

Genetics Education in US Dermatology Residency Programs: A Survey-Based Study

Working knowledge of the principles of genetics is important in the evaluation of patients with complex diseases across all medical specialties. In dermatology, genome-wide association studies have generated novel insights into the immunopathogenesis of psoriasis, atopic dermatitis, and alopecia areata.¹⁻⁴ Familiarity with inheritance patterns and available genetic and molecular tests are therefore useful in the workup, diagnosis, and family counseling of patients with evidence of genetic skin disease. This is especially important given that genodermatoses encompass 560 distinct cutaneous disorders, many of which have overlapping features.⁵ Although these topics are taught in medical school and residency education, greater emphasis is needed at all levels in this age of rapidly expanding technology and increased understanding of the human genome.

We designed a cross-sectional study to assess how genetics topics are incorporated into curricula of dermatology residency programs in the United States. Of particular interest was to ascertain how genetics topics are taught, if resident competency in these topics are assessed, and whether the degree of emphasis placed on genetics/genomics topics varies among residency programs. A voluntary online survey was distributed to directors of accredited US dermatology residency programs via the Association of Professors of Dermatology electronic mailing list. Software from SurveyGizmo (Widgix LLC, Boulder, CO) was used for survey implementation and anonymous data collection.

This study was approved by the George Washington University Institutional Review Board.

A total of 44 residency program directors participated the survey, yielding a response rate of 38% (44 of 117) and a completion rate of 77% (34 of 44). The majority (61%, 25 of 41) had 5 or fewer years' experience as director, and 74% (31 of 42) were currently involved in research (TABLE). In assessing pediatric and adult dermatology, 70% (28 of 40) and 41% (17 of 41) of respondents, respectively, indicated that they *strongly agree* that genetics concepts

are important in these fields. Only 40% (16 of 40), however, rated genetics education as *very important* in the training of dermatology residents. Principles of genetics relevant to skin disease are taught in nearly 80% of programs represented, with 82% incorporating periodic assessments of resident competency in various genodermatoses. A total of 25% of program directors (10 of 40) reported that their curriculum should place higher priority on such topics, with 51% (20 of 39) indicating that their residents likely have knowledge gaps in this area (FIGURE). Lectures were the most frequently utilized teaching tools to improve resident understanding of genetic skin diseases (92%, 34 of 37), followed by readings (75%, 27 of 36) and small group discussion (74%, 29 of 39).

Potential limitations of this study include use of a nonvalidated survey, suboptimal response rate, and response bias. Nevertheless, the results bring attention to possible deficiencies in how the teaching of

TABLE
Dermatology Residency Program Characteristics

Survey Item	n (%)
Program location (N = 42)	
Northeast	13 (31)
Midwest	9 (21)
Southeast	8 (19)
Southwest	5 (12)
West	7 (17)
Program size (N = 41)	
1-5 residents	9 (22)
6-10 residents	12 (29)
11-15 residents	9 (22)
16-20 residents	5 (12)
21 residents or more	6 (15)
Director years postresidency (N = 42)	
Less than 1 year	1 (2)
1-5 years	4 (10)
6-10 years	8 (19)
11-15 years	10 (24)
16-20 years	4 (10)
21 years or more	15 (36)
Years served as director (N = 41)	
Less than 1 year	2 (5)
1-5 years	23 (56)
6-10 years	6 (15)
11-15 years	4 (10)
16-20 years	1 (2)
21 years or more	5 (12)

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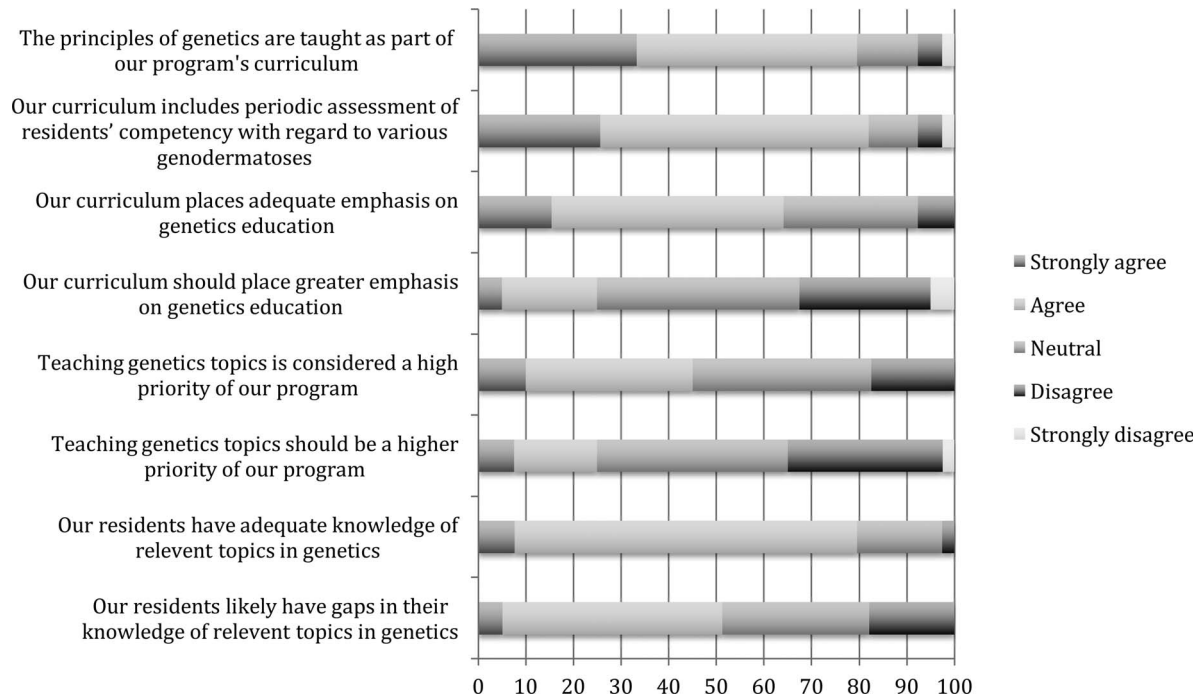


FIGURE
US Dermatology Residency Program Directors Assessment of Genetics Education Within Their Curriculum

genetics topics is currently approached, and suggest variable opinions surrounding the relative importance of genetics in the training of future dermatologists. We think recognition of the relevance of genetics concepts in the graduate medical training of dermatology residents is essential. Producing dermatologists with high levels of competency in genetics will aid in the management of patients with complex genetic skin disorders as medical knowledge evolves toward a deeper understanding of the human genome and gene therapies.

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References

1. Feramisco JD, Tsao H, Siegel DH. Genetics for the practicing dermatologist. *Semin Cutan Med Surg.* 2010;29(2):127–136.
2. Zhang XJ, Huang W, Yang S, et al. Psoriasis genome-wide association study identifies susceptibility variants within LCE gene cluster at 1q21. *Nat Genet.* 2009;41(2):205–210.
3. Esparza-Gordillo J, Weidinger S, Fölster-Holst R, et al. A common variant on chromosome 11q13 is associated with atopic dermatitis. *Nat Genet.* 2009;41(5):596–601.
4. Martinez-Mir A, Zlotogorski A, Gordon D, et al. Genomewide scan for linkage reveals evidence of several susceptibility loci for alopecia areata. *Am J Hum Genet.* 2007;80(2):316–328.
5. Feramisco JD, Sadreyev RI, Murray ML, et al. Phenotypic and genotypic analyses of genetic skin disease through the Online Mendelian Inheritance in Man (OMIM) database. *J Invest Dermatol.* 2009;129(11):2628–2636.