Physical incompatibility of blends of parenteral solutions (infusions)

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Location: research laboratories at IFK, SDU Odense

Prerequisites: information on commonly used Y-site administration will be collected from the clinic e.g. OUH; all experimental equipment incl. the particle-counter will be available at IFK.

This project is suited for one master-student.

Background
Due to a limited number of intravenous access ports and typically multiple drug therapies the question, whether two parenteral solutions may be given simultaneously is oftenly arising with critically ill patients. The formation of micro-precipitates (sub-visible particles) is the most critical factor when blending two parenteral drug solutions before or during intravenous administration to a patient. In cases where compatibility of the two solutions is not documented by the manufacturer(s) or in scientific literature, it is desirable to do analytical screening of such mixtures for physical incompatibility. This should give a basis for decision if secure administration of such blends to patients is possible or not.

Aim
The aim of this project is to gain/extend experiences with visual screening using a strong focused (Tyndall) light beam (white light or red laser light) for the detection of micro-precipitates within blends of drug solutions, a method which may be used in any hospital without use of advanced analytical instrumentation. A selection of drug solutions that are routinely applied by Y-site administration in the clinic, e.g. Odense University Hospital (OUH) will be tested for precipitation upon blending.

Approach
To detect potential precipitation, the solutions will be visually inspected using two different types of strong light beams, a white, non-focused light source and a HeNe pocket laser-pointer, for light scattering. For comparison, a light obscuration particle counter test will be performed as described in the European Pharmacopeia.

An experimental set-up, and a detailed protocol for the method have recently been described in a publication resulting from a previous study {1}. It has been shown that in order to reduce potential background particle burden, the solutions should be filtered through 0.2 micrometer pore size filters prior to mixing.

The performance of this method will now be checked for selected blends in comparison to the Pharmacopeial light obscuration particle count test.

Our goal is to find out if the new and simple Tyndall method may provide a basis for decisions on whether to give two parenteral solutions simultaneously by Y-site administration to a patient at OUH or not.

References: