## P29

**Naltrexone from Alcoholism to Corneal Wound Healing: a Formulation Approach for Treating Diabetic Keratopathy**

Hamdy Abdelkader(1), Charles NJ McGhee(2), Raid G Alany(1).
*(1) School of Pharmacy, (2) Department of Ophthalmology, the University of Auckland, Auckland, New Zealand*

**Objective.** Development of niosome (non-ionic surfactant vesicle) formulations encapsulating Naltrexone. These formulations are intended for topical ocular application for the treatment of diabetic keratopathy.
**Methods.** Naltrexone-loaded niosomes were prepared from different classes of surfactants using two methods, thin-film hydration (TF) and reverse-phase evaporation (REV). The resultant dispersions were characterized using plane, polarized light microscopy and cryo-scanning electron microscopy (Cryo-SEM). The effect of surfactant hydrophilic lipophilic balance (HLB) and cholesterol content on niosome's size and Naltrexone entrapment was investigated.
**Results.** Maltese cross textures were evident under polarized light. Mean vesicle sizes ranged from 5±1.2 to 9±1.5 and 0.88±0.2 to 3±0.07 μm for thin TF-based vesicles and REV-vesicles. Cryo-SEM micrographs revealed rose-shaped structures with Brij 72. The effect of cholesterol level on the entrapment efficiency (EE%) of Naltrexone was bimodal. EE% increased with increasing cholesterol level until a particular value, after which any further increase in cholesterol concentration resulted in a decreased EE%.
**Discussion.** The marked difference in niosomal sizes suggested the vesicle size is highly dependent on the method of preparation. The cryo-SEM images confirmed the multilamellar structure of the vesicles prepared by TF method.The positive effect of cholesterol on EE% is due to the intercalation of cholesterol between the bilayer. Cholesterol can intercalate between surfactant molecules and subsequently decrease the membrane permeability to the water soluble drug. Any further increase in cholesterol level (>30% mole/mole with Span 60 and Span 40), restricted the bilayer's ability to accommodate further cholesterol molecules.

## P30

**An examination of the essential oils of Tasmanian *Kunzea ambigua*, other *Kunzea spp.* and commercial kunzea oil**

Thomas, J (1), Narkowicz, CK (1), Jacobson, GA (1), Davies, NW (2)
*(1)University of Tasmania, Hobart, Tasmania, (2) Central Science Laboratory, Hobart, Tasmania*

**Introduction:** Genus *Kunzea* (after Gustav Kunze) is indigenous to Australia and New Zealand and includes approximately 42 species of woody shrubs. *Kunzea ambigua* (Smith) Druce 1917, genus *Kunzea,* family Myrtacea, is endemic to north east Tasmania, as well as the Furneaux Islands and eastern coastal regions of Victoria and southern New South Wales. The current investigation describes the leaf essential oils extracted from one mainland Australian and four Tasmanian examples of *Kunzea ambigua*. This study has also analysed the volatile oils isolated from the Western Australian species (n=4) and commercially produced kunzea oil. The main objective of this chapter was to analyse the volatile constituents of kunzea oil and to examine essential oil compositional variation within a small selection of Tasmanian and mainland Australian examples of *K. ambigua* and between a selection of *Kunzea* spp. from eastern and western Australia.
**Methods:** The oils were obtained by hydro-distillation of the aerial parts of plant material. Qualitative analyses of the oils were carried out by combined gas chromatography-mass spectrometry (GC/MS). Quantitative analyses of the terpene components of the essential oils were performed by gas chromatograph coupled with flame ionisation detector (GC/FID).
**Results:** A total of 64 components were detected in the studied oils. Ducane kunzea oil contained monoterpenes (70.0%) including α-pinene (48.3%), 1,8-cineole (14.5%) and α-terpineol (1.9%). Oils from individual *K. ambigua* plants varied significantly in their content of α-pinene (0-62.5%), 1,8-cineole (0-11.2%), bicyclogermacrene (0.4-14.0%), spathulenol (0.5-12.2%), globulol (0.5-22.6%) and viridiflorol (0.3-3.08%). The oils from five other *Kunzea* spp. had significant compositional differences from each *K. ambigua* oil. *Kunzea* sp. 'Badja Carpet' had a high β-pinene content (56.1%), *K. muelleri* contained significant levels of allo-aromadendrene (8.0%), spathulenol (7%) and, among all the analyzed oils, it had the highest levels of bicyclogermacrene (15.7.). *K. affinis* contained significant level of p-cymene (26.2%) and γ-terpinene (12.2%) and *K. parvifolia* possessed an oil rich in γ-terpinene (36.5%) and p-cymene (5.0%)
**Discussion:** All the studied *Kunzea* spp. were found to be different in their essential oil profiles both qualitatively and quantitatively. Using a more extensive survey of this genus, it could be possible to draw conclusions about chemotypic variation and evolutionary relationships within the genus.