# Lipogenic activity of Selenium Sulfide (SeS<sub>2</sub>) and its role in enhancing lipid production in Meibomian Glands

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### BACKGROUND

- Meibomian Gland Dysfunction (MGD) is the leading cause of Dry Eye Disease (DED). Reduced secretion of lipids due to obstructive MGD leads to instability of the tear film and drying of the ocular surface.
- SeS<sub>2</sub>, a potent keratolytic agent, has improved glandular function in patients with MGD in several studies.
- Beyond it's ability to alleviate the obstruction it has been suggested that SeS<sub>2</sub> may further Beyond it's ability to alleviate glandular obstruction, it has been suggested that SeS2 may also increase lipid availability. Patients treated with SeS<sub>2</sub> medicated shampoo for seborrheic dermatitis often complain of excessive oil on their scalp. Using a sebometer to measure increased amounts of sebum over the skin following treatment with SeS<sub>2</sub> shampoo confirmed patient do experience increased oil production.
- Meibocytes and Sebocytes originate from the same embryonic origin and share strong similarities in their development, structure and holocrinic mode of lipid secretion. Thus, increased lipid from Sebocytes may indicate that such an effect is possible in Meibocytes.

#### **OBJECTIVES**

Test the hypothesize that SeS<sub>2</sub> can directly induce lipid production in lipid producing cells.

#### **METHODS**

The ability of SeS<sub>2</sub> to enhance lipid secretion was evaluated in two human sebocytre models: **3-D** and **2-D** cultures (SEBO662 SEBO662AR, respectively; BioAlternative, France).



**Step one:** Cytotoxicity assay, using a standard MTT reduction assay **Step two:** Stimulation with SeS<sub>2</sub> and one or two known lipid stimulators (Lipogenic mix [Bioalternative proprietary] and Testosterone). The treated cultures were incubated for 7 or 14 days. Bodipy or Oil-Red-O stained culture sections were evaluated to determine lipid production, in 2D and 3D cell culture, respectively



### **CONCLUSIONS**

Through their lipid secretion the Meibomian glands play a crucial role in maintaining a healthy ocular surface and its optical quality. Located in the upper and lower eyelids, the oil-producing Meibomian glands are modified sebaceous glands and are responsible for secreting the lipid layer (meibum) that forms the outermost layer of the tear film. The lipid layer plays a crucial role in maintaining a healthy ocular surface and its optical quality. These in-vitro results suggest that selenium sulfide has the potential to improve Meibomian Glands' function by pushing cells to their maturation state and therefore increasing lipid production. Such outcome is likely to play a role in the observed benefit of SeS<sub>2</sub> in improving the clinical outcome of MGD patient

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