

Example of immunohaematology testing quality control systems essay

[Literature](#), [Russian Literature](#)



1. In the article, Henry (2009) states; “ In the context of immunohaematology testing, quality control systems should also be able to detect instrument and human errors such as transcription, transposition and transmission”.

Routine immunohaematology tests may look as if they are both dependable and straightforward; however, the failure of reagent and circumstantial technological inaccuracies can take place both in manual and automated systems. Very dangerous errors such as transposition and transcription can be made. Transposition errors are caused when staff or instruments pick up and use incorrect sample or reagent or dispense samples or reagents into an incorrect testing position. Mixing up of test materials such as tubes can also cause very serious transposition errors. Transcription errors occur when reaction scores or results interpretation are written or typed in an incorrect result position. Result interpretation can also occur where a test is performed and the reactions are correct but the staff member simply writes an incorrect result. These errors are highly risky as the errors might not be noticed by routine repeat test inspection measures and will not be identified by laboratory controls that only test reagent performance. Therefore from the statement above, quality systems should be of high quality to sufficiently detect and shun such errors.

2. Discuss problems inherent in creating quality control materials for immunohaematology 10 marks (Half a page)

The main problem in creating quality control materials for immunohaematology is that samples dealt with involve a fundamental

section of a cell membrane for example, a red blood cell antigen, A or B. Therefore dilution is not frequently an alternative as the analyte level is limited to its expected cell facade and appearance. Therefore an individual requires creating a quality material that is reproducible, accurately controlled weak manifestations of A or B antigens to reproduce the weak A and B red blood cells like Ax and Bx cells reactions. Natural cells can be used however according to Henry (2009) the aptitude of natural red blood cells being utilized as accurately adaptable quality controls which are accurate, convenient and authenticated is mired via their respective antigenic heterogeneity as well as abundance. For instance, the rbc's belonging to an Aweak phenotype for example Ax, the donation of blood would be an extremely helpful control employed in influencing the ABO grouping test sensitivity. Conversely, these phenotypes are uncommon, categorization is difficult, and antigen forms and intensities are exclusive to each person and inconsistent among and amid the phenotypes and genotypes. In addition a solitary blood unit merely could not be homogeneous or bore out to meet a surplus sporadic regional demand.

3. Imagine you are in charge of a laboratory which performs ABO grouping on donors. Would you purchase Kodecytes as your QC material of choice? Justify your answer. 30 marks (one page)

As a laboratory in charge, I would purchase Kodecytes as my QC material. This is because the application of KODE technology in QC system products enables Group O human red blood cells to be converted to an Aweak Bweak cell, providing the world's first accurate and dependable ABO blood grouping

test sensitivity control. This machinery is employed in creating cells with reproducible, accurately controlled weak A and B antigens manifestations to imitate the weak A and B cells like Ax and Bx cells reactions, therefore eliminating variations seen in natural weak ABO red cells. The technology also enables the engineering of group AweakBweak samples that provide weak reactions in blood grouping systems working correctly. This allows that characterization of the ABO blood group sensitivity and will allow detection of any methodical sensitivity loss by exhibiting a decline or overall loss of apposite reactions.

The technique samples also behave like common patient sample and therefore might be employed in any regularly used grouping technique to provide the available blood group outcome. The ABO grouping methodical sensitivity control is attained by exploiting the Aweak and Bweak red blood cell. Revealing the cell using suitable reaction strongpoint can certify the testing procedure applied sustains an appropriate intensity of sensitivity.

4. Design a quality control strategy or programme, using the Kodecytes, for laboratories ABO typing blood donors. Your answer should reflect your understanding of the articles and understanding and application of quality assurance 30 marks (one page)

The ABO and Rhesus blood grouping systems are clinically the most important. Blood donors and patients must be correctly ABO grouped because transfusing ABO incompatible blood may result in the death of a patient. The safe transfusion of patients depends on the correct ABO

grouping of donors and recipients. The reactions of anti-A and anti-B sera can be checked using A cells, (preferably A₂ cells) and B cells. A and B cell suspensions can be checked using anti-A and anti-B sera. However, the use of a high quality routine process control containing Kodecytes allows immunohaematology laboratories to implement quality systems that improve Process, Platform and Proficiency aspects of immunohaematology testing. The use of an externally produced superior quality and validated QC material such as this has been revealed to recognize systematic errors such as transcription, transposition and poor scoring thus enabling staff training and system improvements. Test, employee and apparatus performance might be continuously scrutinized, errors and poor presentation discovered and safety incessantly enhanced.

During ABO grouping procedure, as a control, Kodecytes bearing A or B antigens can be utilised to provide cells with a lower manifestation of the A or B antigen respectively. The Laboratory can be encouraged to report results using all blood grouping methods in routine use.

As part of Quality control measures, proficiency testing can also be done. Kodecytes bearing controlled numbers of A antigens can be designed to mimic A subgroups with reactivity below that of an A₂ cell. Kodecytes can be prepared using KODE™ construct A trisaccharide concentrations of 0.01, 0.0075 and 0.005 mM/L respectively.

5. Discuss why it may be advantageous to include MUT, Mur, and MUT+Mur Kodecytes when antibody screening in New Zealand. 20 marks (one page)

Antibody screening is designed to detect clinically relevant (IgG) antibodies. These antibodies are known as unexpected red cell alloimmune antibodies and are usually formed by immune exposure to foreign antigens found on red cells during blood transfusion or from fetal red cells during pregnancy. The unexpected red cell antibodies are either allo or auto antibodies and are normally found only in 0.3 to 2% of the population.

Using MUT, Mur and MUT+ Mur Kodecytes makes it possible to identify clinically relevant alloantibodies which are MUT and Mur (Miltenberger). Correct identification of these red blood cells is important for the selection of appropriate blood for transfusion and the investigation of potential haemolytic disease of the newborn, immune haemolytic anaemia and transfusion reactions. Therefore, patients with clinically relevant antibodies should, where possible, receive red cells that have been tested and found to lack the corresponding antigen.

Now why is it important for New Zealand? Miltenberger is an obsolete name for a related group of glycophorin variant base phenotypes that are common in Asian populations (including New Zealand) but somewhat rarer in Caucasians populations. They are a result of mutated Glycophorin A and B molecules on human red blood cells which derive from genetic crossover events, where the resultant glycoprotein A and B are produced by a point mutation. When an antigen negative individual is exposed to these cells by pregnancy or transfusion they may make antibodies to one or more of these antigens. The common alloantibodies in this case are anti-Mur, MUT and Mia.

These can cause pathological effects including transfusion reactions and severe haemolytic disease of the foetus and newborn.

References

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