preservative-free glaucoma drugs were studied *in vitro* by exposing human corneal and conjunctival epithelial cells (HCE and NHC) to these drugs. The goal was to identify if any of the differentially expressed proteins are linked to inflammatory pathways.
Methods: HCE and NHC cells were exposed to either preservative-free prostaglandin tafluprost, preserved latanoprost or preservative BAC for 24 hours and the proteomic profiles of treated and untreated cells were analyzed with NanoLC-TripleTOFMS mass spectrometry using iTRAQ labeling. A dilution of 1:300 was applied to tafluprost and latanoprost. BAC concentration of 0.000067% was used, which is equal to the BAC concentration in 1:300 diluted latanoprost. Mixed-effects ANOVA model was implemented to normalized data for statistical analysis and q-value adjustment was used to account for multiple testing.
Results: Statistical analysis identified 29 differentially expressed proteins for NHC cells (fold change>1.25 or <0.8, q-value<0.25) and 28 for HCE cells (fold change>1.5 or <0.67, q-value<0.25). For the NHC cell line, interesting proteins include INHA(1.491.07,p=0.0005) and PSMB8(2.521.32,p=0.008), which are both related to apoptosis and were overexpressed in cells receiving BAC. For the HCE cell line, particularly interesting were proteins HSPD1(1.641.13, p=0.008), OAS3(1.821.17,p=0.01) and LAMP1(7.851.81,p=0.01) which were connected to immune system activation. MYL6, MYL12A and MYH9 were all highly over-expressed in preservative-treated samples in HCE cells. Two of these proteins are directly connected to the immune system via leukocyte transendothelial migration (MYL12A) and phagocytosis (MYH9).
Conclusions: Proteins related to the immune response and apoptosis were identified as statistically significant for the BAC induced changes with the induction of apoptotic pathways and inflammation in both corneal and conjunctival epithelial cells. These potential novel proteomic biomarkers will be further analyzed in ongoing clinical studies of glaucoma patients.
Commercial Relationships: Janika Nättinen, None; **Antti Jylhä**, None; **Ulla Aapola**, None; **Roger W. Beuerman**, None; **Matti Nykter**, None; **Juha Kesseli**, None; **Hannu M. Uusitalo**, None

Program Number: 1979 **Poster Board Number:** D0222
Presentation Time: 11:00 AM–12:45 PM
Corneal Hysteresis (CH), Central Corneal Thickness (CCT) and Retinal Nerve Fiber Layer (RNFL) Thickness in Obstructive Sleep Apnea Syndrome (OSAS)
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Purpose: OSAS is associated with hypoxia and hypercapnea which may cause a variety of changes to ocular structures. The purpose of this study was to look at CH, CCT and RNFL thickness in OSAS patients. Intraocular pressure (IOP), Humphrey visual field (HVF) global indices and optic disc parameters were also evaluated in these patients.
Methods: Patients who underwent overnight sleep studies (polysomnography) as part of the investigation of OSAS were recruited at the University Malaya Medical Centre, Kuala Lumpur. Best corrected visual acuity was measured, followed by CCT measurement using Lenstar optical biometry and then 24-2 SITA-Standard HVF assessment. CH was measured using a Reichert Ocular Response Analyzer, after which Goldmann applanation tonometry and gonioscopy were performed. Finally, the pupils were dilated and disc parameters including RNFL thicknesses and average cup: disc ratio were measured using Ocular Coherence Tomography. Only one eye was considered for each patient. Unpaired t-tests were employed for statistical analysis.
Results: 80 patients (49 males, 31 females) were included in this study. The Apnea Hypopnea Index divided them into normal, mild, moderate and severe OSAS. The normal and mild categories (47.5%) were then collectively called Group 1, and the moderate and severe categories (52.5%) were called Group 2. Patients in Group 2 had lower CH (9.8±1.5 vs 10.4±1.2 mmHg, p=0.049). CCT in Group 2 was higher (543.6±31.0 vs 535.3±24.6 μm) but this was not statistically significant (p=0.190). IOP in both groups were similar (15.4±2.7 vs 15.5±2.6 mmHg, p=0.944). Cup:disc ratios were significantly higher in Group 2 (0.56 ±0.11 vs 0.50±0.13, p=0.041). Average and quadrant RNFL thicknesses, as well as HVF global indices all showed no statistically significant differences between the 2 groups (p>0.05).
Conclusions: Patients with moderate to severe OSAS have lower corneal hysteresis and increased cup:disc ratios as compared to normal to mild OSAS. As the two parameters can be associated with glaucoma, screening of patients with moderate to severe OSA is advisable.
Commercial Relationships: n suchitra m nadarajah, None; **Mohammadreza Peyman**, None; **Norlina ramli**, None; **Amir Samsudin**, None; **Mimiwati Zahari**, None

Program Number: 1980 **Poster Board Number:** D0223
Presentation Time: 11:00 AM–12:45 PM
Macular pigment optical density response following oral dietary macular pigment supplementation in glaucoma
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Purpose: Low macular pigment optical density (MPOD) has previously been demonstrated in patients with glaucoma. This study was designed to investigate the MPOD response to oral dietary macular pigment (MP) supplementation in glaucoma patients.
Methods: Eighty-eight subjects with glaucoma were recruited into the Macular Pigment and Glaucoma Trial (ISRCTN56985060), a placebo-controlled, double-masked and randomized clinical trial. Subjects were assigned with equal probability to placebo (n = 44) or treatment arms (n = 44), which comprised a daily oral supplement containing 10mg lutein, 2mg zeaxanthin and 10mg meso-zeaxanthin for a period of 6 months. All subjects underwent a series of vision-related tests including the measurement of MPOD at 0.25, 0.50 and 1.00 degrees of retinal eccentricity using customized heterochromatic flicker photometry. Fourier-domain optical coherence tomography was performed to analyze the ganglion cell complex (GCC), which was used to stratify subjects into those with foveal involvement versus those without. All data were collected at baseline and at 6 months.
Results: Eighty-three subjects (44 male, 39 female); mean age (±SD), 65 (10), range 36-84 years completed the trial. At final visit, central MPOD increased significantly in the treatment arm. Mean MPOD (SD) at 0.25 degrees of retinal eccentricity was 0.25(0.12) at baseline vs 0.30(0.12) at follow up (p=0.01); and 0.21(0.10) vs 0.25(0.10) at 0.50 degrees of retinal eccentricity (p=0.003). There was no statistically significant response in the placebo arm (p>0.05 for all eccentricities). Within the intervention group, a significant MPOD response was observed across both the fovea-involved and fovea-not-involved groups.
Conclusions: MPOD can be increased in glaucoma patients with oral MP supplementation. The level of MPOD increase, however, was small relative to increases previously reported among normal and age-related macular degeneration subjects. There may be a potential role of MP replacement therapy in glaucoma, but would require a supplementation study over a longer duration.