The University of Hong Kong

SAFETY MATTERS

RE: Liquid Nitrogen Safety – Use of Unsuitable Small Containers

In the space of two months there have been two explosion risk incidents in the University in which domestic standard (unvented) vacuum flasks have been used to contain small quantities of liquid nitrogen. In both cases the lid became iced on to the container and could not be removed, creating the risk of pressure build up and explosion. In the first case the incident was handled within the department, the container was moved to a fume cupboard with the sash down and the lab evacuated. The lid subsequently failed and the pressure was released safely. Note that if a container is already under pressure an attempt to move it to a safer location may itself cause an explosion. In the second case a vessel prepared in an outside organization was brought in without prior warning and passed to lab staff in the context of a collaboration. After attempts to open it failed a 999 call was made and a major response by emergency services was mounted. FSD personnel succeeded in removing the lid and over pressure was avoided.

The continued use of unsuitable containers for cryogens in the University and the lack of risk awareness in students and staff using these materials means that a repeat of this type of incident is possible. Next time an actual explosion may be the consequence.

I would advise that departments and schools should reduce their risk as follows:
Firstly by eliminating food-standard vacuum flasks entirely from their operation or if there is a pressing operational need to retain them for other purposes, for example to keep samples on wet ice, to label them as not for use with cryogenic materials. Ensuring that sufficient suitable vessels for cryogens with venting mechanisms are available is an essential complement to this.
Secondly to increase awareness of risk and how to manage it by requiring all staff and students who work with cryogens to receive specific training on their safe use. Safety Office has introduced a training session on this specific risk. Signing up to this training is easy via a link from the training section of the Safety Office web site. The training in the form of a video will be available at any time.
Thirdly ensure outside collaborators are aware of the risks of transporting materials in liquid nitrogen. It is usually possible to transport cells without need to keep them in liquid nitrogen. In some cases cells remain viable at ambient temperature in flasks filled with cell culture medium. Cells can also be shipped on dry ice.

Paul Hunt PhD.
Director of Safety

Examples of Unsuitable Vessels for Liquid Nitrogen Use Observed on Safety Inspections X
In one case users defeated the safety feature of a suitable vessel by taping over the vent to block it XX
A suitable vessel with a vent is shown. Other designs are also available √