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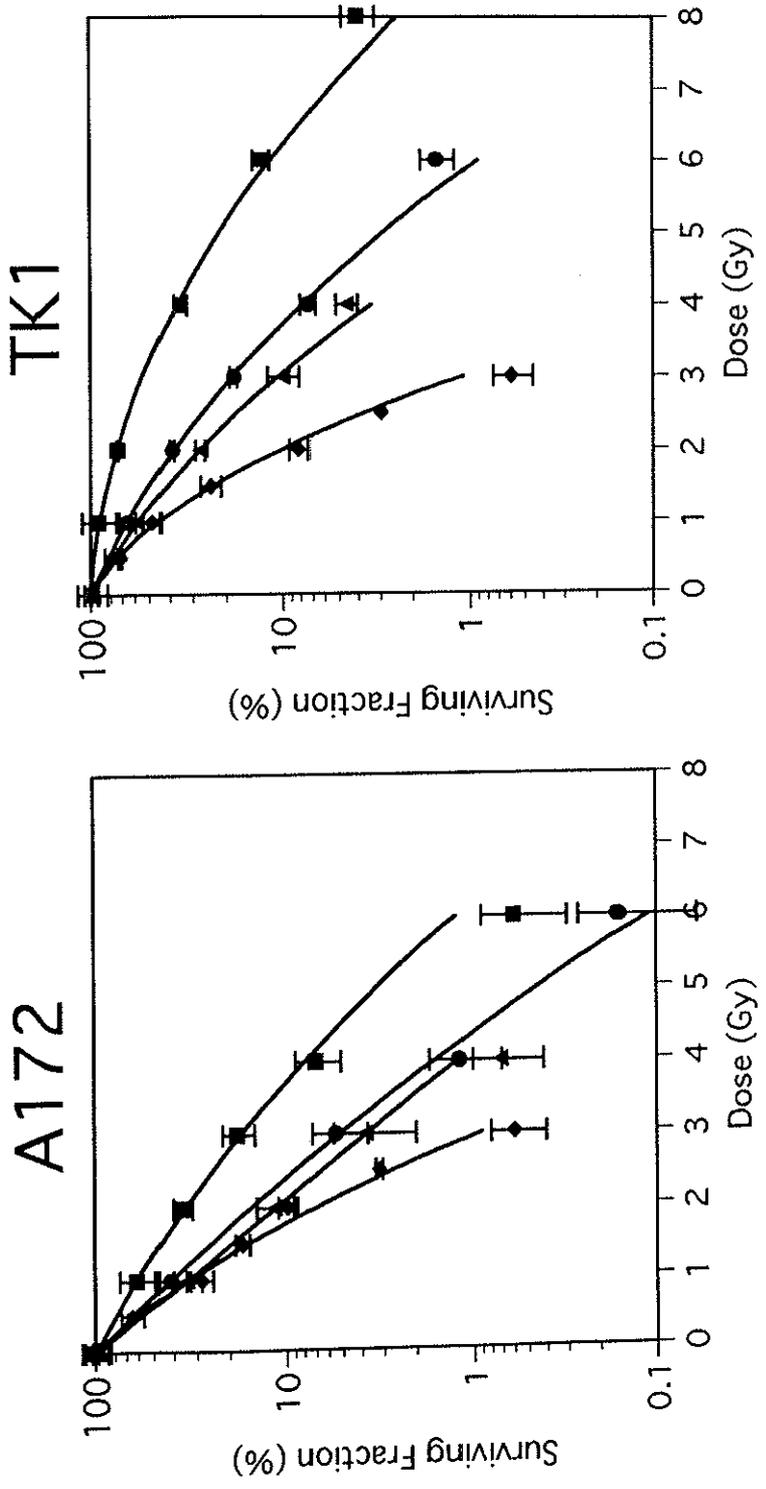


図1 A172, TK1の各種放射線照射後の生存曲線
 ガンマ線 (■)、20keV/μm (●)、40keV/μm (▲)、80keV/μm (◆) 炭素線を照射後コロニー形成法
 により各生存曲線を求めた。エラーバーは3回の独立した実験結果から計算された標準偏差を示す。

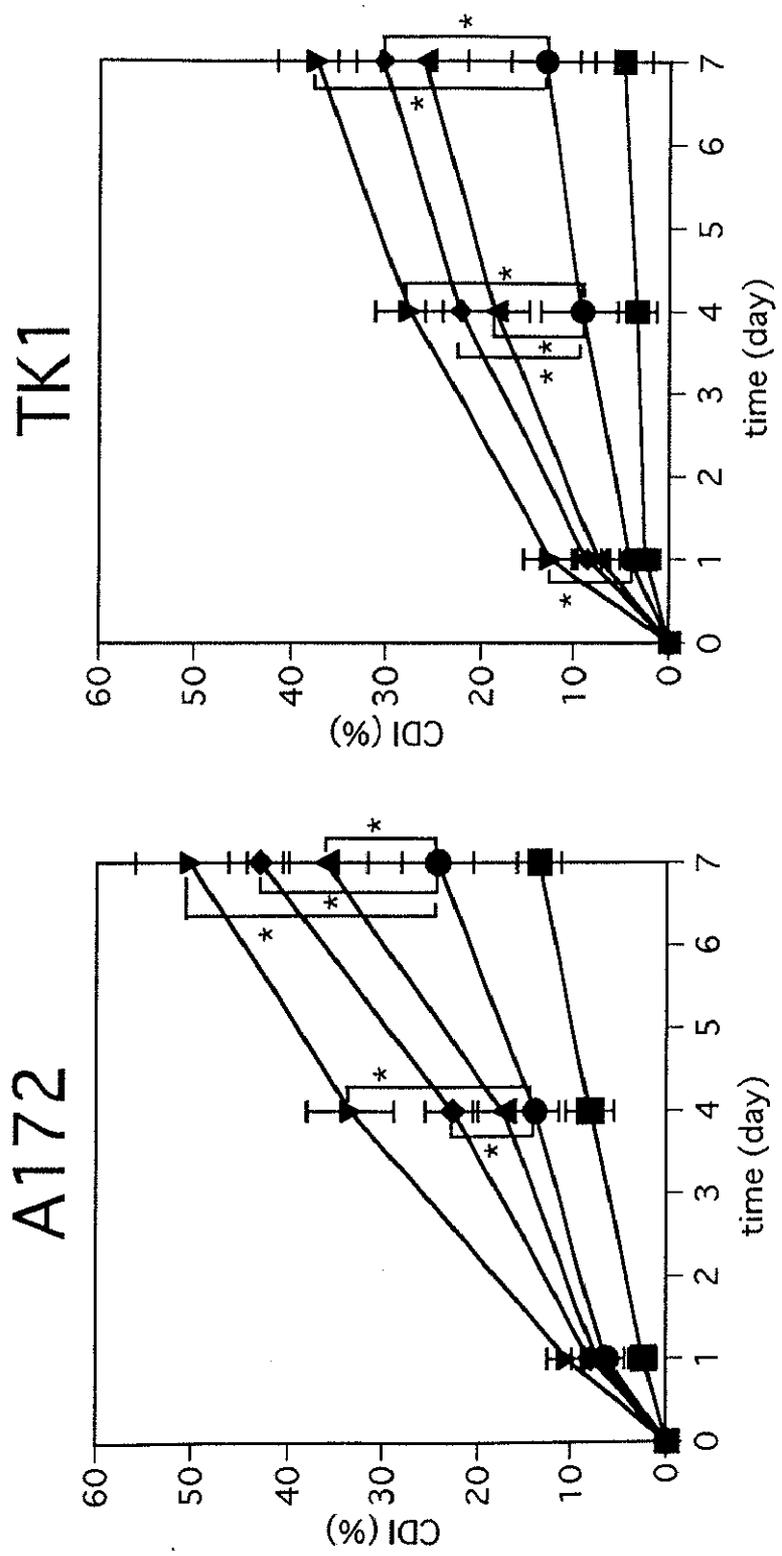


図2 色素排除法による各放射線10Gy照射後の経時的なCell Death Index(CDI)の変化
 照射なし(■)、ガンマ線10 Gy(●)、LET 20 (▲)、40 (◆)、80 keV/μm (▼)の炭素線10 Gy
 エラーバーは3回の独立した実験結果から計算された標準偏差を示す。
 *p < 0.05

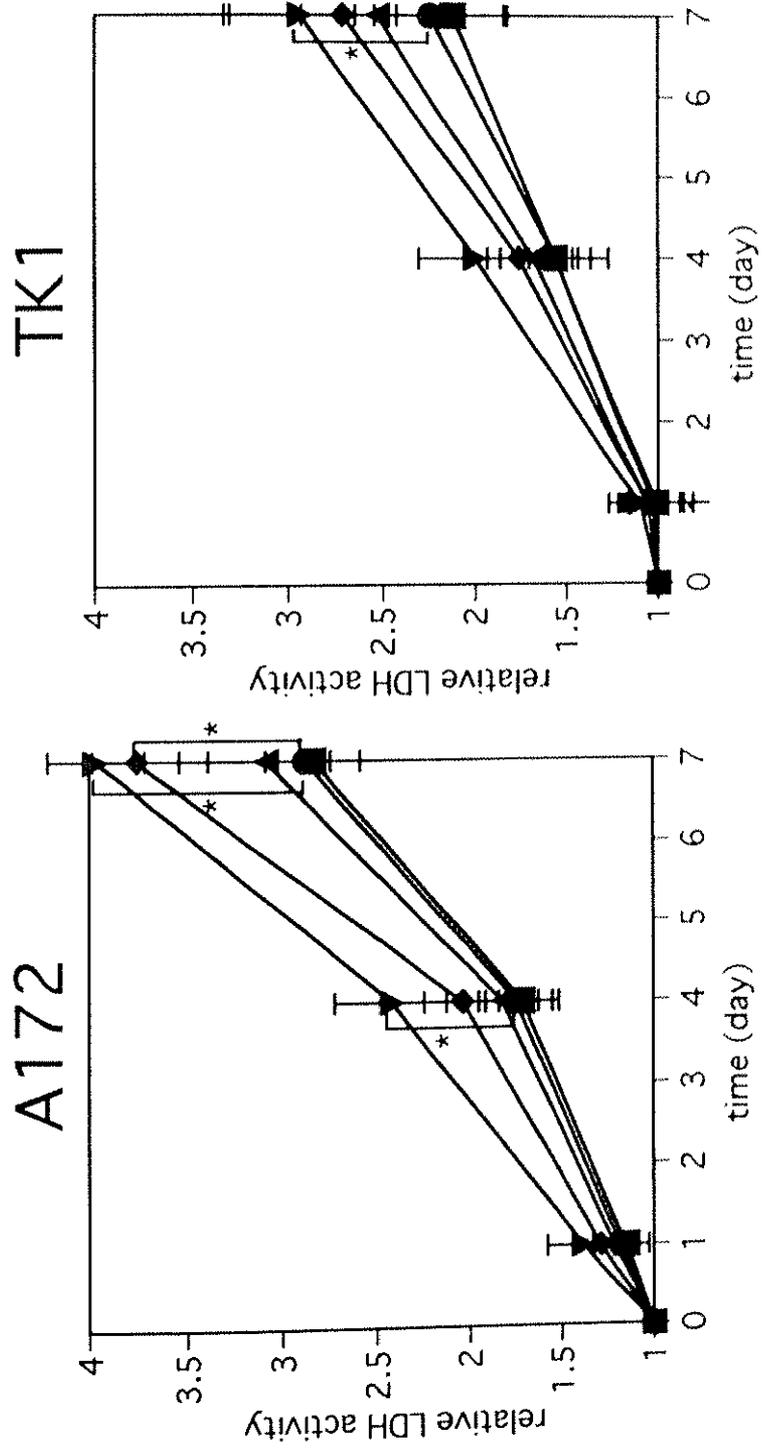
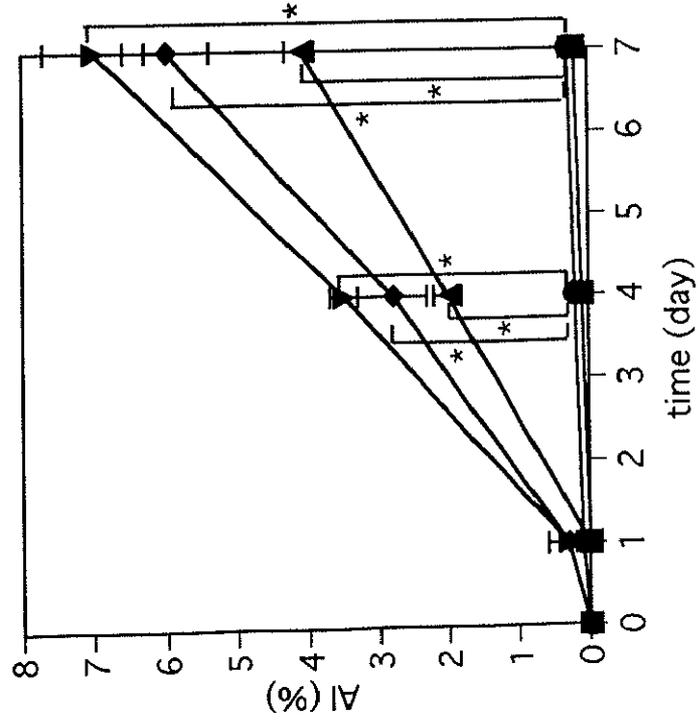


図3 relative LDH activity
 非照射サンプルのLDH活性に対する照射サンプルのLDH活性の比をrelative LDH activityとした。

照射なし (■)、ガンマ線 (●)、LET20 (▲)、40 (◆)、80 keV/μm (▼) の炭素線
 エラーバーは2回の独立した実験結果から計算された標準偏差を示す。
 *p < 0.05

A172



TK1

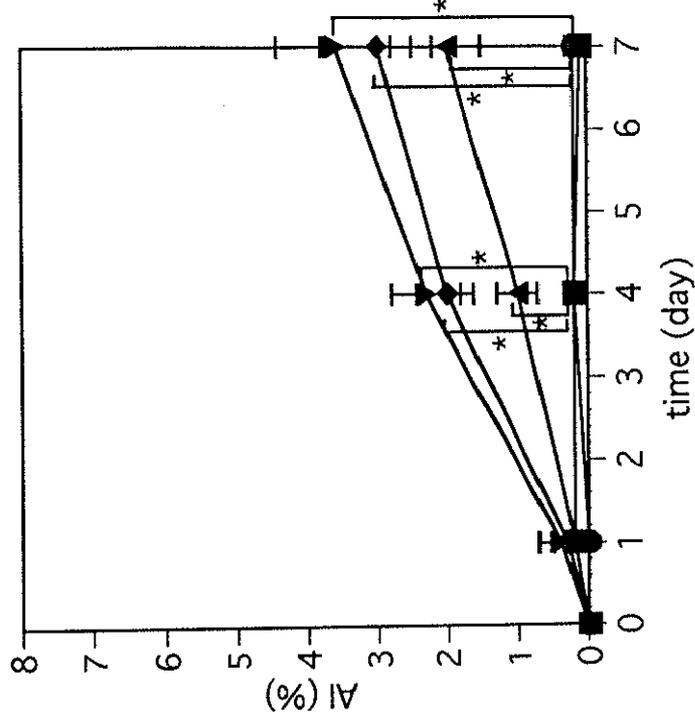


図4 各放射線照射後のapoptotic index (AI)の経時的变化
 照射なし (■)、ガンマ線 (●)、LET20 (▲)、40 (◆)、80 keV/μm (▼) の炭素線
 エラーバーは3回の独立した実験結果から計算された標準偏差を示す。

*p < 0.05

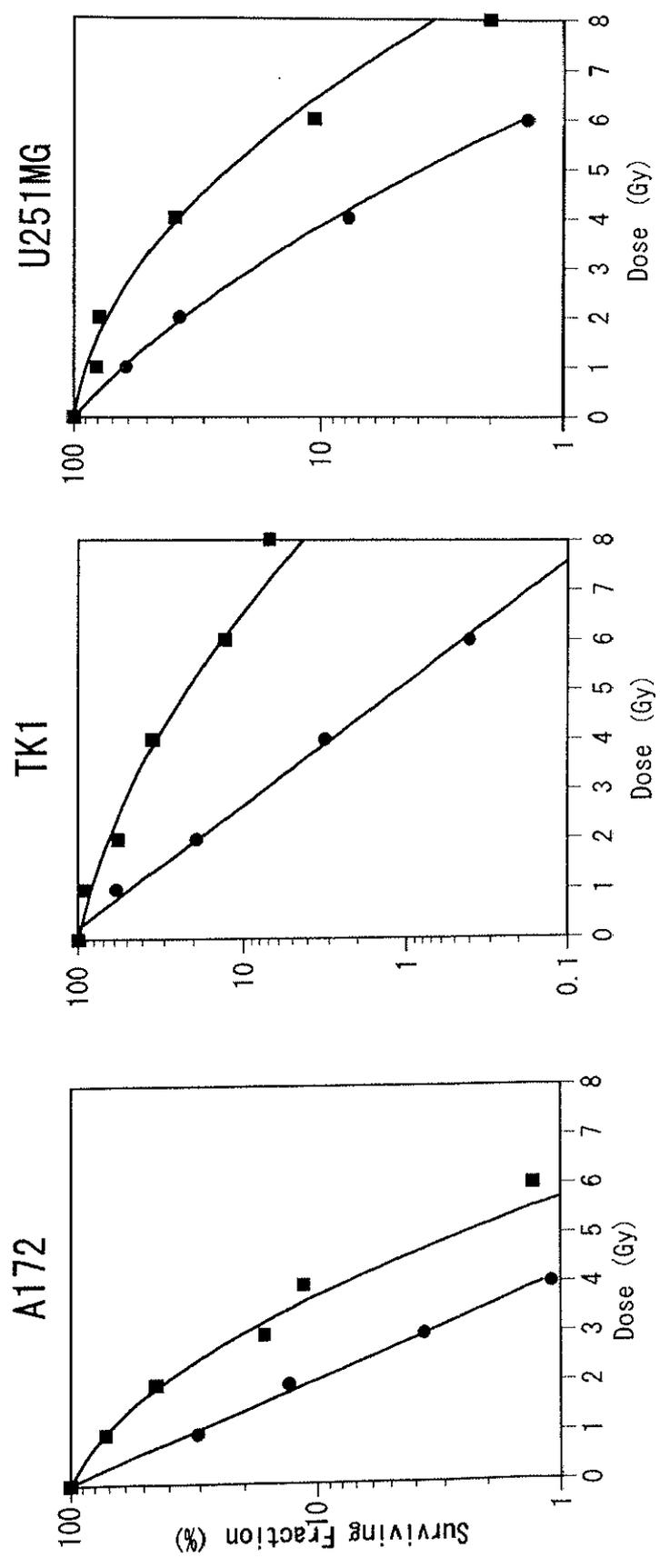


図5 ガンマ線照射後の生存率に及ぼすカフェインの影響
 カフェインなし (●)、カフェイン5mM (■)

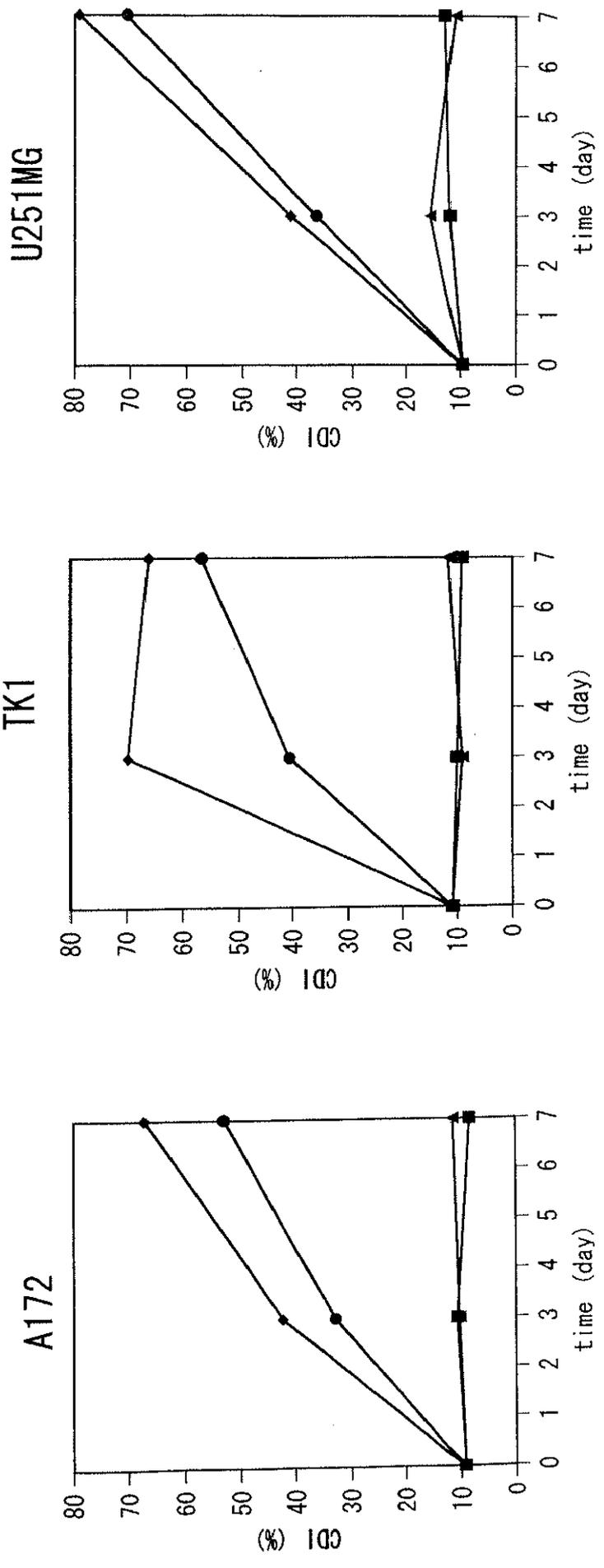


図6 Cell death index (CDI)
 カフェインなし、ガンマ線照射なし (■)、ガンマ線照射のみ (●)、
 カフェイン 5 mMのみ (▲)、カフェイン5 mM+ガンマ線照射 (◆)

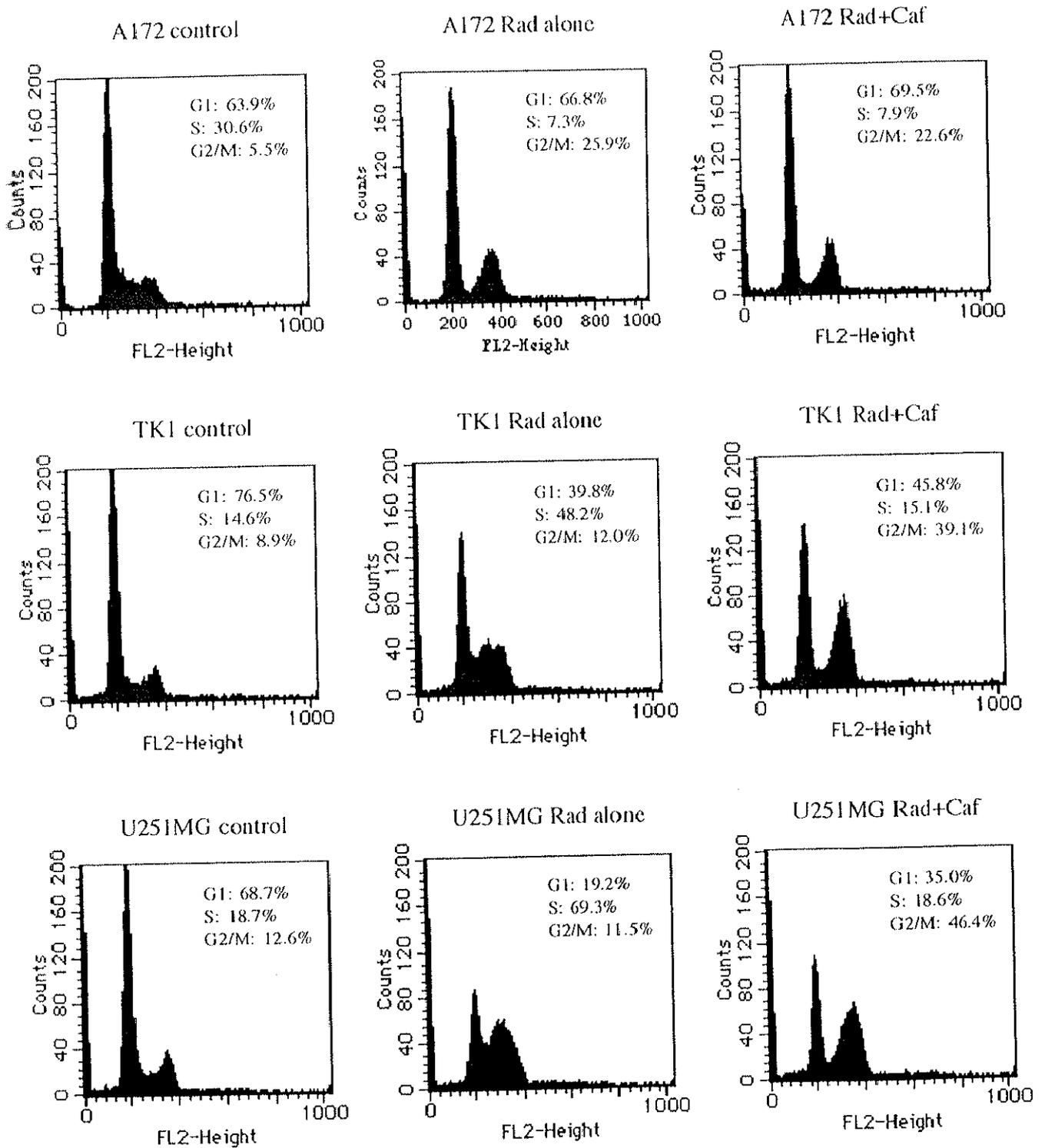
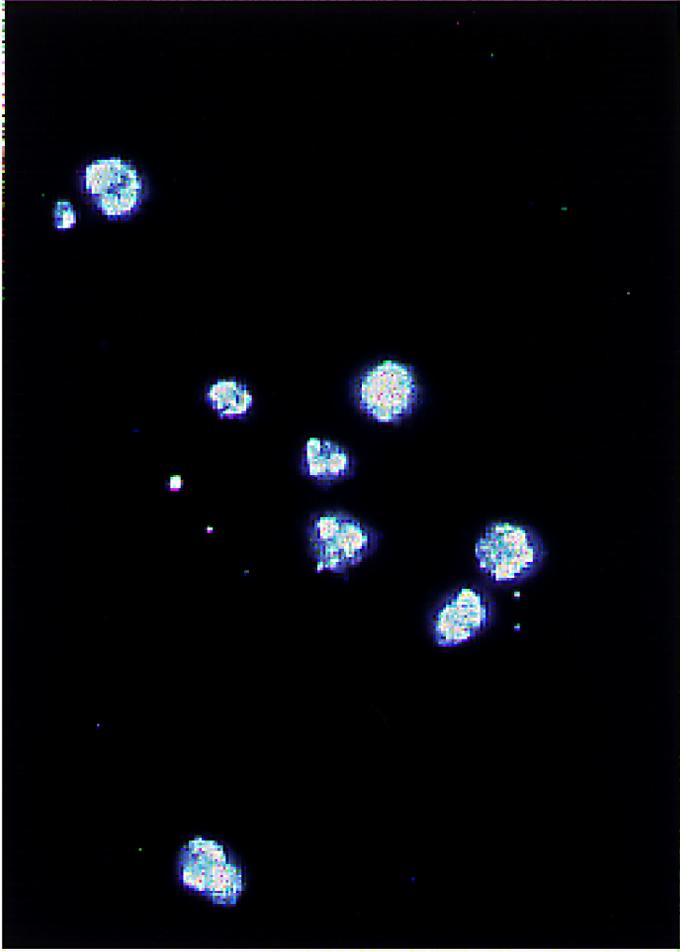


図7 ガンマ線照射およびカフェイン添加後の細胞周期の変化
DNA histogram内の数字はおのこの細胞周期における分布率を示す

U251MG 放射線照射及び
カフェイン添加後 3 日目



U251MG control

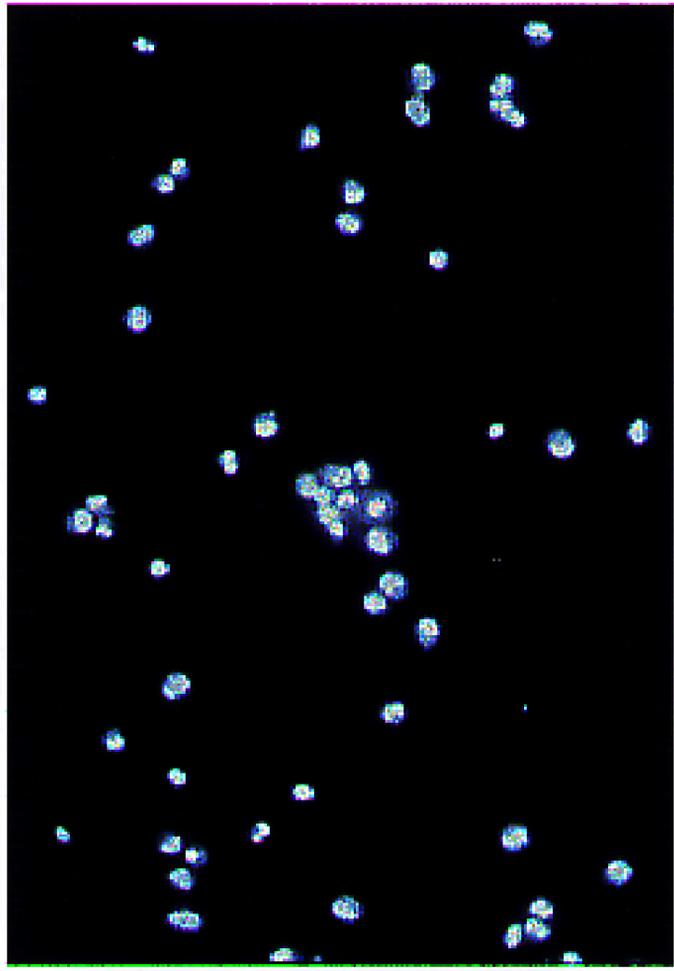


図8 ヘキスト33342染色による核の形態学的観察
放射線照射直後にカフェイン5mM添加されたものでは、アポトーシスに特徴的とな
れるクロマチンの凝縮、核の断片化が認められる。

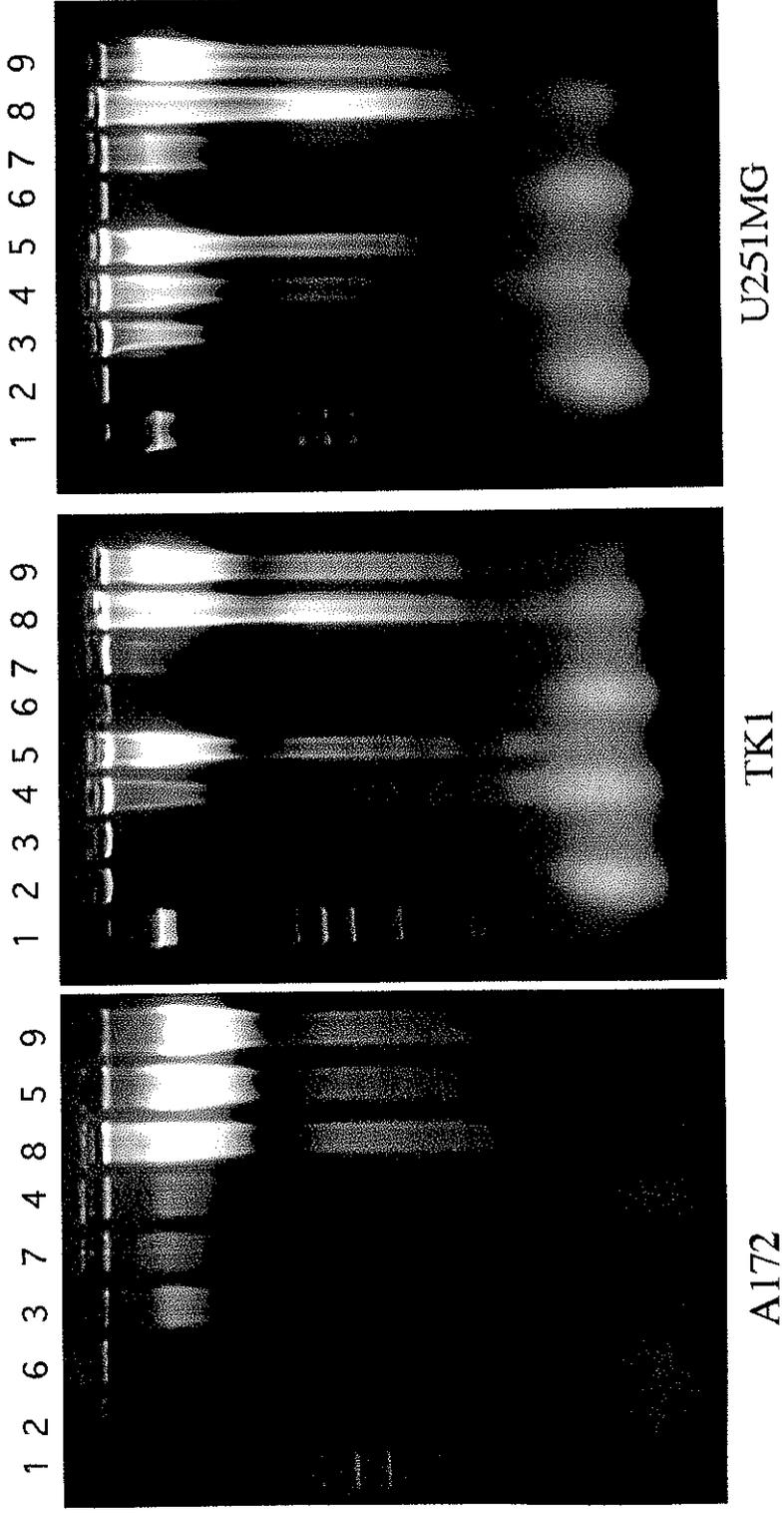


図9 アガロースゲルDNA電気泳動
 lane1: size marker 2~5: day 3 6~9: day7
 lane 2, 6: control, 3, 7: caffeine alone, 4, 8: radiation alone, 5, 9: caffeine + radiation

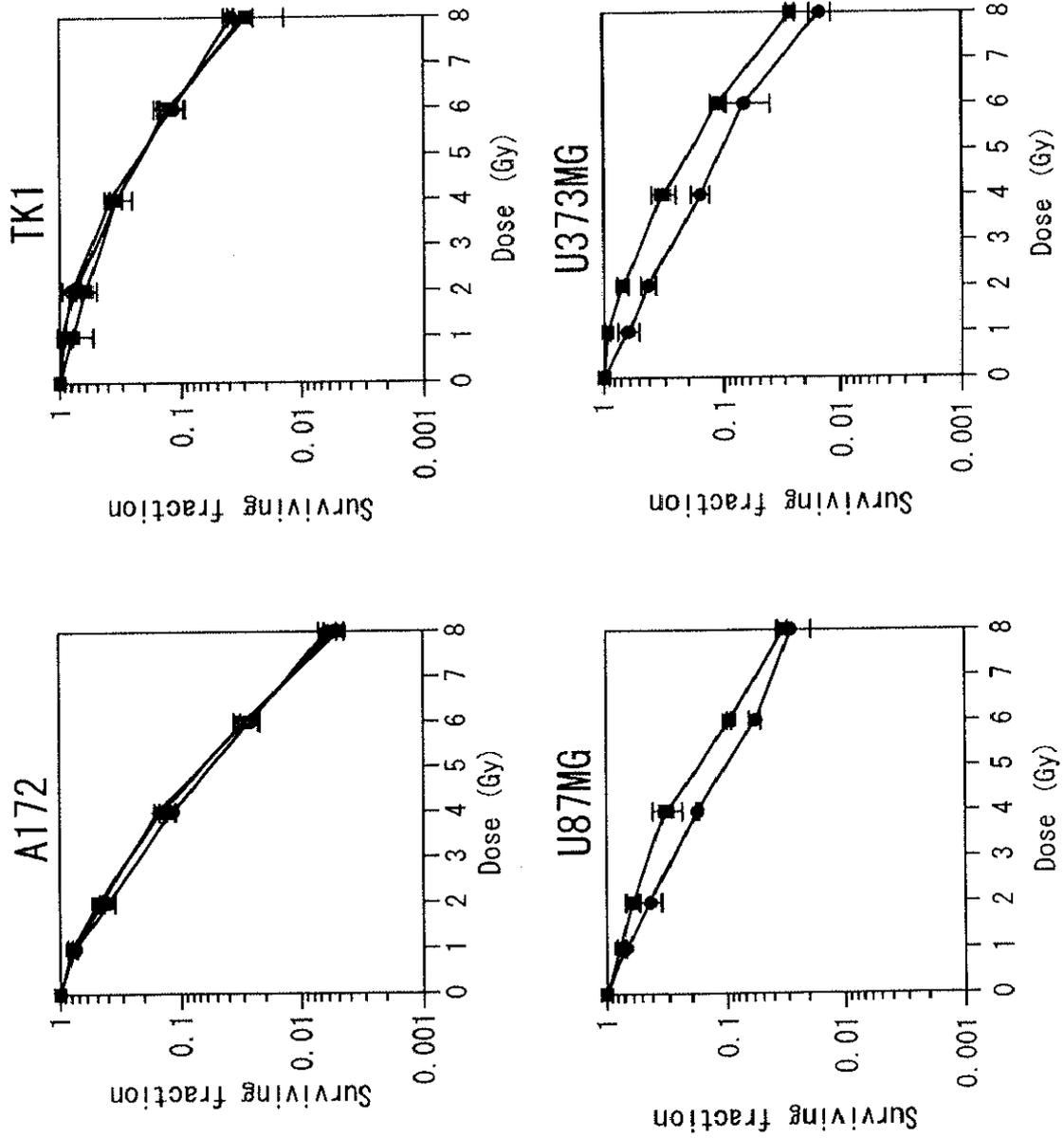


図10 ガンマ線照射後の生存率に対するIFN-βの影響
 ガンマ線のみ (■)、ガンマ線+IFN-β (●)
 エラーバーは3回の独立した実験結果から計算された標準偏差を示す。

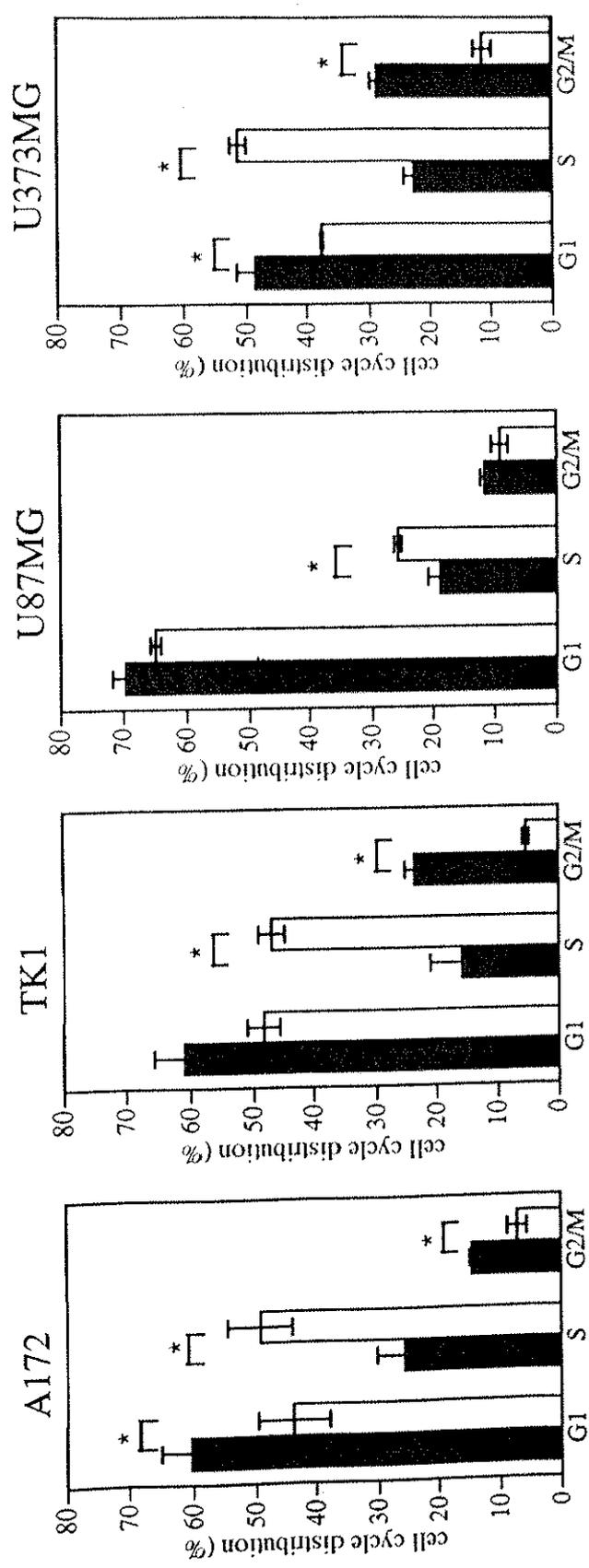


図11 IFN-β1000IU/mlにて24時間前処理後の細胞周期の変化
 IFN-βなし (■)、IFN-β1000IU/ml (□)
 * p < 0.05

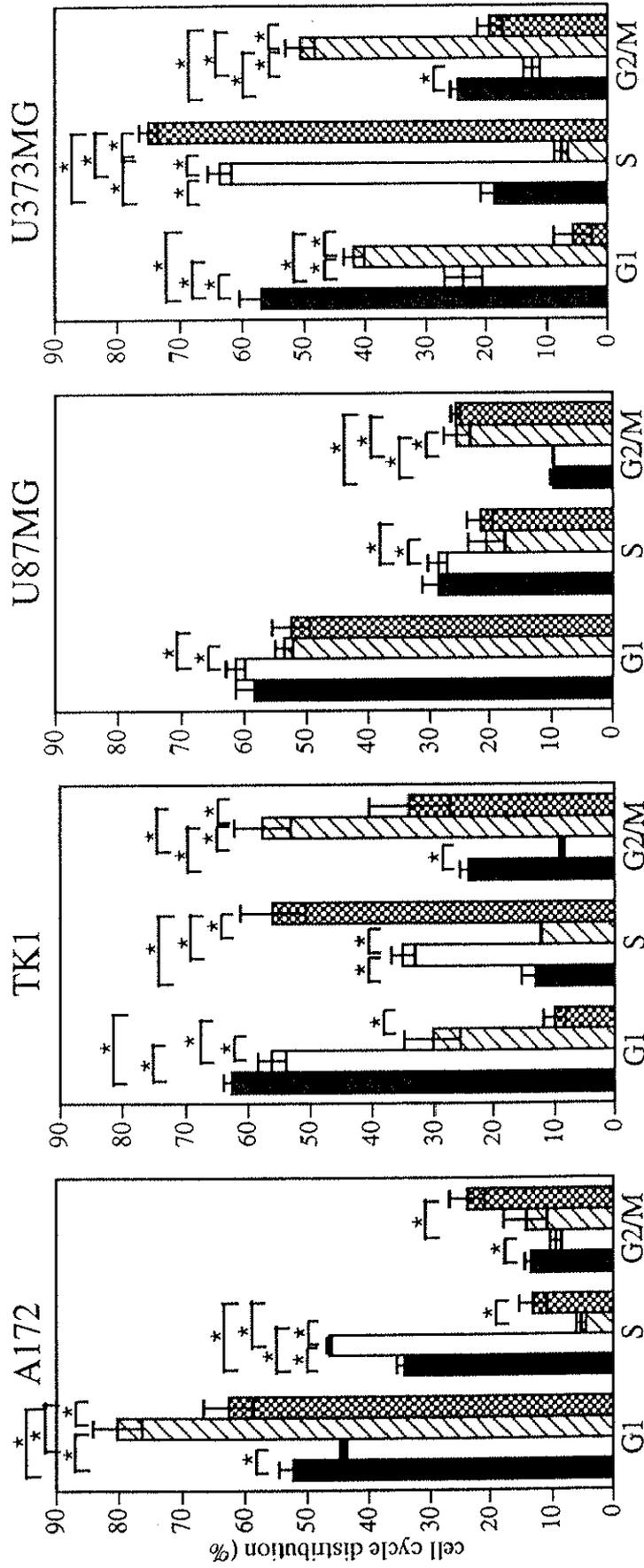


図12 IFN-β処理24時間後に放射線照射し更に24時間培養後の細胞周期の変化
エラーバーは3回の独立した実験から得られた標準偏差を示す

■ control □ IFN-β 1000IU/ml ▨ radiation 8 Gy ▩ IFN-β 1000IU/ml+radiation 8 Gy

* p < 0.05

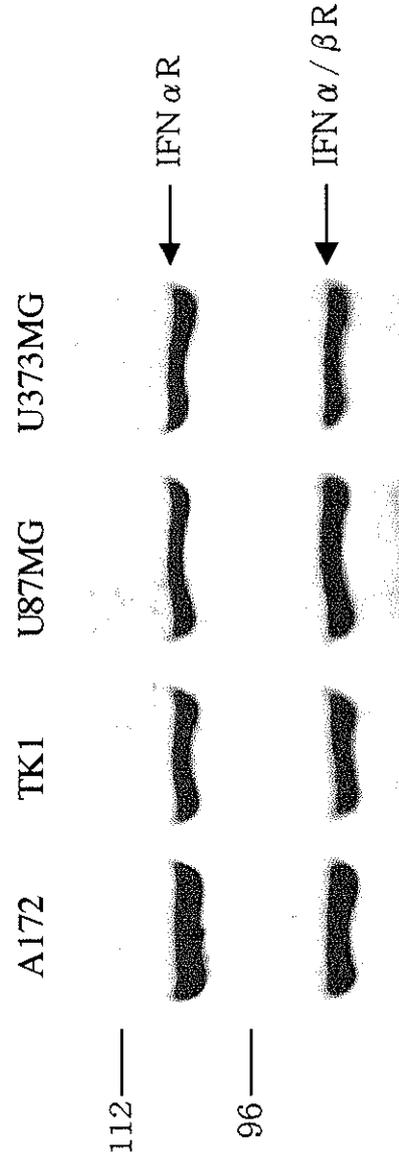


図13 各細胞株におけるIFNレセプター蛋白の発現
 図左の数字はstandard markerの分子量を示す。

表 1 10% survival におけるガンマ線に対する relative biological effectiveness (RBE)

cell line	20 keV/ μ m	40 keV/ μ m	80 keV/ μ m
A172	1.55	1.77	1.86
TK1	1.66	2.08	3.12

*p < 0.05

表 2. SF2, α - and β - values for each cell line after pretreatment with IFN- β for 24h prior to irradiation

Cell line	IFN- β concentration (I.U./ml)	Surviving fraction at 2 Gy (SF2)	α -value (Gy ⁻¹)	β -value (Gy ⁻²)
A172	0	0.49	0.179	0.081
	1000	0.39	0.241	0.088
	3000	0.45	0.207	0.074
TK1	0	0.62	0.159	0.023
	1000	0.80	0.012	0.055
	3000	0.75	0.002	0.064
U87MG	0	0.60	0.216	0.024
	1000	0.42	0.384	0.014
U373MG	0	0.68	0.087	0.044
	1000	0.41	0.454	0.001

* p < 0.05