Blood Typing - Use of Animal Blood

Posted by Anonymous on Tue, 2015-12-01 16:19

Blood Typing—Use of Animal Blood: Hi, I know that if we use human blood for blood typing it has to be screened. A teacher attended a PD session and they used blood from the bottom of a bag of meat that was bought from the shops for human consumption. I'd like to know if it is OK to use this blood in a school laboratory?

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No votes yet

Year Level:
Senior Secondary
Laboratory Technicians:
Laboratory Technicians

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Submitted by on 12 December 2015

Answer reviewed 27th January, 2023

Use of human blood:

Science ASSIST does not recommend the use of human tissue or body fluids such as blood in school science practical classes, due to the risk of disease transmission.

Human body fluids such as blood and other tissues have the potential to transmit diseases. There is a risk of exposure to pathogens such as Human Immunodeficiency Virus (HIV), Hepatitis B (Hep. B) and Hepatitis C (Hep. C). Even screened blood samples cannot be guaranteed to be free from infectious agents. The World Health Organisation (WHO) states:[1]

"*It should be recognised, however, that all blood screening programmes have limitations and that absolute safety, in terms of freedom from infection risk, cannot be guaranteed.*"

Currently there is no consistency throughout Australia concerning the use of human tissue and body fluids in school science activities. Most schools in government jurisdictions prohibit the use of human tissues or body fluids, whilst educational sectors outside government school systems establish their own policies based upon legislation, Australian Standards and their own risk assessments. Science ASSIST has answered another similar question regarding the use of human body tissue and fluids.[2]

Laboratory facilities:

The handling of human body fluids or tissues should occur in laboratories classified as Physical Containment level 2(PC2).

Generally, school science laboratories are classified as Physical Containment level 1 (PC1), **if** they conform to the requirements specified in Section 5 of AS/NZS 2243.3:2022 Safety in Laboratories – Microbiological safety and containment.[3] If they conform to these requirements, then they are only suitable for work with microorganisms and other biological material where the hazard levels are low, and where laboratory or facility personnel can be adequately protected by standard laboratory practice.[4]

When handling human blood, blood products, body fluids and associated material it is generally advised to regard them as potentially infectious. **Human body fluids or tissues should not be handled in a PC1 laboratory.**[5]

Science ASSIST is aware of the diversity in science facilities as well as in staff training and knowledge of infectious diseases. As a result of all of these different factors, **Science ASSIST does not recommend the use of human tissue or body fluids such as blood in school science practical classes due to the risk of disease transmission.**

Use of animal blood:

We provide some guidelines below for the safe handling of blood from meat purchased from butchers. Schools should conduct a site-specific risk assessment prior to handling any raw meat products to identify any hazards and to determine control measures to eliminate or minimise the hazards.

If the raw meat sample has not been transported or stored at appropriate temperatures, then there is the risk of the growth of pathogenic microorganisms capable of causing food poisoning, e.g., *Salmonella* and *Campylobacter* spp. Therefore, Science ASSIST recommends the following:

- Persons handling this material in a laboratory situation should have an understanding of microbiology and cross infection.
- Persons handling the raw meat should have an understanding of food safety and food hygiene.
- Good personal hygiene practices are required.
- The blood sample would only be suitable for short term storage at 4°C, as it would not contain any preservatives.

- Any water contamination of the blood would lyse the red blood cells (burst the cells releasing the haemoglobin), this would render it useless for any blood-typing experiments.
- Any meat products that have been frozen during the transport process result in red blood cells that are lysed.

Alternatives:

As a completely safe alternative, simulated blood-typing kits are available from various scientific suppliers. They contain both synthetic blood and synthetic antisera, which produce realistic blood-typing results. There is no danger of disease transmission from these kits as they contain no blood, blood products, or other material of biological origin. For example, see the Carolina website.[6]

For Australian suppliers see our list of School science suppliers.[7]

References:

[1] World Health Organization website, (2009, January 1), '*Screening donated blood for transfusion-transmissible infections: recommendations',* retrieved from https://www.who.int/publications/i/item/9789241547888, CC BY-NC-SA 3.0 IGO

[2] Science ASSIST, (2023, January 17), '*Use of human body tissue and fluids',* retrieved from https://assist.asta.edu.au/question/4569/use-human-body-tissue-and-fluids

[3] Standards Australia. (2022). AS/NZS 2243.3:2022 *Safety in Laboratories, Part 3: Microbiological safety and containment'* Standards Australia. Sydney, Australia.

[4] Australian National University, (2018, June 27), '*Procedure: biological safety'*, retrieved from the Australian National University website: https://policies.anu.edu.au/ppl/document/ANUP_018026

[5] Australian government, Department of health and aged care, (2007, March), '*Guidelines for the certification of physical containment facilities',* retrieved from https://www.ogtr.gov.au/resources/collections/guidelines-certification-physical-containment-facilities

[6] Carolina website, (accessed 2023, January 27), '*ABO-Rh typing with synthetic blood kit'*, retrieved from https://www.carolina.com/blood-typing/carolina-abo-rh-typing-with-synthetic-blood-kit/700101.pr

[7] Science ASSIST website, (2020, June), '*School science suppliers',* retrieved from https://assist.asta.edu.au/resource/664/school-science-suppliers

National Blood Authority Australia website, (accessed 2023, January 27), '*Safety of blood products',* retrieved https://www.blood.gov.au/safety-blood-products

Food Standards Australia and New Zealand website, (2021, November), '*Standard 3.2.2 Food Safety Practices and General Requirements',* retrieved from https://www.foodstandards.gov.au/industry/safetystandards/safetypractices/pages/default.aspx