Y3: Monocular and Binocular Visual Acuity Changes with Luminance-modulated and Contrast-modulated Letters in Visually Normal Eyes throughout Adulthood

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ABSTRACT

Introduction: Evidence that human visual performance declines with normal ageing abounds. However, age-related visual acuity (VA) changes with contrast-modulated stimuli still remain unclear. This study was conducted to evaluate the effect of healthy ageing on visual acuity using luminance-modulated (LM) and contrast-modulated (CM) letter stimuli. Methods: We measured VA with LM and CM letter stimuli monocularly and binocularly in healthy and visually normal adults aged between 21 to 70 years old. Results: VA with LM letters was better than that with CM letters (p<0.05). There was a significant decrease in VA with ageing for both stimulus types (p<0.05). Throughout adulthood, binocular VA was better than monocular VA (p<0.05) and binocular summation ratio for CM letters was significantly higher than that for LM letters (p<0.05). Piecewise models showed that VA with LM letters (monocular and binocular) improved (logMAR vs age slope of ~0.013) until the age of 35±0.90, followed by a decline (slope of ~ 0.009) with increasing age. A similar trend is observed for monocularly viewed CM letters. However, for binocularly viewed CM letters, the best VA was obtained in our youngest age group up to age of 37±5.88 followed by a decline with increasing age. Conclusion: A young binocular visual system may give advantage for resolving CM letters over LM letters and older age. VA measurements with contrast-modulated stimuli might be useful to detect subtle binocular anomalies which would be missed if measured with luminance-modulated stimuli.

Y4: Time-Kill and Scanning Electron Microscope Studies of Pterostilbene against Human Pathogens

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ABSTRACT

Introduction: Pterostilbene is an analogue to resveratrol which is found in blueberries and grapes. The antibacterial activity of pterostilbene in combination with gentamicin against six strains of Gram-positive and Gram-negative bacteria were investigated. Methods: The minimum inhibitory concentration of pterostilbene were determined using microdilution technique whereas the antibacterial activities of pterostilbene in combination with gentamicin were assessed using time-kill kinetic study. Scanning electron microscopy (SEM) was used to study the morphological alteration of the bacteria cells treated by pterostilbene. Results: Results of the present study showed that pterostilbene exhibited inhibitory effects against three bacteria strains as followed: Staphylococcus aureus ATCC 25923, Escherichia coli O157 and Pseudomonas aeruginosa 15442. The time-kill study showed that combination effects of pterostilbene with gentamicin was indifference which did not significantly differ from the gentamicin treatment. Furthermore, time-kill study also showed that the growth of bacteria was completely attenuated within 24 hours treatment with 0.5 × MIC of pterostilbene and gentamicin. The SEM results confirmed that the pterostilbene-treated S. aureus and E. coli cells were damaged, showing formation of pores and blebs in the cell wall of the bacteria, while significant changes in cell shape were observed in S.aureus. Conclusion: The identified antibacterial effects could be of effective therapeutic value against bacterial infections.