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Sommario/riassunto

The auditory perception of sounds (environmental, vocal or music) is one of the 5 principal senses consciously monitored by our brains, and is crucial for many human endeavors as well as quality of life. Loss of optimal performance in this principal sensory system leads to loss of effective communication and intimacy, as well as increased risk of isolation, depression, cognitive decline, and greater vulnerability to predators. The vestibular system ensures that individuals remain upright and effectively monitor their posture within their spatial surroundings, move effectively, and remain focused on visual targets during motion. The loss of vestibular sensitivity results in postural instability, falls, inability to observe the environment during motion, and a debilitating incapacity to function effectively. The sensory cells for both auditory and vestibular systems are located within the inner ear of the temporal bulla. There are many causes of auditory and vestibular deficits, including congenital (or genetic) events, trauma, aging and loud sound exposures. Ototoxicity refers to damage of the auditory or vestibular structures or functions, as the result of exposure to certain pharmaceuticals, chemicals, and/or ionizing radiation exposure that damage the inner ear. Ototoxicity is a major contributor to acquired hearing loss and vestibular deficits, and is entirely preventable. In 2009, the United States Department of Defense initiated the Hearing Center of Excellence (HCE), headquartered in San Antonio, Texas, in response to the prevalence of acquired auditory and

vestibular deficits in military and veteran populations. The knowledge shared in this eBook supports the HCE's mandate to improve aural protection of military and civilian populations worldwide. The last few years have seen significant advances in understanding the cellular mechanisms underlying ototoxic drug-induced hearing loss and vestibular deficits. In this eBook, we present some of these advances and highlight gaps where further research is needed. Selected articles discuss candidate otoprotective agents that can ameliorate the effects of ototoxicity in the context of how they illustrate cellular mechanisms of ototoxicity. Our goal in illustrating these advances in mechanisms of ototoxicity is to accelerate the development of clinical therapies that prevent or reverse this debilitating disorder.