Table 1. Changes of SOD Activity in RBA-1 and PC-12 Cells after 7 Days of Incubation with Vitamin E

	Vitamin E	0 μM	7 days 50 μM	100 μM	200 μM
RBA-1	CuZn SOD	62.5 ± 0.6	59.0 ± 0.7*	56.5 ± 0.7**	54.2 ± 0.5*
	Mn- SOD	13.1 ± 0.2	11.1 ± 0.7*	10.1 ± 0.5**	9.4 ± 0.6**

Data are expressed as means ± SE, *p < 0.05; **p < 0.01 (compared with 0 μM vit E).

Table 2. Changes of SOD mRNA in RBA-1 and PC-12 Cells after 2 Days and 7 Days of Incubation with Vitamin E

		2 days				7 days			
	Vitamin E	0 μM	50 μM	100 μM	200 μM	0 μM	50 μM	100 μM	200 μM
RBA-1	CuZn SOD	100	110.8 ± 7.4*	95.7 ± 9.4	88.0 ± 8.9**	100	88.8 ± 5.1*	87.3 ± 7.0**	84.5 ± 6.0**
	Mn-SOD	100	107.7 ± 6.3*	93.6 ± 7.5*	84.3 ± 7.3**	100	88.0 ± 4.1*	87.1 ± 5.5*	77.9 ± 4.5**
	CAT	100	107.6 ± 6.3*	92.9 ± 7.7*	86.3 ± 8.3**	100	81.2 ± 5.1**	76.7 ± 3.9**	70.9 ± 9.7**
	GPX	100	108.3 ± 6.9*	97.6 ± 7.2	94.2 ± 8.8*	100	79.8 ± 8.3**	72.8 ± 9.6**	70.4 ± 7.9**
PC-12	CuZn SOD	100	106.5 ± 4.6*	107.6 ± 5.5*	106.4 ± 13.0	100	97.9 ± 7.4	98.9 ± 6.2	96.8 ± 12.7
	Mn-SOD	100	100.7 ± 3.2	106.1 ± 2.8**	101.5 ± 2.7	100	106.5 ± 6.0	101.6 ± 6.8	101.9 ± 8.7
	CAT	100	103.4 ± 4.0	103.1 ± 6.0	100.6 ± 3.3	100	112.7 ± 4.0	111.3 ± 8.2	92.1 ± 4.9
	GPX	100	105.3 ± 2.7	108.8 ± 8.3	96.6 ± 7.5	100	99.1 ± 6.7	109.7 ± 9.3	92.5 ± 8.4

Data are expressed as means ± SE; *p < ± 0.05; **p < 0.01 (compared with 0 μM vit E).

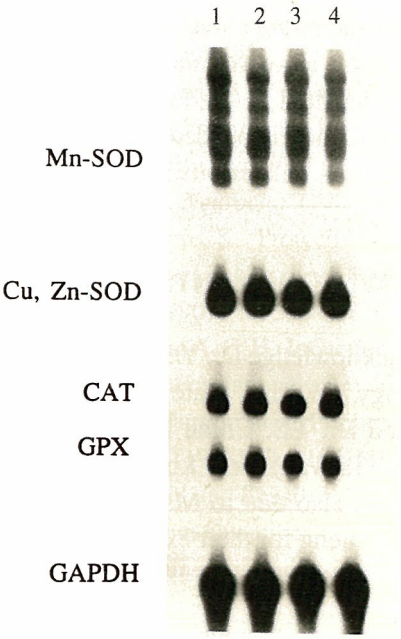

Fig. 1. Northern blot of total RNA (30 μg/lane) from control and vitamin E-incubated samples probed for CuZn-SOD, Mn-SOD, catalase and glutathione peroxidase (GPX) to compare the internal standard (GAPDH). Lane 1 shows the control, and lanes 2-4 indicate the response to a 2-day incubation with vitamin E at 50, 100, and 200 μmol/L, respectively.

cells increased to 107.6% ± 6.3% and 108.3% ± 6.9% of the vehicle-treated control, respectively. After 7 days of incubation, the mRNA level of CuZn-SOD was decreased by vitamin E. The mRNA of Mn-SOD was lower in RBA-1 cells incubated with 100 to 200 μM vitamin E for 7 days (Table 2). The mRNA levels of other redox enzymes, catalase and GPX, were also attenuated by vitamin E with 7 days of incubation. After 7 days of incubation, vitamin E at 50 μM, 100 μM and 200 μM produced mRNA levels of catalase of 81.2% ± 5.1%, 76.7% ± 3.9%, and 70.9% ± 9.7% of the control, respectively. Also, the mRNA levels of GPX in these cells became 79.8% ± 8.3%, 72.8% ± 9.6% and 70.4% ± 7.9% of the control by 7 days of incubation with vitamin E at 50 μM, 100 μM and 200 μM, respectively. However, similar changes were not observed in PC-12 cells (Table 2).

DISCUSSION

In the present study, we found that incubation of α-tocopherol (vitamin E) with cultured RBA-1 resulted in increases in both the activity and mRNA level of endogenous SOD within 2 days and produced down-regulation of SOD with 7 days of supplementation of this