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**Abstract Title:** **Aromatase Influence on Gene Expression in the Meibomian Gland**

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**Purpose:** Recently, we discovered aromatase mRNA in the human meibomian gland. Aromatase is a cytochrome P450 enzyme that catalyzes the formation of estrogens from androgens and contributes to a number of sex-specific differences in a variety of tissues. We hypothesize that this enzyme, through its control of estrogen biosynthesis, plays a critical role in meibomian gland function. To begin to test this hypothesis, we examined the impact of aromatase on gene expression in the meibomian gland.

**Methods:** Meibomian glands were obtained from adult, age-matched wild type (WT) and aromatase knockout (ArKO) mice (n = 5/sex/group; n = 3 separate experiments). Tissues were pooled according to sex and group, processed for the isolation of total RNA, and analyzed for differentially expressed mRNAs by using GE CodeLink Bioarrays (n ~ 20,000 genes/array). Array data were evaluated with GeneSifter bioinformatics software and statistical significance (p < 0.05) was determined by using the Student's t-test. Gene expression was confirmed by the use of Affymetrix GeneChips.

**Results:** Our results show that aromatase significantly influences the expression of numerous genes in the meibomian gland. Aromatase presence (i.e. WT) upregulated over 500 genes (e.g. resistin), whereas its absence (i.e. ArKO) upregulated more than 260 genes (e.g. interleukin 13 receptor, 2 alpha), in both female and male meibomian glands. Aromatase also exerted a significant effect on many gene ontologies, including a stimulation of those related to electron transport and GTPase regulation and a suppression of genes associated with the defense response and lyase activity. Of particular interest, most of the genes influenced by aromatase in the meibomian gland were sex-specific.

**Conclusions:** Our findings demonstrate that aromatase, an enzyme that regulates estrogen production, has a significant impact on gene expression in the meibomian gland. In addition, our results show that the nature of aromatase influence on the meibomian gland is sex-dependent.

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