

7-2016

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## Recommended Citation

Motofei, I. G., Rowland, D. L., Georgescu, S. R., et al. (2016), Are hand preference and sexual orientation possible predicting factors for finasteride adverse effects in male androgenic alopecia?. *Experimental Dermatology*, 25(7): 557–558. doi:10.1111/exd.13003

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# Are hand preference and sexual orientation possible predicting factors for finasteride adverse effects in male androgenic alopecia?

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**Abstract:** Sexual side effects of finasteride seem to be redoubtable, being encountered not only during therapy but also after treatment cessation. Consequently, any possible clinical/paraclinical elements that might predict these adverse effects would be useful in the selection of a therapeutic strategy for male androgenic alopecia. Previous published studies show that some compounds that interfere with sexual hormones can decrease sexual activation and response, according to hand preference (as reported for finasteride and tamoxifen) and according to sexual orientation (as noted for bicalutamide). Our

preliminary published data and the arguments presented here suggest that these two individual parameters might be used by dermatologists in the therapeutic approach of male androgenic alopecia, so as to alert specific subsets of men, prior to treatment, of the potential increased risk for developing adverse effects to finasteride.

**Key words:** finasteride – hand preference – male androgenic alopecia – sexual orientation – sexual side effects

Accepted for publication 22 February 2016

## Background

Finasteride adverse effects seem to be encountered in male androgenic alopecia only in a subset of men, consisting especially in mental and sexual disturbances (1). Such selectivity was reported also for some hormonal drugs, which induce adverse effects especially in subjects presenting a certain dominant hand and/or sexual orientation (2–4). Starting from this general perspective, [2] we advance the hypothesis that (mental and sexual) adverse effects of finasteride could be correlated not only with the dominant hand but also with sexual orientation of subjects taking the drug.

## Premises

Studies related to finasteride showed that the frequency of adverse effects is significantly higher when patients are informed (prior to treatment) about these possible adverse effects, and lower when this information is omitted (5). As a consequence, the reported adverse effects strongly depend on the study design. For this reason, in a previously published study, we alerted subjects to both possible positive and negative finasteride side effects, assessing separately the results in right-handed vs. left-handed patients. Sexual side effects of finasteride were generally related to handedness, with right-handed men presenting no effect or lower sexual function on most subscales of IIEF (International Index of Sexual Function) (2).

Using a relatively similar study configuration, tamoxifen induced sexual side effects in both right- and left-handed men, but to a greater extent in left-handed men as indicated by interaction effects (3). Regarding sexual orientation, studies with antihormonal compounds such as bicalutamide suggest that the frequency and severity of sexual side effects might be [3] greater in homosexual than heterosexual men (4).

## Hypothesis

These previous studies suggest that adverse effects of finasteride might be correlated with individual parameters of subjects, such as the dominant hand and sexual orientation. The intention of this study was (i) to present/explain this correlation through a psycho-physiological perspective; (ii) to suggest how this premise might be tested/verified in dermatological practice and (iii) to highlight its relevance with respect to the therapeutic management of male androgenic alopecia.

Physiologically, recent imagistic studies have shown that male sexual pheromones act on the left hemibrain of homosexual men (left angular gyrus, left caudate nucleus, left amygdala, etc.), while the female sexual pheromones act on the right hemibrain of heterosexual men (right hippocampus, right parahippocampal gyrus, right amygdala, etc.) (6–9). In contrast, sexual hormones might be related not only to sexual orientation (see bicalutamide) but also to the lateralized process of hand preference (see finasteride and tamoxifen). Thus, the lateralized process of sexuality (related to pheromones) and the lateralized process of hand preference (related to hormones) could be physiologically interconnected within the brain.

Psychologically, lateralization of cognition increases mental efficiency/ability (s1), while poor lateralization predisposes individuals to mental dysfunctions or even severe mental illnesses, such as schizophrenia (s2). But the mind/attentional focus involved in cognition would be related not only to sexual activation but also to hand preference, such that the lateralization of sexuality and lateralization of hand preference could be interconnected through the lateralization process of cognition, too.

As a working conclusion/[4] hypothesis, sexual hormones, sexual pheromones/sexual orientation, handedness and cognition

might all be interrelated, presumably due to the overall lateralized processes of the brain (2, 3).

### How to test the hypothesis

Bicalutamide induces sexual side effects especially in homosexual men; finasteride induces sexual side effects predominantly in right-handed persons. It would be interesting to investigate [5] finasteride side effects, taking into account concomitantly hand preference and sexual orientation, within the same sample. We predict that a very specific subgroup of men (right-handed, homosexual men, for example) might exhibit an increased frequency and magnitude for finasteride side effects.

Sexual side effects are easily and reliably quantified through the IIEF; hand preference could be assessed using EHI (Edinburgh Handedness Inventory), while sexual orientation could be obtained based on subject self-report.

We have already performed a study in this regard (s3, s4) that confirmed the previous expectation regarding hand preference (2), but the number of homosexual participants in our sample was too small. [6] Thus, we believe a larger study including many participants, a significant number of whom are homosexual men should help clarify (inter) relationships among sexual orientation, hand preference and finasteride adverse effects.

### Relevance and perspectives

Such information could be useful to dermatologists in the therapeutic approach to male androgenic alopecia. Patients indicating

a certain sexual orientation and hand preference [7] (right-handed homosexual men?) might be forewarned of an increased risk/sensitivity regarding potential adverse effects to finasteride. At the same time, patients belonging to the low-risk group for adverse effects would likely show better compliance to finasteride treatment and, furthermore, likely avoid complicating depressive symptoms and/or suicidal thoughts sometimes encountered among former users of finasteride with persistent adverse effects.

### Acknowledgements

This work was partly supported by a scientific project of the Ministry of National Education, CNCS-UEFISCDI, project number: PN-II-ID-PCE-2012-4-0409.

### Author Contribution

Ion G. Motofei, David L. Rowland and Simona R. Georgescu designed the hypothesis and wrote the paper. Tampa Mircea and Bogdan C. Baleanu wrote the paper. Stana Paunica designed the hypothesis.

### Conflict of Interests

The authors have declared no conflicting interests.

### Supporting Information

Additional Supporting Information may be found online in the supporting information tab for this article:

**Data S1.** Supplementary material.

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DOI: 10.1111/exd.13012

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Letter: *Mouse Mutants with Absent Skin Phenotype*  
Section Editor: Michael Rendl, New York

## Limited impact of fibromodulin deficiency on the development of experimental skin fibrosis

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**Abstract:** Excessive production of collagen is the hallmark of fatal diseases of fibrosis such as systemic sclerosis. Overexpression of the proteoglycan fibromodulin (FMOD) has been associated with improved wound healing and scarless repair. In this study, we have investigated the consequences of FMOD deficiency on the development of experimental skin

fibrosis. Using immunohistochemistry, we identified FMOD in both human and murine fibrotic skin. In the bleomycin model of skin fibrosis, FMOD<sup>-/-</sup> mice developed skin fibrosis to a similar degree compared to FMOD<sup>+/+</sup> mice. Analysis of skin ultrastructure using transmission electron microscopy revealed a significant reduction in collagen