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Title	Blood agglutination detection by impedimetric measurement using pencil graphite electrode on a hybrid microfluidic chip
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#### Abstract

Blood agglutination involves red blood cells (RBCs) and antibody used for blood typing testing. Some conventional testing of blood typing has a limitation in manual interpretation. In this work, a rapid and low-cost prototype of a disposable hybrid microfluidic chip coupled with a pair of coplanar electrodes made of pencil graphite electrode (PEG) was fabricated to investigate the agglutination detected by electrical impedance. The charge transfer resistance in the impedimetric detection was used for the quantitative classification of agglutination analysis. This proof-of-concept provided an integrated biological protocol appropriate for further use as point-of-care (POC) diagnoses.