

Purpose: To assess the relative contribution of exogenous and endogenous factors to alopecia in genetically identical males.

Methods: Male twins completed comprehensive questionnaires followed by standardized digital photography. Sputum samples were also obtained for salimetric analysis. Midline, temporal, and coronal hair loss were measured using Adobe© Photoshop©. Data analysis was performed to determine the relationship between hair loss measurements, genetics, sputum testosterone levels, and questionnaire items.

Results: A total of 66 males with a mean age of 51.32 (23 – 82) were available for analysis. Genetics was the strongest predictor of midline hair loss ($F 10.491$, $p = 0.002$). A positive smoking history and increasing pack years was associated with increased midline hair loss ($F 6.89$ and 8.433 ; $p = 0.011$ and 0.008). In addition, increasing sun exposure and a history of dandruff was associated with increased midline hair loss ($F 4.491$ and 4.088 , $p = 0.039$ and $p = 0.047$). Cumulative sun exposure and a history of cancer were associated with significantly more temporal hair loss. Age was a stronger predictor of coronal hair loss than genetics ($F 6.409$ vs. 4.033 ; $p = 0.014$ and 0.049). Again cumulative years of sun exposure and history of cancer were significant predictors of coronal hair loss. Those twins who had a history of hypertension and did not regularly exercise also had significantly more coronal hair loss ($F 6.602$ and 8.367 ; $p = 0.017$ and 0.005). 22 male twins (mean age 50.09) provided sputum samples for evaluation of testosterone levels. Genetics was a significant predictor of testosterone levels ($F 5.567$; $p = 0.029$) while age was not. However, the combination of age and genetics was a significantly better predictor of male testosterone levels than either alone ($F 6.019$; $p = 0.009$). Increased sputum testosterone levels were a significant predictor of decreased male temporal hair loss ($F 12.197$; $p = 0.002$).

Conclusions: In our cohort, there was a significant difference in the relative contribution of genetics and endogenous factors to hair loss based on anatomic location. The effects of smoking, sun exposure, and medical conditions may offer putative targets for therapeutic intervention. The synergistic significance of age and genetics regarding coronal hair loss suggests a unique chronological phenomenon. The seemingly protective association between elevated testosterone levels and temporal hair loss may offer support for the use of 5-alpha reductase inhibitors.