbed on an equal volume of calcium phosphate gel. The pure enzyme was then eluted from the gel and activity determined.

The enzymic reactions were carried out in solutions where each 5·0 ml. portion contained *M*/10 trihydroxymethyl-amino-ethane buffer, *p*H 8·0, *M*/60 magnesium chloride, *M*/15 of either adenosine-5′-diphosphate, guanosine-5′-diphosphate, uridine-5′-diphosphate or cytidine-5′-diphosphate, each alone or in pairs, and 0·5 ml. of 5 per cent solution of the sperm enzyme.

Chromatograms of the reaction solutions were developed by the descending technique in two dimensions. The solvent systems used were ammonium–*iso*butyric acid and tertiary amyl alcohol–formic acid–water[6,7]. Permanent records of the chromatograms were obtained by the photographic technique[7]. The polynucleotides located were cut out from the chromatograms and eluted. The ultra-violet absorption spectrum, chemical identity and concentration were studied.

Table 1. Stoichiometry of Reactions Catalysed by Sperm Phosphorylase

	Nucleotides		Ortho-phosphate	Polynucleotides	
Initial	ADP	9·8	1·0	ADP	0·0
90 min.	ADP	−5·5	+6·0	ADP	+5·0
Initial	GDP	9·4	1·0	GDP	0·0
90 min.	GDP	−5·0	+6·0	GDP	+5·0
Initial	UDP	9·6	1·0	UDP	0·0
90 min.	UDP	−5·2	+6·0	UDP	+5·0
Initial	CDP	9·6	1·0	CDP	0·0
90 min.	CDP	−5·4	+6·0	CDP	+5·0
Initial	ADP+GDP	19·8	2·0	ADP . GDP	0·0
90 min.	ADP+GDP	−10·5	+12·0	ADP . GDP	+10·0
Initial	ADP+UDP	20·0	2·0	ADP . UDP	0·0
90 min.	ADP+UDP	−10·8	+12·0	ADP . UDP	+10·0
Initial	ADP+CDP	19·4	2·0	ADP . CDP	0·0
90 min.	ADP+CDP	−10·2	+12·0	ADP . CDP	+10·0
Initial	GDP+UDP	−19·0	2·0	GDP . UDP	0·0
90 min.	GDP+UDP	−10·0	+12·0	GDP . UDP	+10·0
Initial	GDP+CDP	19·0	2·0	GDP . CDP	0·0
90 min.	GDP+CDP	−10·6	+12·0	GDP . CDP	+10·0
Initial	UDP+CDP	19·9	2·0	UDP . CDP	0·0
90 min.	UDP+CDP	10·8	+12·0	UDP . CDP	+10·0

ADP, Adenosine-5′-; GDP, guanosine-5′-; UDP, uridine-5′-; CDP, cytidine-5′-phosphates.

Homopolymers of adenylic, uridylic, guanylic and cytidylic acid with several heteropolymers containing the adenylic-guanylic, adenylic–uridylic, adenylic–cytidylic, guanylic–uridylic, guanylic–cytidylic and uridylic–cytidylic are found in the above enzyme reaction solutions (see Table 1). The enzymic activities of the polynucleotide phosphorylase provide a possible explanation of the differences in composition and structure of ribonucleic acids.

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Influence of Vitamin D on Synthesis of Hexosamine by Rachitic Rat Cartilage

It is believed that chondroitin sulphate or its protein complex plays a very important part in the process of calcification[1]. The fact that during calcification there is a marked increase in metachromatic staining in the region which exhibits calcification led Rubin and Howard[2] to postulate that either there is an increase in the concentration of the mucopolysaccharide or that there is a change in its state of polymerization. In the former case it is possible that