

Erythrocyte aggregation as an indicator for sedimentation and coagulation of whole blood

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Erythrocytes are the principal type of cells in blood. Their rheological and physical properties have long been studied. We are working on understanding the fundamental properties of erythrocytes such as rouleaux formation and sedimentation and we aim to develop clinical assays based on this understanding. In this talk, we will present our work on understanding red blood cell behavior and development of two clinical assays, erythrocyte sedimentation rate (ESR) and coagulation time monitoring. In particular, a point-of-care system will be presented that has the ability to determine ESR and widely used coagulation time monitoring assays such as prothrombin time (PT) and activated partial thromboplastin time (APTT). The fundamental measurement principle and the development of the handheld prototype will be presented together with the clinical verification results [1,2].

[1] Z. Isiksacan, M. Asghari and C. Elbuken, “A microfluidic erythrocyte sedimentation rate analyzer using rouleaux formation kinetics,” *Microfluid Nanofluid*, 21:44, Feb 2017. DOI: 10.1007/s10404-017-1878-7

[2] Z. Isiksacan, O. Erel and C. Elbuken, “A portable microfluidic system for rapid measurement of the erythrocyte sedimentation rate,” *Lab Chip*, v. 24, p. 4682–4690, Nov 2016. DOI: 10.1039/c6lc01036a