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Responsible Investigator: William N. Valentine, M.D.

University Department: Medicine

Financial Support 1954-55: PHS $31,417.00; Parke-Davis $20,000.00.

Title of Project: Biochemical, Enzyme, and Physiologic Studies of Blood Cells.

This project, as in previous years, is concerned with investigating the biochemical constituents and enzymatic activities of human white blood cells obtained from normal subjects and from subjects with a variety of clinical diseases. This includes studies on leukocyte metabolism and leukemia as compared to normals and in this sense is related to cancer research. During the past year, extensive studies have been conducted on certain enzymatic constituents of leukocytes, such as esterase and alkaline phosphatase as well as on such non-enzymatic constituents as free glutathione. By the methods employed it was not possible to show elevation in unit leukocyte glutathione in leukemia such as has been reported by other authors. Leukocyte esterase activity was found to be widely distributed among the various leukocyte types and to not vary in any consistent or significant way in the various leukemias. A very considerable amount of work has been done on the alkaline phosphatase activity of leukocytes under the stimulus of increased endogenous adrenal cortical activity resulting from

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naturally occurring stresses or from the administration of ACTH. Unit leukocyte alkaline phosphatase increases markedly over a space of 72 hours when substantial doses of ACTH are given at 8 hour intervals during this period. In addition to the above, the histamine content of leukocytes and myelocytic leukemia has been found to correlate very closely with the absolute number of basophils.

Publications:

Beck, William S., and Valentine, William N. The Glycolytic Rate and Its Relationship to Certain Glycolytic Enzymes and Coenzymes in Normal and Leukemic Leukocytes. Proc. Am. Assoc. Canc. Res. 1(2), April 1954.

Follette, James; Valentine, William N.; Hardin, E. Barton; and Lawrence, J. S. Studies on the Glucuronic Acid Content of Human Leukocytes in Health and Disease. J. Lab. & Clin. Med., 43:134, January 1954.

Hardin, E. Barton; Valentine, William N.; Follette, James H.; and Lawrence, J. S. Studies on the Sulfhydryl Content of Human Leukocytes and Erythrocytes. Am. J. Med. Sciences, 228:73-82, 1954.

Valentine, William N. The Biochemistries of Leukocytes in Health and Disease. Transactions International Congress of Hematology.(in press). Speech presented in Paris, France, Sept. 1954.

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Valentine, William N. The Enzymes of Leukocytes. Annals N.Y. Acad. Sci. (in press).

Valentine, William N. The Leukocytes and the Leukopathies. Ann. Rev. Med. 6, 1955 (in press).

Valentine, William N. The Relationship of the Basophil to Blood Histamine in Man. Blood (in press).

Valentine, William N. Abnormal Hemoglobin: Clinical Disorders Resulting from Various Combinations of the Abnormal Hemoglobin. J. Calif. Med. Assoc. (in press).

Valentine, William N.; Follette, James H.; Hardin, E. Barton; Beck, William S.; and Lawrence, J. S. Studies on Leukocyte Alkaline Phosphatase Activity: Relation to "Stress" and Pituitary-Adrenal Activity. J. Lab. & Clin. Med., 44:219-228, August 1954.

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