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# The effect of perfluorocarbon therapy in Streptococcus pneumonia infected sickle cell mouse

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Sickle Cell Anaemia (SCA) is a chronic haemoglobinopathy. It results from a genetic defect in the globin gene, which leads to a haemoglobin S (HbS). SCA is characterised by a chronic haemolytic anaemia and 'vaso-occlusive crises'. Both result from distorted (sickle) red blood cells (RBCs). Individuals with SCA also have a significantly greater risk of overwhelming pneumococcal infection, which occurs at a much higher rate than for other encapsulated bacteria, suggesting that individuals with SCA are uniquely vulnerable to pneumococci. *Streptococcus pneumoniae* is a common cause of pneumonia (an inflammatory condition of the lung), which can cause vaso-occlusion in SCA patients and this is due to asplinea. RBC transfusion reduces the risk of further vaso-occclusion but recurrent transfusions risks such as iron overload. An alternative to RBC transfusion is artificial blood. For example Perfluorocarbons (PFC) have an O2 carrying capacity, which is 40 to 50 times higher than haemoglobin. As observed in ex *vivo* and *in vivo* models sickle red blood cell -induced vaso-occlusion is often partial, allowing for decreased remnant flow. Hence, if oxygen is delivered to these areas decreased obstruction might be achieved. The hypothesis of this study that treatment with PFC will reverse sickle cell induced pulmonary vascular-occlusion in SCA mice with pneumococcal lung infection. The effect of the perfluorocarbon emulsions was tested in vitro and *in vivo* on S. *pneumoniae* to determine whether it encouraged the pneumonia-causing bacteria to grow. This was done using two different strains of the pneumoniae D39 serotype 2 and TIGR 4 serotype 4. The findings suggest that PFCE may have a role in treating patients with sickle cell anemia

## Biography

Nawal Helmi has completed BSc in Biochemistry (2004) and Master degree in Genetic and Pharmacology (2008) from King Abdul Azizi University (Jeddah). She has also undertaken volunteer work at the King Abdul Azizi University Hospital; there she saw at first hand the suffering of sickle cell anaemia patients and this contributed to her decision to try to stop the suffering of the sickle cell anaemia patients around the world. She got her PhD from University of Leicester (2014) and her dissertation was on the "Effect of perfluorocarbon therapy in *Streptococcus pneumoniae*-infected Sickle Cell Mouse". During her PhD study she received for two years in row awards "Best 50 research in University of Leicester". She now works as Assistant Professor in AL-Farabi College in Jeddah.

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