REFERENCES

1. Frank, A.B. Nuclear Magnetic Resonance Spectroscopy. Academic Press, Inc., New York, 1986.

2. Robin, K.H. Nuclear Magnetic Resonance Spectroscopy. Tongman Group UK Ltd., New York, 1986.

3. Andrew, E.D. Modern NMR Techniques For Chemistry Reaearch. volume 6 Pergamon Books Ltd., Canada, 1989.

4. Jeremy, K.M.S. and Brian, K.H. Modern NMR Spectroscopy; A Guide for Chemistry. Oxford University Press, New York, 1990.

5. Willium, K. NMR chemistry; A Multinuclear Introduction. Macmillan Education Ltd., London, 1988.

6. Richards, S.A. Laboratory Guide to Proton NMR Spectroscopy. Backwell Scientific Publications, Oxford, 1988.

7. Dudeck, H. and Dietrich, W. Structure Elucidation by Modern NMR. Stienkopff Verlag Darmstadt and Springer Verlag, New York, 1989.

8. Baysal, E., Sullivan, S.G., and Stern, A. Binding of iron to human rd blood cells membranes. Free Radic Res. Commun. 8(1) (1989): 55-59.

9. Besson, J.A.O., Wheatley, D.N., Skinner, E.R. and Foster M.A. Proton NMR relaxation times and water content of red blood cells from chronic alcoholic patients during withdrawal. Magn. Reson. Imaging 7(3) (1989): 289-292.

REFERENCES

10. Bennet, H.F., Brown, R.D., Kena, J.F.W., Koenig, S.H., and Swertz, H.M., Interaction of nitroxides with plasma and blood: Effect on $1/T_1$ of water protons. <u>Magn. Reson. Med.</u> 14(1) (1990): 40-55.

11. Monti, J.P., Braguer, D., Guelton, C. and Serratrice, G. Intraerythrocytic water relaxation rates in amyotrophic lateral screlosis and NMR investigation. <u>Clin. Chim. Acta</u> 185(1) (1989): 53-60.

12. Besson, J.A.O., Graig, E., Ebmerier, K.P., Foster, M.A., and Wheatley, D.N. The effect of progressive abtinence from alcohol and red bloodc cells proton NMR relaxation times and water content. <u>Alcohol Clin. Exp. Res.</u> 15(2) (1991): 181-183.

13. Cameron, I.L., Ord, V.A. and Fullerton, G.D. Water of hydration in the intracellular and extracellular environment of human erythrocytes. <u>Biochem. Cell Biol.</u> 66(1) (1988): 1186-1199.

APPENDIXES

1) CELL-DYN 610 hematology analyzer :

This apparatus is a multi-parameter, hematology analyzer designed for in vitro diagnostic use in clinical laboratories. It aspirates externally diluted whole blood to perform the following:

a) Measure, using the resistivity method (detection a change in conductivity during the measurement cycle), the number and size of cells present per volume of whole blood for:

- White blood cells (WBC) or leukocytes

- Red blood cells (RBC) or erythrocytes

- Plateletes (PLT) or thrombocytes

b) Measure, via colorimetric method, grams or millimoles of hemoglobin (HGB) present per volume of whole blood.

c) Derive, using size distribution (histogram) data values for:

- Perceent of lymphocytes (%L)

- Percent of granulocytes (%G)

- Mean cell volume (MCV)

d) Calculate, using appropriate measured or derived data, values for:

- Number of lymphocytes (lym)

- Number of granulocytes-monocytes (GRAN)

- Hematocrit (HCT)

2) Isotonic Detergent :

Isotonic Detergent is a general purpose cleaning agent, in less concentrated from for use on electronic hematology analyzers. Its components compose of water, sodium chloride, potassium chloride, buffer, surfactants, preservatives and contains less than 0.1% of sodium azide.

3) Isotonic Diluent :

Isotonic Diluentis a multipurpose blood diluent for use in electronic containing of the number of red and white blood cells and plateletes, determination of hematocrit and particle sizing by hematology analyzers. Blood diluted 1:62,500 in isotonic diluent will maintain accurate red blood cell count, hematocrit and MCV values for a minimum of five minutes. Its components are water, sodium chloride, potassium chloride, buffer, preservatives and contain less than 0.1% sodium azide.

4) Anticoagulant :

Substance usually a chemical (such as EDTA) that is mixed with blood to prevent coagulation.

5) Coagulation :

Process by which blood thickens into a coherent viscous mass.

6) Hematocrit (Packed cells volume) (HCT) :

The measurement of the total packed cell volume in relationship to the total blood volume. Electronically the amplified pulse of each particle (cell) detected is directly proportional its the volume and is included in the size distribution data. Hematocrit value is calculated from the red cell count and mean cell volume using the following formula:

$$HCT = (RBC \times MCV)/10$$

The number is reported as the volume percent of packed red cell per volume of whole blood.

7) Mean cell (corpuscular) volume (MCV) :

The average volume of an individual red cell in a given blood specimen. Mean cell volume of the measured specimen is determined from the size distribution data. The number is reported as the mean red cell volume in femtoliters (10-15l).

8) Red blood cell (RBC) :

RBC is the most numerous cell type in the blood. Mammalian red cell is a nonnucleated, biconcave disc hich carries oxygen to the tissues via hemoglobin. About 7.5 microns in diameter in healthy men. This value is reported as the number of red blood cells in megas (million) per microliters of whole blood.

9) Diluent :

Solution used to dilute blood cells to provide a cell concentration suitable for measurement.

10) in vivo :Wihtin the living body.

11) in votro :Outside the living body.

12) Standard deviation :

Measure of the dispersion of a group of related values around their common mean. In a normal distribution. 68 percent of the values will fall within 1SD;95 percent will fall within 2SD.

13) Conductivity :

Ability or quality of medium to transmit an electrical current. Reciprocal of electrical resistivity.

VITA

Miss Wanjana Wannaphahoun was born on May 28, 1968 in Bangkok, Thailand. She graduated with a Bachelor Degree of Science majoring in chemistry from Chulalongkorn University in 1990. She was a graduated student at Chulalongkorn University sinc 1992. She will graduate with a Master Degree of Science (Organic Chemistry) in 1994.