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Effect of thimerosal, a preservative in vaccines, on intracellular  
Ca(2+) concentration of rat cerebellar neurons.

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The effect of thimerosal, an organomercurial preservative in vaccines, on cerebellar neurons dissociated from 2-week-old rats was compared with those of methylmercury using a flow cytometer with appropriate fluorescent dyes. Thimerosal and methylmercury at concentrations ranging from 0.3 to 10microM increased the intracellular concentration of Ca(2+) ([Ca(2+)]<sub>i</sub>) in a concentration-dependent manner. The potency of 10microM thimerosal to increase the [Ca(2+)]<sub>i</sub> was less than that of 10microM methylmercury. Their effects on the [Ca(2+)]<sub>i</sub> were greatly attenuated, but not completely suppressed, under external Ca(2+)-free condition, suggesting a possibility that both agents increase membrane Ca(2+) permeability and release Ca(2+) from intracellular calcium stores. The effect of 10microM thimerosal was not affected by simultaneous application of 30microM L-cysteine whereas that of 10microM methylmercury was significantly suppressed. The potency of thimerosal was similar to that of methylmercury in the presence of L-cysteine.

Both agents at 1microM or more similarly decreased the cellular content of glutathione in a concentration-dependent manner, suggesting an increase in oxidative stress. Results indicate that thimerosal exerts some cytotoxic actions on cerebellar granule neurons dissociated from 2-week-old rats and its potency is almost similar to that of methylmercury.

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