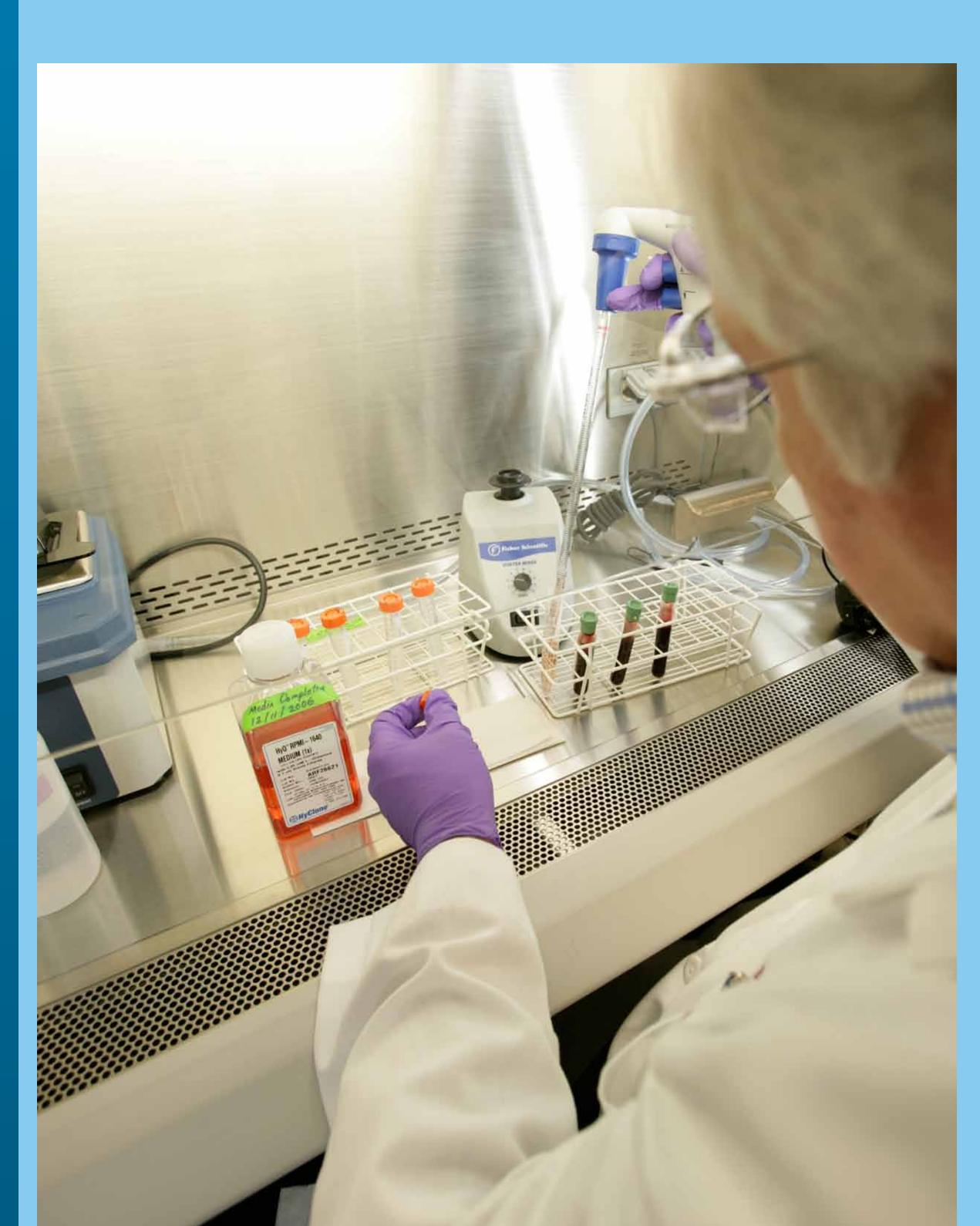
Cytogenetic Biodosimetry Laboratory

Cytogenetic biodosimetry is used to identify damage to chromosomes in individuals who have been exposed to ionizing radiation. The Cytogenetic Biodosimetry Laboratory in Oak Ridge, Tennessee — one of only two federally funded facilities of its kind — was reestablished to assist the medical community in the evaluation, triage, and management of victims with radiation injuries and to strengthen the nation's response to the growing threat of nuclear terrorism. Cytogeneticists at the lab carefully examine blood cultures from exposed individuals following a multi-stage process:

Cell Culture/Harvest

Blood samples are shipped at room temperature to the laboratory.





White blood cells, lymphocytes, are cultured under sterile conditions in an incubator for 48 hours using a standard growth medium. Culture tubes are centrifuged, and cells are re-suspended in a weak salt solution, which allows the chromosomes to separate and spread evenly on slides.

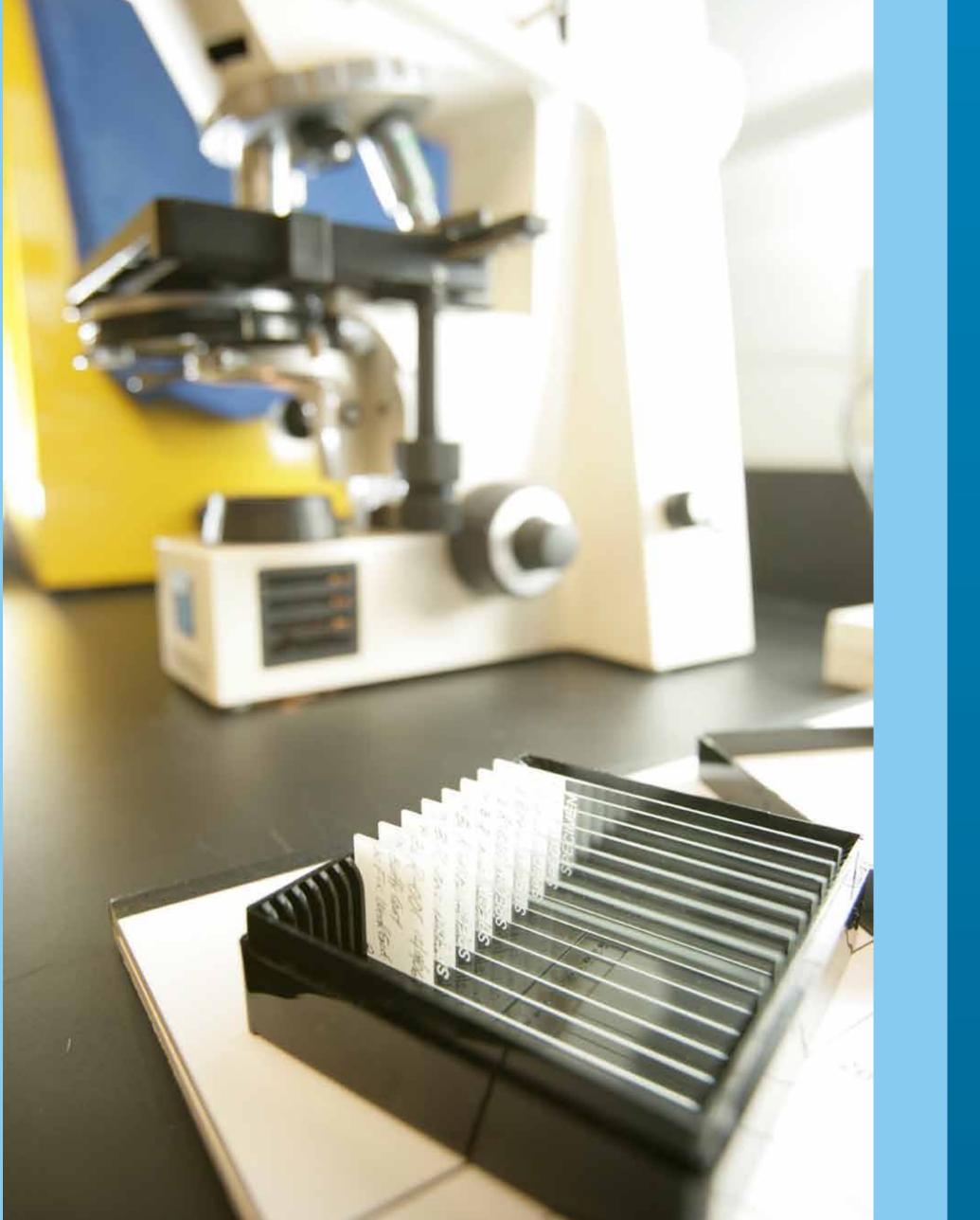
ABOUT THE LABORATORY

The Cytogenetic Biodosimetry Laboratory is a unique emergency response resource within ORISE's Radiation Emergency Assistance Center/Training Site (REAC/TS). Funding has been provided by the U.S. DOE National Nuclear Security Administration (NNSA).

Chromosome Staining

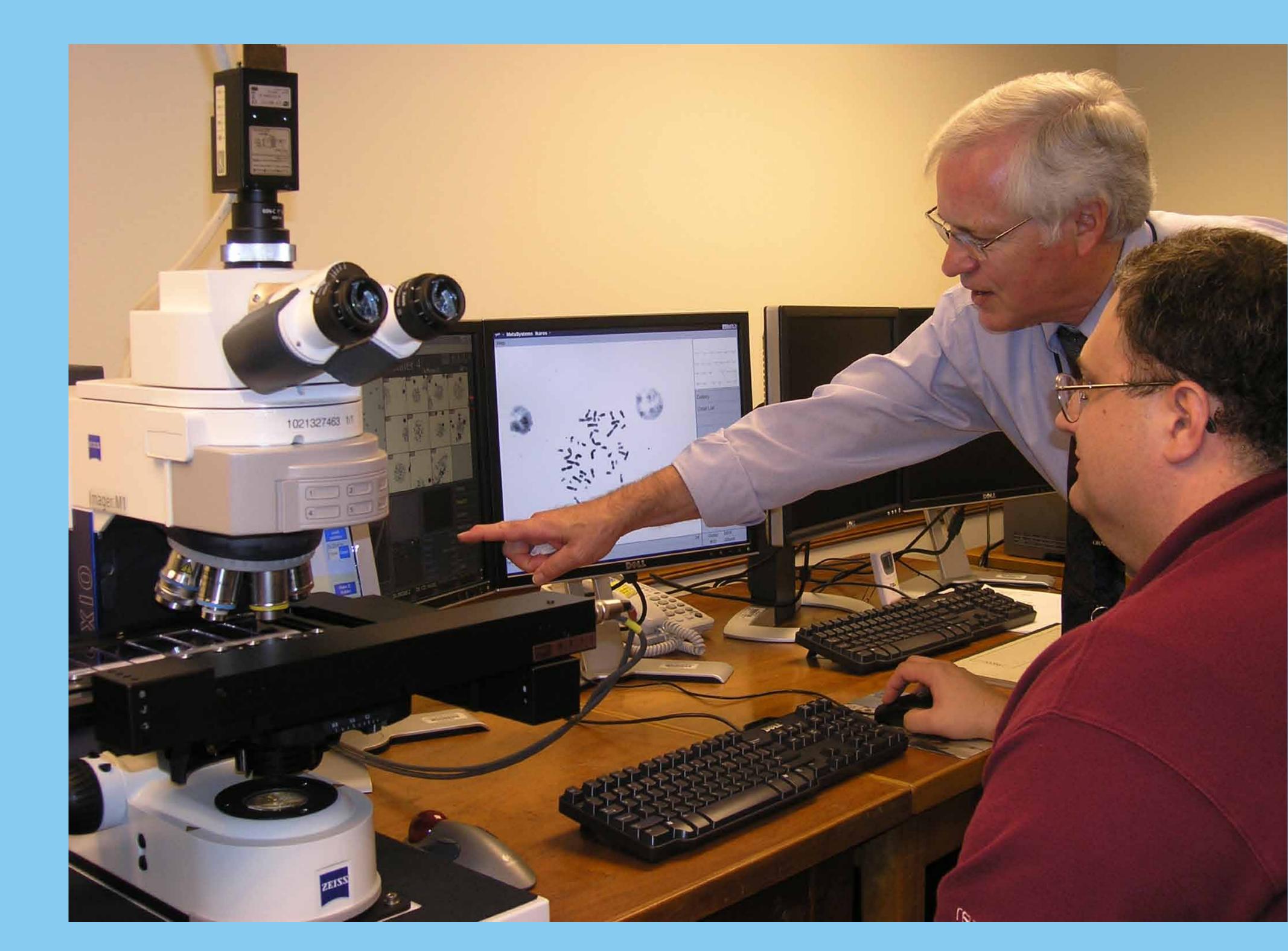
Chromosomes are stained making them visible under a microscope at up to 1,000x magnification. Slides are then mounted using very thin glass cover slips, which protect and preserve the cells. The metaphase spreads are now ready for microscopic analysis.





Microscopic Analysis

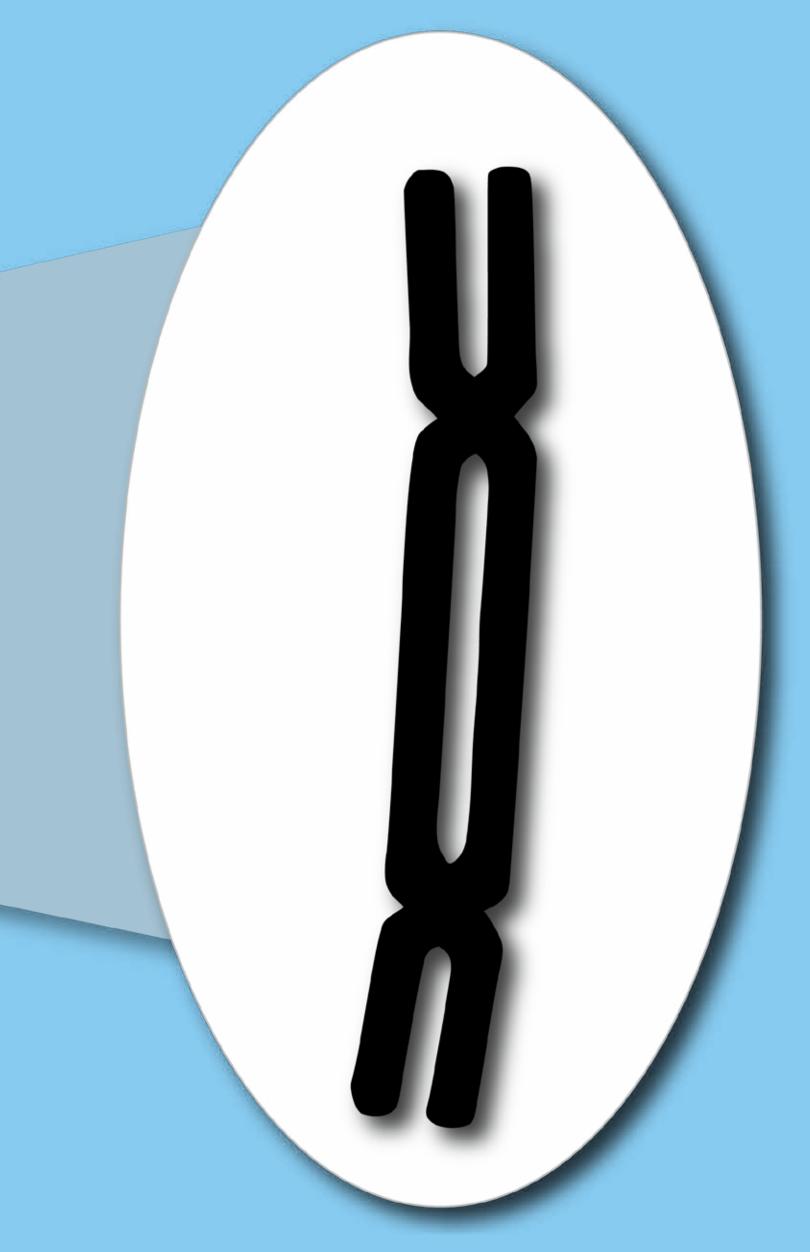
The automated workstation, a motorized Zeiss microscope coupled with a slide changer, automatically locates metaphase spreads on the slide and can scan slides unattended overnight. The microscope can hold and scan up to 80 slides — each one holding from 300-1,500 dividing blood cells.

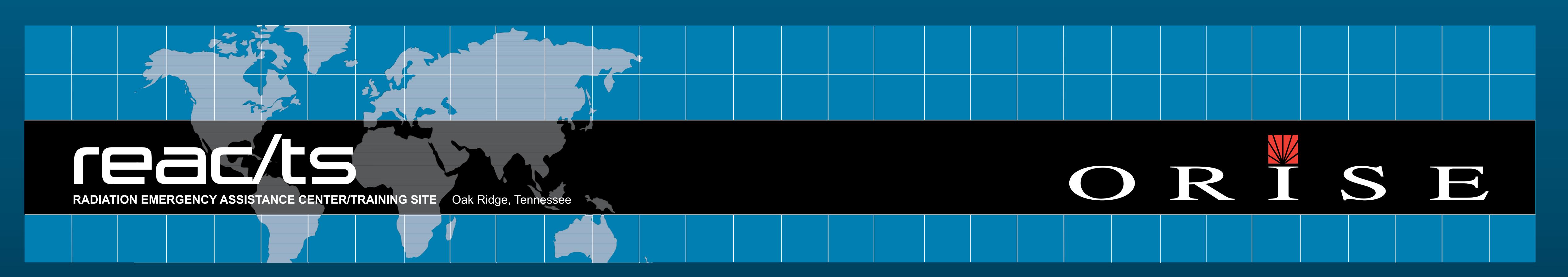


Dicentrics Scoring

A cytogeneticist analyzes the chromosomal images for dicentrics, radiation-specific chromosomal aberrations. The number of dicentrics is directly related to the ionizing radiation dose. A dicentric chromosome is abnormal due to the presence of two centromeres rather than one. The centromere is the point where the two chromatids are connected.







Contact Information

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