

**Priorities for Skin Biology
and
Disease Research**
Society for Investigative Dermatology

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The Society is a nonprofit organization comprised of over 1,800 members world-wide. This report was prepared by the Committee on Long-range Planning and Priorities at the request of the Board of Directors.

Mission

To advance and promote the sciences relevant to skin health and disease through education, advocacy, and scholarly exchange of scientific information.

Vision

The SID will be the pre-eminent organization for the science of skin health and diseases. It will be a leading purveyor of educational programming. It will promote a culture of discovery and serve as the premier forum for the exchange of scientific information relating to dermatologic research. It will build cross-disciplinary bridges to provide catalytic leadership in attaining intellectual, political, and financial support for skin-related scientific investigation. The SID will be—and be viewed as—a significant force in shaping public policy. As a result of recruiting, nurturing, and mentoring the next generation of scientists, it will be a financially robust and self-sustaining organization.

Committee on Long-range Planning and Priorities

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The Impact of Pain, Disfigurement, and Disability Caused by Skin Disorders Is Immense

- Skin cancer occurs in approximately 1 in 5 Americans, resulting in more than one death per hour.
- Poor wound healing capacity in the elderly and in those with chronic skin diseases often makes minor skin injuries or common skin diseases the precipitating event for costly interventions.
- In addition to adult and elderly populations, millions of children suffer from inherited and acquired skin diseases.
- Skin disorders are responsible for a significant percentage of occupational-disease claims nationally. In the course of a year, 65 million Americans are affected with an annual cost to society in lost wages and medical care of approximately \$39 billion.
- Millions of Americans with chronic diseases of the skin, hair and nails require medical evaluation and treatment to maintain their functionality and to decrease pain, severe itch, and dependency.
- Image and appearance are highly valued and are especially important in certain occupations.
- The importance of healthy skin may be best reflected by the billions of dollars spent yearly by Americans on consumer products for care of the skin, hair and nails.

Investment in Skin Biology Research Has Resulted in Breakthroughs That Have Enhanced the Health Status of Americans

- Genes responsible for skin cancer and inherited skin disorders have been identified, making targeted therapy possible.
- The molecular mechanisms of auto-immune and inflammatory skin diseases are better understood, allowing for the use of focused, selective immunosuppressive therapy with greater safety and efficacy.
- Oral medications to treat and prevent viral and fungal diseases have become available.
- Lasers have made possible the removal of disfiguring skin malformations.
- Modern phototherapy and photochemotherapy allow for more effective treatment of inflammatory skin disease, lymphoma, depigmenting disorders and auto-immune diseases.
- Retinoids and sunscreens have reduced the risks of poor wound healing and skin cancer in the elderly, in transplant patients, and in other populations.
- Painless transdermal drug delivery has become available.

Principles That Guide Our Recommendations

Basic and clinical research has dramatically improved our understanding of skin biology and has led to striking improvements in patient care. Furthermore, the skin represents a powerful and accessible model system for the study of basic cellular and molecular processes important during inflammation, wound healing, and tumorigenesis. Fundamental discoveries resulting from skin biology and translational research have yielded advances that are broadly applicable to human development and disease. Continued investment is required to fully capitalize on these ground breaking advances.

In the sections that follow, we offer recommendations for specific areas in which gaps exist in knowledge or resources. However, we strongly believe that the scientific community most effectively identifies and addresses the critically relevant research problems. Investigator initiated research--in the context of a rigorous and efficient peer review system--is essential for the continued discovery of new medical and surgical treatments for skin disorders. Large scale initiatives should be carefully considered and in general should provide infrastructure support for the scientific community rather than dictate specific types of research or research collaborations. Our recommendations reflect the view that resources should be directed at solving fundamental problems important to skin biology and disease. To sustain a healthy research enterprise, we suggest the following.

- The payline for approved research project grant applications should be maintained above the 20th percentile.
- The duration of approved grants should not be reduced to less than 4 years.
- Generalized administrative reductions of approved budgets should not exceed 10 percent.

Scientific Areas That Require Investment

Functional Studies Based Upon Genomics

Research over the past decade has led to the identification and cataloguing of numerous gene mutations that result in skin disorders. Functional studies at the cellular and molecular level are now needed to determine how these mutations cause skin pathology. An understanding of these processes is required in order to translate existing knowledge of gene mutations into new skin disease treatments.

Studies Directed at the Underlying Causes of Cutaneous Neoplasia and Inflammation

An exquisite balance between cell proliferation, cell death and differentiation underlies normal epidermal homeostasis. A focus is needed on understanding how changes in cellular signaling pathways lead to uncontrolled skin cell growth in the context of benign and malignant skin tumors and during inflammation. These studies will lead to new breakthroughs in patient-directed therapies for a range of skin diseases.

Skin Stem Cell Research

Funding for the identification, isolation, and application of adult keratinocyte stem cells is needed. Related work in the characterization of the stem cell niche and in the area of epithelial-mesenchymal interactions is also of high priority. These studies will yield fundamental new knowledge and will dovetail with initiatives in regenerative medicine, tissue engineering, and developmental biology.

High Risk Studies, Concept Grants, and Technical Development

Studies that involve significant risk/benefit should be supported to encourage development of new fields. Funding mechanisms could include no data "concept grants" to experienced investigators and funding for collaborations that enhance technical development and interdisciplinary engineering. These mechanisms of funding will unleash the creativity of experienced skin biology investigators.

Data-based Studies to Conceptualize, Define, and Measure the Burden of Skin Disease

A critical need exists to understand the burden of skin disease to patients and to society as a whole. This work will form the foundation for how skin disease is perceived, funded, and treated.

Development of Animal Models of Skin Diseases

Animal models for various skin diseases are needed to support basic research, drug development and testing, and for therapeutic development based on gene therapy and other emerging technologies. These animal models will provide a critical resource for a broad range of investigative approaches.

High Quality Clinical Trials Independent of Industry

A critical need in dermatology is the development and completion of rigorous, industry-independent clinical trials to determine the relative efficacy of competing compounds and therapies. These studies will lead to dramatic improvements in patient care.

Infrastructure Needs Critical to Skin Biology Research

Training and Career Development

Increased funding is needed to allow skin disease researchers to establish and maintain research programs. Career development and salary support for new and mid-career investigators is critical to ensure success of investigators that have entered skin biology research. In particular, programs are needed to stem the loss of physicians involved in cutaneous biology and dermatology research.

Scientific Collaborative Arrangements

Mechanisms to foster collaborations are required to facilitate research teams, to support scientific meetings, and to foster networks among researchers focused on rare diseases. The NIH should provide incentives for these groups to form naturally rather than dictating the composition of the groups or their focus.

Infrastructure Development

Individual institutions cannot provide infrastructure with the scope necessary to support modern biomedical research. Specifically, the development of centralized resources is needed for:

- reagents, both living and non-living;
- bioinformatics;
- tissue banks; and
- clinical research.

In addition, funding for institutions to develop and provide local services for advanced genomics and proteomics analysis is required to support research on human diseases, animal models of skin biology, and studies at the cellular and molecular level.

Administration of the Funding Process

Adopt Review and Regulatory Procedures that Facilitate Research and Address Societal Concerns

The NIH should play a lead role in working with federal, state and academic organizations to foster simplicity in the administration and regulation of all aspects of research. The need for simplified regulatory procedures and enhanced funding is particularly critical in the areas of clinical trials and drug development.

Streamline the Grant Proposal Review Process

The foundation for high quality research in all areas of skin biology and dermatology is an efficient, fair and rigorous peer review program. However, an improved and faster review system is needed, including a more streamlined application process. In addition, peer review panels need to be more knowledgeable in the type of research they review, and experienced investigators need to be more involved in the grant review process. Initiatives to ensure participation of established investigators should be considered to enhance the peer review process.