

4. Antioxidant Therapy Prevents Age-Related Hearing Loss

Heman-Ackah SE, Juhn SK, Huang TC, Wiedmann TS. [A combination antioxidant therapy prevents age-related hearing loss in C57BL/6 mice](#). Otolaryngology-Head and Neck Surgery, 2010:143,429-434.

Study Background

Age-related hearing loss (ARHL or presbycusis) refers to a gradual, progressive hearing loss that accompanies aging. The hearing loss is typically described as downwardsloping high frequency loss but may be associated with various types of system dysfunctions that progress with aging. Age-related hearing loss is one of the most common conditions affecting the elderly population. Approximately 35 percent of adults age 65 and older have been reported to have some degree of age-related hearing loss. It is projected that by 2025, approximately 24.5 million Americans will be affected. Age-related hearing loss disables an individual's ability to communicate, thereby effectively jeopardizing their autonomy. Patients often experience associated depression and social withdrawal. Thus, age-related hearing loss presents a major public health concern. Oxidative injury caused by free-radical damage is perhaps the most fundamental cause of age-related pathology in the biological aging of cells. Oxidative damage may be an important intrinsic factor in the pathogenesis of presbycusis. Increased concentrations of free radicals [(ROS) and reactive nitrogen species (RNS)] are implicated as a mediator of oxidative stress and damage to the inner ear in ARHL.

Summary: This study uses a strain of mice that progressively lose their hearing over their lifetime and is a widely accepted model for the study of ARHL. A combination antioxidant cocktail which included RiboCeine, a critical precursor of cysteine for the biosynthesis of glutathione, was administered. The rationale for creating a 19 combination of antioxidant treatment was to target multiple sites within the oxidative pathway to retard or prevent oxidative stress.

Results: The data demonstrated that the administration of this combination of antioxidants to this animal model greatly attenuated the presentation of ARHL at all frequency levels compared to the control group.

Conclusion: The administration of combination antioxidants, which included RiboCeine, attenuated the presentation of AHRL, suggesting that such combinations might be useful in preventing or delaying ARHL, a major public health problem.