A Multiplexed Nanobiosensor for the Detection and Classification of Anaemia

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Anaemia is a blood-related disease affecting people of all ages, genders, and ethnicities. It is caused by the reduction of the number of erythrocytes or haemoglobin concentration in blood, resulting in a deficiency in oxygen transport. Anaemia is often a symptom of other diseases which can make its diagnosis difficult [1]. Anaemia can be classified into different phenotypic groups, such as: haemolytic, microcytic, macrocytic, hypochromic, and Iron Deficiency Anaemia (IDA), among others [2,3]. These have different causes and treatments and can be identified by measuring the levels of different biomarkers in pateints' blood. Diagnosis of anaemia types requires knowledge of haemoglobin concentration, red blood cells' physical parameters (size, shape, volume, etc), as well as serum iron and serum ferritin concentrations [2,3]. Current methods for anaemia diagnosis rely on blood analysis and a complete haemogram; which are time-consuming, require expensive equipment and trained personnel. Herein, we are developing a point-of-care microfluidic, multiplexed biosensor based on nanotechnology detection techniques for the diagnosis and classification of anaemia through the evaluation of the previously mentioned parameters. This point of care biosensor will be user-friendly, fast, and less invasive, requiring only a small drop of blood. Additionally, it could serve as a screening and monitoring tool for other disease states in which anaemia is a symptom.

References

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