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Programmed cell death or apoptosis has been documented in inner ear epithelia (Kil et al., ARO 1995; Shibata et al., ARO 1995). One of the characteristics of apoptosis is nonrandom fragmentation of the DNA which results in collections of free 3' OH ends. Researchers have labeled inner ear cells that contain cleaved DNA. These cells also show other characteristics of programmed cell death, such as condensation of chromatin, membrane blebbing, and cell shrinkage. The Belgian Waterslager (BWS), one strain of canary, has a hearing deficit at higher frequencies. The BWS basilar papilla contains cells that are clearly abnormal and may be apoptotic, while similar abnormal looking cells are absent in the normal basilar papillae from the wild canary and the domestic chicken.

The presence or absence of apoptotic cells may account for the rate of proliferation in these end organs. Other inner ear epithelia that contain proliferating cells, such as the normal chick utricle and the regenerating chick basilar papilla, also contain apoptotic cells. In contrast, very little proliferation occurs in the normal basilar papilla, and therefore low rates of apoptosis might be expected. Previous results indicate a modest rate of proliferation in the BWS basilar papilla which may also be correlated with some programmed cell death. In this study, cell death rate was quantified in the chick and wild canary basilar papillae and will be compared with results from the BWS canary.

Apoptotic cells were labeled in fixed whole mount or five micron sections.

Fluorophore-conjugated nucleotides were added to the free 3' OH ends of cleaved DNA strands present in apoptotic nuclei in situ, by using the enzyme terminal deoxynucleotidyl transferase (Oncor). Fluorescein nuclei were visualized by 494 nm wavelength light and quantified.

No apoptotic cells were observed in the normal chicken or wild canary basilar papillae. Typical apoptotic cells with brightly labeled condensed chromatin were observed outside of the sensory epithelia in the underlying connective tissue indicating that the procedure does indeed label apoptotic cells. These results will be compared to the apoptotic cell death rate in the BWS canary.

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