Quantification of variation in biological input materials and its effect on clinical outcome and manufacture

This item was submitted to Loughborough University's Institutional Repository by the/an author.

Citation: THURMAN-NEWELL, J.A., PETZING, J.A. and WILLIAMS, D.J., 2013. Quantification of variation in biological input materials and its effect on clinical outcome and manufacture. Presented at the Fourth Doctoral Training Centre Joint Conference 2013, 12th July 2013, Sheffield University.

Additional Information:

- This is a conference paper.

Metadata Record: https://dspace.lboro.ac.uk/2134/13278

Version: Published

Publisher: EPSRC

Please cite the published version.
This item was submitted to Loughborough’s Institutional Repository (https://dspace.lboro.ac.uk/) by the author and is made available under the following Creative Commons Licence conditions.

For the full text of this licence, please go to: http://creativecommons.org/licenses/by-nc-nd/2.5/
A systematic search of the literature was carried out for bone marrow & peripheral blood using PRISMA(2)

Variation
Addressing
This focused on donor characteristics and collected/transplanted cell populations

Map
10000
10000
1000
The
Humans
However,
A demonstration of the results are shown in Figures 1 to 4

Protocols,

Figure 1: Collected BMT

Figure 2: Collected PBPC

The biological variation in blood based-products can be up to four orders of magnitude of the median

Figure 3: Transplanted BMT

Figure 4: Transplanted PBPC

Median TNC Count v Median CD34+

Results

A critical drawback of this study is that it is based on an incomplete dataset that is limited by the information published in the literature.

• Important donor characteristics such as gender, weight and ethnicity were rarely reported
• Protocols, techniques and equipment were also sporadically reported
However, Figures 1 to 4 demonstrate the scope of the problem
• The biological variation in blood based products can be up to four orders of magnitude of the median
• The current process may be adding variation up to two orders of magnitude

A more complete dataset is essential to corroborating these findings.

Future Work

The key outcomes of this project will be strategies for handling complexity in manufacturing and product development consequent from input variation, incorporating measurement precision, for living products.

1. Establish a complete database and applying this database to a therapeutic application (GSK)
2. Map the contributions of input material to clinical outcome (Dana Farber Cancer Institute(3) and GSK)
3. Retrospectively study the trend in biological precision over time to predict the future trend
4. Addressing the issue of measurands (the “CD34 issue”(4))