BENCHSIDE DISPATCHES

DEALING WITH SEX BIAS IN BASIC DERMATOLOGY RESEARCH

AN INTERVIEW WITH BETTY KONG, MD, PHD

Welcome to the next installment of Benchside Dispatches, a series of interviews with top researchers in the field of dermatology intended to highlight important advances in the care of medical skin disorders. Over the course of this series, prominent thought leaders have explored the latest research in specific dermatologic disease states.

In this installment, Betty Kong, MD, PhD discusses the problem of sex bias in basic dermatology research and the implications for patient care. Dr. Kong is a Dermatology Resident at Northwestern University Feinberg School of Medicine in Chicago. She and her colleagues published "Mind the Gap: Sex Bias in Basic Skin Research" in the Journal of Investigative Dermatology in January 2016.

What are potential implications of over-representation of male cells or animals and under-representation of female in basic research?

Betty Kong, MD, PhD: Many skin diseases have a predilection for one sex over the other. For example, lupus, rosacea, and certain types of hair loss affect women more than men, while men have higher mortality rates from melanoma. The mechanisms for these differences are poorly understood and further exacerbated by lack of comparative studies between sexes in basic skin research. Identifying differences between males and females early on in research has tremendous implications for informing downstream clinical trials and therapy.

What did your analysis find? What are immediate implications for trial design?

Dr. Kong: We found that the majority of studies conducted using cell lines or animal models did not report the sex of the animal or person from which the cells were originally derived. Of those that did report this information, most used tissue from one sex, either male or female, but not both. In particular, in studies that used cell culture, there were significantly more male derived cells than female. This discrepancy is partially explained by the fact that discarded neonatal foreskin from circumcision is a common and easily accessible source of tissue for researchers in epithelial biology. These results suggest that many clinical trials are designed based on incomplete data from only one sex, which increases the risk of inappropriate therapy and harm for the non-studied sex.

What more do we need to learn about sex bias in basic skin research? Where would you like to see the research go now?

Dr. Kong: We need to know where these sex differences truly matter and where it may be less vital. Requiring use of both sexes, especially for animal models, tremendously increases the cost of research in an already limited funding environment. It would be great to develop a high throughput, cost-efficient way to quickly screen for sex-based differences that could inform downstream study design. We are also calling for scientific journals and grant funding agencies to require reporting of the sex of animals or cell lines used in basic skin research; these changes are already starting to occur.

As a researcher, why were you interested in this?

Dr. Kong: I have had a long-standing interest in women's health and completed my doctoral dissertation in a reproductive biology lab, where we discussed and developed fertility preservation options for both males and females about to undergo cancer treatment. Sex-based differences have a direct impact on patient care, and as we enter an era of personalized medicine, sex-based differences will undoubtedly influence choice of intervention.

What's next for you? What other research interests are you pursuing?

Dr. Kong: I am currently completing my dermatology residency at Northwestern University. I am pursuing a project on different genetic and epigenetic signatures of different melanoma subtypes. I also have a particular interest in identifying molecular differences in melanoma from men compared to women. It is well known that melanoma incidence rates are higher in younger females and older males, with a higher mortality rate from melanoma in males, so it would be very interesting to identify sex-based and hormonal differences that could explain these epidemiologic findings. ■