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## Editorial

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# Introduction to the Biosafety Guidelines for Sorting of Unfixed Cells

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Cell sorting of biologic specimens by flow cytometry has become a widely used technique in research and clinical laboratories. Because viable biologic specimens can contain infectious agents, precautions need to be taken to prevent the exposure of operators of flow cytometers to biohazards arising from the use of these instruments. The International Society of Analytical Cytology (ISAC) recognized the need for establishing guidelines for sorting of unfixed cells and initiated the formation of a Biohazard Working Group, which has produced a set of recom-

mendations that can aid in preventing such exposures. The guidelines contain recommendations on 1) sample handling, 2) training and protection of operators, 3) laboratory design, 4) cell sorter setup and maintenance, and 5) testing the instrument for the efficiency of aerosol containment. *Cytometry* 28:97-98, 1997. © 1997 Wiley-Liss, Inc.

**Key terms:** flow cytometry; biohazard; occupational health; safety; cell sorting; aerosol containment

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Since many laboratories utilize flow cytometric applications in the study of potentially biohazardous materials, the protection of laboratory personnel is an issue of concern. In particular, sorting of unfixed cells that may harbor known or unknown pathogens on jet-in-air, deflected droplet sorters can potentially expose operators to organism-containing droplets and aerosols generated by the instruments. At a workshop held at the XVIIth Congress of the International Society for Analytical Cytology (ISAC) in Lake Placid, New York, in 1994, the biohazards of cell sorting of infected specimens were discussed. It became apparent that many workshop participants were performing viable cell sorting experiments without considering potential hazards and without testing their instruments for the efficiency of aerosol containment. As a consequence it was suggested that the Society should become involved in establishing biosafety guidelines for sorting of unfixed cells. In 1995, ISAC formed the ISAC Biohazard Working Group with the following members: Phillip N. Dean, Chair; Ingrid Schmid, Guidelines Coordinator; Janis V. Giorgi; George Janossy; Annalisa Kunkl; Peter A. Lopez; Janet K.A. Nicholson; Stephen Perfetto; and Larry Seamer.

The Biohazards Working Group was charged with the responsibility of providing written recommendations for

handling and sorting of unfixed cells, including known biohazardous samples, and for testing the efficiency of aerosol containment on cell sorters.

### METHODS

Initially, suggestions about the document format and content were collected from Working Group members and were combined into a draft version of the guidelines. This version was sent to all Group members for review and discussed at a meeting held at the XVIIIth ISAC Congress in Rimini, Italy, in 1996, by Group members who attended this Congress. Representatives of two major commercial manufacturers of cell sorters were also present at this meeting. Comments resulting from the first review process were collated and incorporated into a revised and expanded document. An outline of the contents of this document was approved by ISAC Council in July of 1996. The revised document itself was reviewed again by all Biohazard Working

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Group members. In addition, comments and suggestions were solicited at this time from biosafety professionals and from others known to be interested in the guidelines. All comments obtained from the second review process were carefully considered and incorporated into the guideline document as appropriate. Phillip Dean, Chair of the Working Group, then submitted this version of the guidelines to the ISAC Council for approval. In January of 1997 the document, Biosafety Guidelines for Sorting of Unfixed Cells, was approved by ISAC Council for publication as the official recommendations of the Society.

#### **SUMMARY**

The biosafety guidelines are not designed to be a procedure manual for cell sorting laboratories. Rather, the intent is to provide recommendations for handling and sorting of unfixed cells and for testing of aerosol containment on cell sorters. Publication of the guidelines in *Cytometry*, the official journal of the International Society

of Analytical Cytology, permits the global dissemination and evaluation of this type of information and underlines the critical role of the Society as a sponsor for establishing biosafety recommendations for viable cell sorting. Given the rapidity with which flow cytometric technology is evolving and as new methods for the assessment of droplet and aerosol containment on flow cytometers are developed, it is expected that these guidelines will require periodic revisions.

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