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Belgian Waterslager canaries (BWS) suffer from an inherited hearing deficit which is associated with cochlear pathology including pathological and missing hair cells. BWS have on average 30% fewer hair cells than canaries of other strains. Here we determined the number of auditory nerve fibers in normal and BWS canaries to see whether the loss of hair cells characteristic of this strain is accompanied by a similar loss of afferent nerve fibers.

Semithin 1 $\mu$ m cross sections of the complete Durcupan embedded auditory nerve at the porus of the inner auditory canal were obtained. Since at this level auditory and lagenar fibers can not be discriminated, we also made cochlear cross sections near the apical end of the basilar papilla in order to count the number of lagenar nerve fibers separately. The sections were digitized with a video camera at high magnification using a microscope with a 100x oil immersion lens. Typically 70-100 frames were taken for the reconstruction of a nerve cross section and 15-25 frames for the lagenar bundle. The reconstructions were then plotted at a final magnification of 3400x for the manual nerve fiber counts.

The mean number of nerve fibers in the nerve cross sections in 3 normal canaries was 6881  $\pm$  250 (range 6547 - 7147). The number of lagenar fibers in 2 normal canaries was 815 and 795. Thus the number of auditory nerve fibers in normal canaries is approximately 6080. In 4 BWS nerve cross sections we found a mean of 6212  $\pm$  257 (range 5808 - 6480) nerve fibers. Lagenar counts were 843 and 855 in 2 BWS basilar papillae. This results in an estimate of 5360 auditory nerve fibers in BWS. These data show that the reduction of hair cells in BWS canaries (30% reduction) is not accompanied by an equivalent reduction in auditory nerve fibers (12% reduction). Consequently, the ratio of nerve fibers to hair cells is clearly increased in BWS.

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