Sterile luciferin extracts made in 1918 and kept under a 3 inch layer of vaselin, to prevent oxidation, gave a good luminescence when luciferase was added to them in 1928. So long as oxidation is prevented, luciferin in water solution appears perfectly stable. A flask of luciferin solution was evacuated and the glass sealed. This flask was then heated in a water bath at 100° C. for one hour and set aside, sealed, January 22, 1924. On October 16, 1928 the flask was opened to the air. No luminescence appeared on opening, but when luciferase was added, a brilliant light appeared. Evidently boiling does not destroy luciferin if air is absent. Absolute alcohol extracts of luciferin kept in air show no luminescence after a few weeks when mixed in small quantity with luciferase solution. A slow oxidation of luciferin must take place.

Luciferase solution cannot be heat sterilized and if allowed to stand unsterilized, undergoes putrefaction and the luciferase disappears after a few weeks. A solution preserved with chloroform retains the power to luminesce when mixed with luciferin for several months but the luciferase gradually disappears and a sample 10 years old gave no luminescence with luciferin. Preserved with saturated NaCl, luciferase also gradually deteriorates, but a sample over 10 years old gave a faint luminescence with luciferin. On the other hand luciferase precipitated from solution with alcohol, the precipitate dried and kept over $CaCl_2$ for 10 years, gave a good luminescence when mixed with luciferin solution.

I conclude that dry luciferin and luciferase can be kept unharmed for long periods and that an aqueous luciferin solution is also stable in absence of oxygen, but that luciferase undergoes destructive changes in water solution.

4179

On Hemagglutination by Tumor Extracts.

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A report was made years ago on a distinct agglutinating action of extracts of tumors, of human and animal origin, on rabbit erythrocytes.[1] The question was raised whether the active substance might possibly be related to growth stimulating principles.

[1] Landsteiner, K., *Wien. klin. Wochenschr.*, 1908, S. 1549.

The agglutinating activity of the extracts disappears rather rapidly on standing and this property in itself differentiates the active substance from serum agglutinins, an inference probable also for other reasons. The agglutination phenomenon is shown also by Rous tumors.

Recently Mueller[2] described experiments which showed that the active principle of the Rous sarcoma deteriorates quickly on account of oxidation and that it can be preserved by the addition of cysteine and protection from the air. These results suggested similar experiments with the agglutinating extract of tumors. It was found that the deterioration of the agglutinating activity of tumor extracts (mouse sarcoma and Rous tumor) is also very markedly delayed when cysteine (1:500) is added to the solution and still more when the latter is covered with a layer of liquid paraffin. Thus the action is obviously different from agglutination by serum. A distinct agglutinating action, less intense than that of the tumors, was found in extracts of mouse embryos and mouse placenta.

Saline extracts of normal organs, as stated previously, did not show the agglutination phenomenon. Experiments are being made, using cysteine, in order to investigate whether a similar, though weaker, agglutinating action can be detected also in extracts of normal organs.

4180

Penetration of Alkaloids Into Vacuoles of Living Cells.

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The rate of penetration of brucine (from a solution of brucine sulphate) into the vacuole of a living cell of *Nitella* is much greater with the external solution at pH 9.3 than at pH 5.5. At pH 9.3 brucine accumulates in the sap and becomes more concentrated than in the external solution. As brucine penetrates, the pH value of the sap in the vacuole in increased. (The brucine is tested with nitric acid and the pH value with indicators.)

When cells exposed to brucine sulphate solution are transferred to a buffer solution containing no brucine the rate of exit of brucine from the vacuole is greater when the buffer solution is at pH 5.5

[2] Mueller, J. H., *J. Exp. Med.*, 1928, xlviii, 343.