

Literature talk  
Hua Fei  
Room: FW 300  
Time: 1:00pm, Friday, December 5<sup>th</sup>

## Lipids of human meibum: mass-spectrometric analysis and structural elucidation

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### Abstract:

Tears are formed by tiny glands that surround the eye. Meibomian gland (MG), located in the eyelids of humans and other mammals, is a major source of various lipids that participate in formation of the tear film lipid layer. The protective power of the tear film lipid layer should directly relate to the chemical composition of the lipid layer. In order to further evaluate the structures of the compounds detected in normal human meibomian gland secretions (MGS) collected from individual subjects, and collect more information about the components in human MGS, the ion trap atmospheric pressure ionization mass spectrometry analysis (API MSn) with direct infusion of the samples was conducted in this research to perform multiple sequential fragmentations of the analytes. The samples of MGS and a model mixture of lipids composed of several standard lipids was analyzed using high-pressure liquid chromatography (HPLC) experiments with APCI detection of the analytes (HPLC API MSn). The major precursor ions were isolated and subjected to further sequential fragmentation in MSn experiments, and their fragmentation patterns were compared with those of authentic lipid standards. In the negative-ion mode, an apparently new group of lipid compounds with  $m/z$  values of 729, 757, and 785 that were tentatively identified as anionogenic lipids of the diacylglycerol family were found in the secretions. Contrary to earlier studies, only trace amounts of phosphocholine-containing lipids were detected in MGS by API MSn. The dominant species of the nonpolar lipids were oleic acid-, stearic acid-, and linoleic acid-based WEs with fatty alcohol moieties ranging from C18:0 to C30:0 and with their general molecular formula separately  $C_nH_{2n-2}O_2$ ,  $C_nH_{2n}O_2$  and  $C_nH_{2n-4}O_2$ . The other major species were cholesterol ester (Chl-E), oleic acid (OA), and cholesterol (Chl). These observations suggest that MGs are a major source of nonpolar lipids for human TFL, whereas more-polar PL, ceramide, and fatty acid amide components of the TFL should be supplied through other secretory mechanisms.