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

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Potential competing interests: No potential competing interests to declare.

The author presents analytical results to improve fundamental understanding of blood centrifugation. In seeking to provide a sound theoretical basis for the relevant phenomena, the author's goal is worthwhile. While I think there are publishable results here, I recommend that the author strengthen the manuscript in a number of ways. Many of these comments and suggestions were also made by previous reviewers, including Alexis Darras and Siddhartha Tripathi.

1. Treating a biconcave disk as a sphere for the purpose of simplifying the analysis seems acceptable, only if some estimate of the assumption's effect on the results is made.

2. Many of the derivations begin with $N = 1$ for the number of red blood cells. Some more discussion should be added concerning how a much larger population of red blood cells affects the analysis.

3. There are issues with units in several equations. For example, in Eqn. (3), the Langevin equation, the mass m should appear on the left side, in order to make the units for the terms on the right side consistent. That is, the force term f should have units of newtons or ML/T^2, as seen in Eqns. (1) and (2). In the equation for γ which is after Eqn. (19), the term γ' should be removed, since the following expression involving B and T is being substituted for γ'. The quantity γ' is correctly referred to as 'dynamic viscosity' and has the proper units M/LT; however, γ is also called 'viscosity' but has units of M/T. In any case, some adjustments should be made in this regard.

Also, all terms should be defined after introducing an equation. For instance, in the Langevin equation, V should be explicitly defined as velocity.

4. More up-to-date articles should be included in the literature review, since there have been recent developments in the area.

5. Because many of the trends mentioned in the manuscript seem straightforward, experimental verification of the results would greatly enhance the paper's value. Either previously published or newly obtained data could be used. Quantified comparisons would help with Comments 1 and 2 above, as well. Was the experimental data in Table 1 found in the literature (Rosina et al., 2007) or collected by the author?

6. As has been pointed out by others, the grammar in the manuscript should be reviewed.

7. Several of the figures (3a and 6a and b) have discontinuous step increases at various parameter values. Do these

correspond to formation of rouleaux? Mathematically, where do these discontinuities occur in the equations? Incidentally, in Figure 6, units should be indicated for the axes. The x-axis seems to indicate temperature as the independent variable, but the caption states that temperature is fixed at 15 degrees Celsius.