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Research shows how 'Mallard' dye fills need for speed

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Scientists at the University of York have developed a new medical tool which could help surgeons carrying out complex procedures in the operating theatre.

Researchers have developed a dye which provides a quick and accurate method of checking heparin levels in the blood. Heparin is an important anti-coagulant which has a significant role in major surgery. The scientists in the Department of Chemistry at York have used inspiration from biological systems to allow the dye to bind heparin even in highly competitive human serum.

In the laboratory, they have modified existing dyes which previously could not bind with heparin successfully under these challenging conditions. The modified dye, which has excellent sensing capacity for heparin pinpoints the anti-coagulant's level in human serum and has the potential to work more quickly than existing clinical methods for doing this.

The research, which was funded by the Biotechnology and Biological Sciences Research Council, is published in the Journal of the American Chemical Society.

Because the dye can rapidly detect heparin levels, the scientists have named it 'Mallard Blue'. It is the same shade as the livery of the A4 Pacific Mallard, which holds the world speed record for a steam locomotive, and is now preserved at the National Railway Museum in

York.

Professor Dave Smith, of the Department of Chemistry at York who led the research said: "Our new dye allows the quantification of heparin in serum at clinically relevant levels and is the best in class for this application in terms of its ability to bind heparin strongly under really competitive biological conditions, and may improve on the currently used systems.

"We have named the dye 'Mallard Blue', after the record-breaking steam train, 'Mallard' which is housed in the railway museum here at York. Our dye is the same colour as the locomotive, and we believe it is similarly ground-breaking in its performance."

The York researchers worked with a team led by Sabrina Pricl at the University of Trieste who used high-level computer modelling to understand precisely how Mallard Blue binds to heparin so strongly.

The next stage in this research would involve the incorporation of this new dye into a device for simple bedside read-out of heparin levels in blood.

More information: pubs.acs.org/articlesonrequest … YzXPy7pkeKpfPBUEXKvY

Provided by University of York