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# x一线离体照射人体淋巴细胞诱发的染色体畸变：剂量一效应关系的研究

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摘要

本文研究了180千伏X-线离体（in vitro）照射人体淋巴细胞诱发染色体畸变的剂量一效应关系。全血样本在离体条件下（恒温37士0. 5 0C）接受不同剂量(0-465拉特）照射。用微量血培养技术培养48-56小时，观察和分析的中期细胞均为受射后的第一次有丝分裂。按WHO的标准识别各类染色体畸变，用最小二乘方作泊森方差和加权迥归分析，对实验资料配以4个剂量一效应关系模式： Y＝a1＋b1D, Y=a2＋c2D2, Y=a3＋b3D＋c3D2和Y=b4Dn.结果表明，双着丝点体最适于配二次多项式，a3=0（迥归线通过原点），Y=(0.52+0.18)，10-3D + (4.71士0.67) 10-6D2；也适于配幂函数，Y=7.10·10-5D1.59+0.08.双着丝点体＋着丝点环同样适于配以上二个模式，分别为Y=(0.51+0.21)·10-3D+(5,02+0.77·10-6D2'和Y=6.50.10-1.61+0.05。在二次多项式中，样本迥归系数b,和c，与总体迥归系数为“0"有显著差别；在幂函数中，剂量幂次n~0, n~ 2，而是界于1和2之间。对一次击中畸变（末端缺失），最适于配直线模式，a1=0（迥归线通过原点），Y一（5.86+0.55)·10-4D;也可配以幂函数，Y= 1.47·10-3.81+0.153相互易位十臂间倒位仅能配以幂函数，Y=3.34.10-4D0.87+0.20.
文中较详细地分析了电离辐射诱发的各类染色体畸变和剂量之间的关系，以及影响畸变量的诸因素。最后作者认为，双着丝点体或双着丝点体＋着丝点环最适于用作生物剂量测定；而在较低剂量的情况下，或可用末端缺失作为剂量测定的指标，但有待进一步的研究。

关键词
分类号

# X-RAY INDUCED CHROMOSOME ABERRATIONS IN HUMAN PERIPHERAL BLOOD LYMPHOCYTES IRRADIATION IN VITRO: STUDIES ON DOSE-RESPONSE RELATIONS

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**Abstract**

<FONT face=Verdana>The relationship between X-ray induced chromosome aberrations in human peripheral blood lymphocytes in vitro and radiation dose has been studied. Whole blood samples were irradiated with various (0-465 rads) of 180 kV X-rays at 37士0.50C,,and cultured for 46--54 hr by microtechnique. In all cases aberrations were scored in metaphase cells observed in their first post-irradiation mitotic division in culture All chromosome-type aberrations were classified into：polycentrics, centric rings, acentric rings, minutes, reciprocal translocations, pericentric inversions and terminal deletions.Depending on WHO's criteria, the resulting data were fitted to the four models,Y=a，＋b1D, Y -=a2＋c2 D=, Y＝a3=b3D＋ca3D2 and Y=b,4D0n by least square regression analysis using Poisson variance and weights. The dicentrie data gave the best to the second degree polynomial model with a。一0 (the regression was constrained to pass through the origin), Y＝(0.52 + 0.18) -10-3 D (4.71 + 0.67) -10-6 D2. An equally

good fit was obtained with the potential function, Y＝7.10.10-s D1.59+0.08. The dicentrie plus centric ring data follow similar models to伍ose for dicentrie,Y＝(0.51士0.21)-10-3D (5.02士0.77)-10-6-D2 and Y一6.50，1.0-5 D1.61+0.05。05 respectively. The data for one hit aberration (terminal deletion乡gave best fit to linear model with a,＝0 (the regression was constrained to pass through the origin). An equally good fit was obtained with the potential function, Y＝1.47·10-3 D0.81+0.15. But the reedproeal translocation plus pericentrie inversion was only fitted to the potential lunetion,Y＝3.34.10-4 D0.87+0.02.<BR> The relationship between aberration yield (Y) and radiation dose (D) was eoncerned in details. The possible importance of other technical factors in influencing the aberration yield was also discussed. T rom this analysis, vve believe that the dieentries or dieentric plus centric rings may be the most efficient indicator for dose estimation at higher doses, however, the terminal deletions would be more useful than the asymmetric exchanges at lower doses for same aim.</FONT>

**Key words**

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