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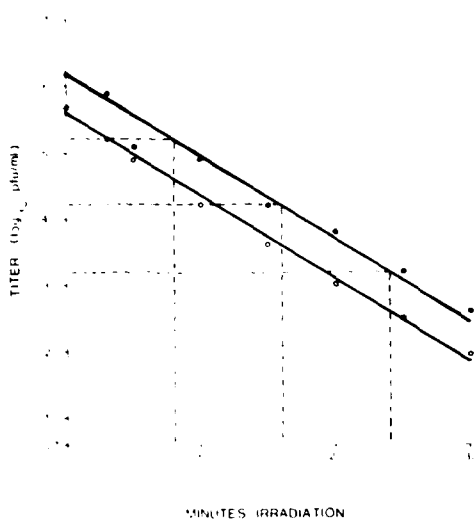
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Inactivation of Ebola Virus with ⁶⁰Co Irradiation

Data Base



Legend. Survival curves of Zaire (●) and Sudan (○) strains of Ebola virus after gamma-irradiation with 2.88×10^4 rad/min. Pools of the Zaire (E 718) and Sudan (Boniface) strains of Ebola virus were prepared from the sixth passage in Vero cells. Three frozen 1-ml samples of each strain were irradiated with ⁶⁰Co (gamma 220 cobalt 60 irradiation unit; Atomic Energy of Canada, Station J, Ottawa, Canada) for the intervals shown. Each point is the mean of titers for three samples determined in triplicate by plaque assay on Vero cells. The broken lines represent the intervals required for inactivation of $1.0 \log_{10}$ pfu of virus/ml.

Summary

Since Ebola virus was first reported in southern Sudan [1] and northern Zaire [2], laboratory investigations

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have been conducted with maximal biological containment in a P4 laboratory [3]. Safety considerations for investigations of Ebola viral antigens outside the containment laboratory have necessitated viral inactivation by effective means such as irradiation.

The strains of Ebola virus used in this study were received from Microbiological Research Establishment, Porton, England. After passage, strains were reidentified as Ebola virus by electron microscopy and by the indirect fluorescent antibody test, using human convalescent-phase Ebola hemorrhagic fever sera provided by the Centers for Disease Control, Atlanta, Ga.

Ebola virus was inactivated in a log-linear relationship to gamma-irradiation dosage with a reduction in viral titer of $1.0 \log_{10}$ pfu/ml after exposure for 8 min (2.3×10^5 rad). This rate of inactivation is compatible with the known molecular size of Ebola virus RNA (single stranded) of 4.0×10^6 daltons. In an identical but separate experiment, residual virus could not be detected by plaque assay on Vero cells after exposure of $5.0 \log_{10}$ pfu of the Zaire strain of virus/ml to 3×10^4 rad/min for 30 min. After 1 hr of irradiation, samples were not infectious for animals.

Acetone-fixed infected cell antigens exposed for 2 hr to ⁶⁰Co irradiation were superior to ultraviolet-treated preparations in the indirect fluorescent antibody test because the antigenicity was equal and false-positive results were eliminated.

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References

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