

# Review of: "Dynamics of blood cells during a routine laboratory examination"

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Potential competing interests: No potential competing interests to declare.

## Abstract

This work is done to study effect of angular speed and temperature on centrifugation process experimentally. Mathematical comments on dynamics of blood is given by Langevin equation and Fokker-Plank equation. Work is further done on establishing correlation between surface tension and viscous friction. This correlation is used to show how viscosity affect capillary action of blood and erythrocyte sedimentation rate.

## Introduction

Writer introduced with the importance of this study in medical sector and how it can help to increase the efficacy of centrifugation process. Writer talked about already done work in this field and what are the gaps in work that can be filled with this study. Further, provided references to mathematical equations.

## The Model

Author modelled RBC as Brownian particle that undergoes a biased random walk on one-dimensional test tube. Effects of gravitational and centrifugal forces are considered. The viscous friction  $\gamma$  and  $T$  are assumed to be spatially invariant along with the medium. Modelling is divided in to two part under damped and over damped case. Using mathematics from different references writer arrived at position of the cell equation. This equation is later used with correlation between surface tension and viscous friction to show effect of surface tension on RBCs sedimentation rate.

## The Dynamics of blood cells during centrifugation

Through plotting of graphs author has showed that how centrifugation process's efficacy is effected as different parameters varied. Through these result it can be deduced how velocity of RBCs, sedimentation displacement changes and optimum value can be chosen. No discussion about optimum value of these parameters is done.

## The Dynamics of whole blood during capillary action

Author has used the data from a reference article to produce a correlation between surface tension and viscous friction as a function of temperature is achieved. This correlation is used to find the variation of capillary height as a function of temperature. It is deduced that as temperature increases the capillary height decreases.

## The Role of Surface Tension On Erythrocytes Sedimentation Rate And The Dynamics Of Blood Cells During

## Centrifugation

In this section correlation obtained is used to show effect of surface tension on the sedimentation rate of RBCs through mathematical equations. Equation of variation of velocity is plotted against temperature for RBCs and platelets. As the weight and size of RBCs and platelets are different so different velocity variation is observed. Similar process is done for sedimentation rate variation wrt time for RBCs and platelets.

## Summary and Conclusion

In this paper, via an exact analytical solution, the authors study the factors that affect the efficacy of the centrifugation process. The effect of the centrifugation time on the efficacy of the centrifugation process is explored by studying the dynamics of the blood cells via the well-known Langevin equations or equivalently, by solving Fokker-Plank equations.

## Grammatical mistake

1. Page 2 heading introduction

Because our study is performed by considering real physiological parameters, the results obtained in this work non only agree with the experimental observations but also help to understand most hematological experiments that are conducted in vitro

Work not only

## Other comments

1. Page 3 heading the model

The viscous friction  $\gamma$  and  $T$  are assumed to be spatially invariant along with the medium.

Line shows that  $T$  is viscous friction but it has been used to signify temperature.