Scientists develop 'magic bullet' nanomedicine for Acute Lung Injury

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Researchers at Queen's University Belfast have devised a 'magic bullet' nanomedicine which could become the first effective treatment for Acute Lung Injury or ALI, a condition affecting 20 per cent of all patients in intensive care.

There are 15,000 cases of ALI every year in the UK. The main causes are road traffic accidents and infections, and many with the condition die as a result of lung failure.

ALI patients can become critically ill and develop problems with breathing when their lungs become inflamed and fill with fluid. These patients frequently require ventilators to aid breathing within an ICU hospital unit. An ICU bed costs the NHS in excess of £1800 per day.

There are currently no effective treatments for this serious condition, but in a joint collaboration between the School of Pharmacy and Centre for Infection and Immunity at Queen's, a team of scientists and clinicians have developed a new drug that could revolutionise clinical management of patients in intensive care units.

Their new drug is a nanoparticle, measuring around one billionth of a metre. The patient can inhale it, taking the drug directly into the lungs and to the point of inflammation. Current treatments are unable to target directly the inflammation and can result in unpleasant side effects.

Speaking about the development, Professor Chris Scott from the School

of Pharmacy, who is leading the research, said: "Nanoparticles are perhaps one of the most exciting new approaches to drug development. Most research in the area focuses on how the delivery of drugs to the disease site can be improved in these minute carriers. Our own research in this area focuses on how nanoparticles interact with cells and how this can be exploited to produce therapeutic effects both in respiratory disease and cancer."

The new nanoparticle from Queen's has a surface which allows it to recognize and bind to immune cells called macrophages in the lungs - key to the uncontrolled inflammation that occurs in ALI. This binding induces a rapid reduction in the inflammation, and has the potential to prevent the damaging effects that will otherwise occur in the lungs of ALI patients.

The project is developing the new nanomedicine towards clinical evaluation within the next three years, and is currently sponsored by a £505,000 grant for two years from the Medical Research Council Developmental Pathway Funding Scheme.

Professor Danny McAuley from the Centre for Infection and Immunity, a partner in developing the new nanomedicine, added:

"This funding allows us to evaluate a completely novel therapeutic approach to the treatment of ALI and if successful, this nanomedicine could also have application in other common lung disorders such as COPD and Cystic Fibrosis."

Provided by Queen's University Belfast

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