

论著

用染色体涂染方法对先前辐射受照人员进行回顾性照射剂量估算

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摘要 背景与目的: 探索用染色体涂染(painting)技术回顾性估算先前辐射受照人员照射剂量的可行性。材料与方法: 用不同剂量(0~5.00 Gy)的⁶⁰Co γ射线照射正常人外周血, 用1、2和4号染色体涂染探针分析染色体易位, 建立辐射诱发的染色体易位率剂量-效应曲线。用同样的方法分析3例先前受⁶⁰Co γ射线照射人员的染色体易位, 参照剂量-效应曲线估算剂量, 与照射后当时估算的生物剂量比较; 并对1例无照射当时的生物剂量病例进行回顾性剂量估算。结果: 用painting方法分析0~5.00 Gy ⁶⁰Co γ射线诱发的全基因组易位率均随着吸收剂量的增加而增高, 吸收剂量和全基因组易位率之间的剂量-效应曲线均为二次方程模式, 曲线方程为 $= 0.043D^2 + 0.006D + 0.0036$ 。3例先前受照人员的估算剂量与照射后生物剂量的资料基本一致, 另1例先前受照人员的估算剂量与照后当时物理模拟剂量一致。结论: 本研究建立的painting方法可用于先前受辐射照射人员的回顾性剂量估算。

关键词 [染色体涂染](#); [易位畸变](#); [回顾性剂量估算](#)

Dose Reconstruction for Persons with Previous Accidental Irradiation Exposure by Chromosome Painting Method

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Abstract BACKGROUND AND AIM: To investigate the applicability of painting method in retrospective dose estimation. MATERIALS AND METHODS: Healthy human peripheral blood samples were irradiated with 0—5.00 Gy ⁶⁰Co γ-rays. Then the chromosome translocations in these samples were detected with painting method using chromosomes 1, 2 and 4 probes. The dose-response curve of absorbed dose and genome translocation frequency were established. The retrospective doses were estimated for 3 individuals, who previously had accidental radiation exposure and had biodosimetry data shortly after the exposure. And similar estimation was done for another individual without biodosimetry data but with the physical dose data. RESULTS: The genome translocation rates induced by 0—5.00 Gy ⁶⁰Co γ-rays detected by painting were increased with the absorbed dose. The dose-response curve was $=0.043D^2 + 0.006D + 0.0036$ for painting. The retrospective doses for the 4 individuals were similar with the previous biodosimetry data or the physical dose data. CONCLUSION: Dose reconstruction for previous radiation exposure individuals could be carried out with the painting method established in this study.

Keywords [chromosome painting](#) [translocation](#) [retrospective dose estimation](#)

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