Early warning systems to flag evolving toxicities through rapid turn-round monitoring capabilities and integration into digital algorithms

The Challenge

Evolving toxicities are common side effects of many Advanced Therapy Medicinal Products (ATMPs). Cytokine Release Syndrome, associated with CAR-T therapy, is one of these and has been used as an exemplar to develop systems to safely manage patients receiving ATMP and is applicable to other indications where immune toxicities are experienced.

The Solution

In order to safely manage patients receiving ATMPs, the use of rapid turnaround monitoring capabilities to establish early-warning systems to flag evolving toxicities is being explored. Further to this, integration into a digital algorithm is the next step to be taken to determine if clinical management of patients can be aided in this way.

The Results

As part of iMATCH, a 12 cytokine enzyme-linked immunosorbent assay (ELISA) panel for rapid identification of changes in cytokine levels associated with cytokine storms (CRS) has been designed and validated in line with Good Clinical Practice (GCP), with the provision to transfer this across to the clinical setting for ISO-level validation. Stored patient samples from previous CAR-T patients have been retrospectively assayed and analysed alongside those from sepsis patients to generate specific

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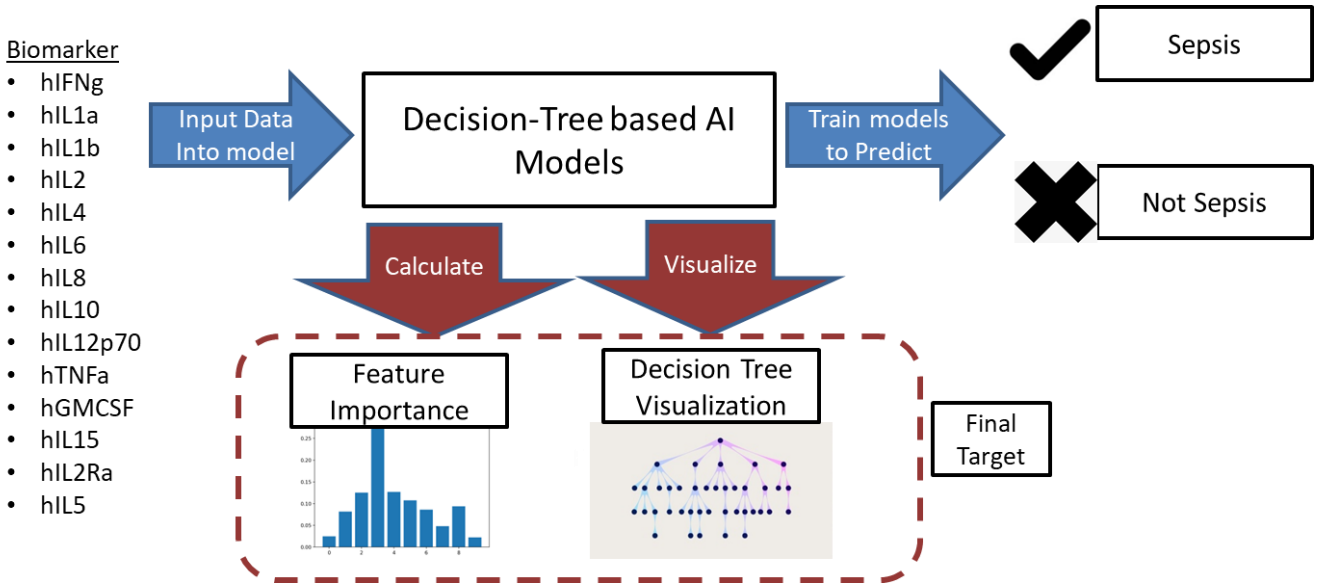
CRS panels and feed into development of a predictive algorithm for cytokine release storm alongside the clinical outcomes and literature to date.



Making Further Impact

By creating and developing a targeted assay and downstream algorithm to identify patients developing a cytokine storm, it allows clinicians to make appropriate adaptive, early decisions to ensure safe delivery of ATMPs. The ELISA will be conducted with a rapid turnaround (initial aim of 24hr) in the clinical diagnostic setting following development of a strategy to address cost reductions to render analysis of single/few samples affordable. One further benefit is the availability of the assay in both the research setting (CRUK-MI) and the Christie Diagnostic Laboratory (CPP), providing a resource for research studies as well as the the provision to provide an in-house service that could be rolled out across multiple trusts.

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