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PHA-STIMULATED LYMPHOCYTES AS A POSSIBLE BIOLOGICAL DOSIMETER

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Cultures of human peripheral lymphocytes were irradiated at 100, 200, 400, and 800 R, and phytohemaggultinin added to induce DNA synthesis and mitosis. The ability of the irradiated cells to respond to phytohemagglutinin was determined at 44, 48, 68, and 72 hours after irradiation, using both morphologic criteria and autoradiography with tritiated thymidine. At 44 hours after irradiation, cultures having received 100 R had an almost equal percentage of labeled cells (17%) as unirradiated control cultures. However, after exposures of 200, 400 and 800 R, the percentage of labeled cells dropped to 14.7, 9.3, and 5.2%, respectively. The same pattern of response was present at 48 hours after irradiation, although the total percentage of labeled cells was higher. A plot of labeled cells vs. radiation dose at 44 and 48 hours after irradiation showed a "shoulder" extending to 100 R and was consistent with an exponential survival curve in which increasing radiation produced a progressive diminution in the ability of the cells to respond to phytohemagglutinin. Despite the difficulty in extrapolating these results to the situation of *in vivo* radiation damage, it appears that the response of irradiated lymphocytes to phytohemagglutinin might be useful as a biological dosimeter.