

product acted similarly, but to a lesser degree, in 4 experiments in which it was dissolved in plasma.

Summary. An analysis of the effects of 6 different types of globulin, dissolved in Locke's solution, upon the sedimentation time of erythrocytes, reveals that in 12 experiments 4 of the types prolonged the sedimentation time, and that in 12 experiments the remaining 2 types shortened the sedimentation time. In 8 experiments in which 2 of the types of globulin were dissolved in plasma, the sedimentation time was prolonged.

Conclusion. These experiments indicate that a consistent relationship cannot be established *in vitro* between the sedimentation time of erythrocytes and the globulin content of various solutions of serum globulin.

8370 P

A Comparison of the Tar Tumors of Rabbits and the Virus-Induced Tumors.

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By tarring the ears of domestic and cottontail rabbits tumors have been procured for comparison with others experimentally induced with the Shope virus.¹ The tarred rabbits were strictly isolated.

The growths caused by virus regularly developed from the surface epidermis and were papillomas varying little in structure, whereas not a few of those consequent on tarring originated from the skin appendages, with result in a wider morphological variety. The tar papillomas were scattered, discrete and often punctate in origin; so too were the papillomas due to virus when this had been appropriately inoculated. The growths due to tarring appeared only after it had been repeated often enough to cause general hyperplasia of the epithelium, together with complex connective tissue alterations; and many of them retrogressed after tarring was stopped. The virus tumors, on the other hand, arose on the basis of the slight epidermal trauma incident to inoculation, and their progression was followed, not preceded, by connective tissue changes. The virus evidently needed no help,—though the growths it caused could be stimulated to rapid enlargement by connective tissue disturbances experimentally

¹ Shope, R. E., *J. Exp. Med.*, 1933, **58**, 607.

induced.² The unknown cause of the tar papillomas, on the other hand, was effective only when epithelial and connective-tissue disturbances had long existed, becoming independent thereof only after the growths had undergone considerable development, and often not even then. The tar papillomas were structurally much more irregular than early virus papillomas, as would follow from the disturbance of the underlying connective tissue, which was of a sort to bring about corresponding irregularities in the virus tumors. The surface of the tar papillomas often underwent maceration because covered, whereas the exposed surface of the virus growths consisted of dry, keratinized material.

When due allowance had been made for these differing conditions of incidence and growth, the resemblance between the tar and virus papillomas was found to be close. Often growths of the 2 kinds could not be told apart under the microscope except by the diffuse hyperplasia consequent on tarring. This was notably true of tumors induced in cottontail rabbits, the natural hosts of the virus. In general, however, the tar papillomas were less pigmented or unpigmented, as would follow from the fact that they originate from a single cell or from but few.³ Melanoblasts are only passively included in the epidermal papillomata, with rare exceptions⁴; and the fewer the cells from which these arise the less likely are such elements to be included in quantity with a resulting pigmentation of the growth. This holds strikingly true of the virus papillomas, which, when punctate in origin, are often wholly unpigmented even when originating from a deeply pigmented skin.

Sometimes the granular epithelial layer was relatively pronounced in the tar papillomas and the cells became flatter before they keratinized, features referable to a slower differentiation. Retrogression of growths of both kinds took place in the same way.⁵

Cottontails possess considerable resistance to the virus-induced papillomas, as evidenced by their slow enlargement and frequent retrogression. They have never in our experience gone on to cancer, whereas the especially vigorous growths of domestic rabbits have frequently done so.⁶ The changes taking place then are identical with those occurring when a tar-induced papilloma becomes a carcinoma; but in the latter instance the transformation is often more

² Beard, J. W., and Rous, Peyton, *J. Exp. Med.*, 1934, **60**, 723.

³ Mottram, J. C., *J. Path. and Bact.*, 1935, **40**, 407.

⁴ Beard, J. W., *PROC. SOC. EXP. BIOL. AND MED.*, 1935, **32**, 1334.

⁵ Beard, J. W., and Rous, Peyton, *J. Exp. Med.*, 1934, **60**, 723.

⁶ Rous, Peyton, and Beard, J. W., *J. Exp. Med.*, 1935, **62**, 523.

rapid, as one would expect from the favoring local conditions. Whether such conditions will cause the virus papillomas of cottontails to become cancerous remains to be seen. Frequently the alteration of a virus papilloma to a squamous cell cancer halts for a time at one stage or another, and in consequence cystic tumors or malignant papillomas develop, growths unusual after tarring.

In one cottontail small virus papillomas grew for a while, at 2 of 3 inoculation sites on the trunk. Fourteen weeks after their disappearance tarring of the ears was begun. One growth reappeared during the 5½ months of tarring, and a new papilloma developed at the site that had previously been negative. The new tumor progressed after tarring was stopped, but the growth which had recurred disappeared once more. In untarred rabbits a reappearance of retrogressed papillomas due to virus has never been observed. The fact is attested, however, that intercurrent stimulation may influence decisively the course of established growths.⁷

To summarize, the results of the comparison accord with the conception that the tar tumors may be due to a virus or viruses encondensed in the epidermis and dependent for pathogenic activity upon tissue derangements such as are produced by tar.

8371 C

A Convenient Method for the Preparation of Concentrates of Follicle Stimulating Hormone from Urine.*

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In the course of investigations on the excretion of gonad stimulating hormones in the urine of mental patients^{1, 2} the following method was developed for the preparation of concentrates of the follicle stimulating hormone (F.S.H.).

⁷ Kidd, John G., Rous, Peyton, and Beard, J. W., *PROC. SOC. EXP. BIOL. AND MED.*, 1935, **33**, 193.

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¹ Harris, M. M., Brand, E., and Hinsie, L. E., *Am. J. Psychiat.*, 1935, **91**, 1239.

² Harris, M. M., Brand, E., Hinsie, L. E., and Block, R. J., *PROC. SOC. EXP. BIOL. AND MED.*, 1935, **32**, 1576.