

THE
BASICS 

1 Why Skin?

Skin. The word conjures up many things—beauty, youth, grace, sex, illness, even art. Perhaps this is because our skin is the part of our body that we know best. We see it daily. We feel it. We feel through it. We groom it. We know right away when it's broken. We envy those whose skin is smooth as silk. We feel badly for those who are disfigured.

We think and speak daily about skin in ways we never pause to consider: Smooth as a baby's bottom. By the skin of our teeth. No skin off my nose. Shirts and skins. Skin, it seems, is both a part of our body and a metaphor for so much that goes on in our lives.

Medically, skin is the resilient living fabric that envelops our entire self. It is defined as the “tough, membranous tissue that forms the external covering of the animal body.” But skin is a lot more than just a membrane that covers. It is much, much more than plastic wrap that holds in our bones, organs, and blood like so many boxes on a pallet. In fact, the skin, our largest organ, is biologically *very* complex. Consider, for example, these amazing qualities:

- When we cut skin, it heals and makes new skin.
- Skin's complex layers of cells keep germs out 24 hours a day.

- Skin can tell if it has met an unwelcome plant, like poison ivy, and can remember the encounter years later.

Our skin, or integument, has molecules to shield us from the harmful rays of the sun, and it can change in specific ways to provide us with clues about how our insides are functioning.

In concert with our blood vessel system, skin helps retain moisture when necessary, just like a cactus, or diffuses excess body heat when we are exercising. In short, our skin is the house in which we live and our first interface with the world around us.

When we think of complex organs, the brain usually comes to mind first. Some might be impressed by the repetitive consistency of the heart or the amazing chemistry laboratory that is the liver. But in many ways, as you shall see, the skin itself is as complex as any of these other organs, steadfast in its service, and amazing in its chemistry.

The ultimate adaptability of the skin is due to its several layers. The *epidermis* is the top layer of skin cells. These cells divide and restore themselves at regular intervals, creating at the same time a protective layer called the *stratum corneum*. A second layer, called the *dermis*, depends heavily on a stretchy molecule called *elastin* and strong, cable-like bands called *collagen* to give skin its flexibility and strength. The dermis includes miles of tiny blood vessels that skirt to the surface of the skin, then plunge down into the deeper layers to transport nutrients and heat. Coursing through the dermis, as well, are lymph channels that escort away germs and other noxious elements. Throughout the skin one also finds unique cells that form an immunologic guard for the body, as well as a skein of specialized nerve endings, each with its own purpose. Some of these nerves can tell you you've been pricked by the pin of a dry cleaner's tag; others can warn that you are about to singe the side of your hand over a low gas flame; a third variety mediates the sensation of pressure and, unbeknownst to you, reminds you to turn while you are asleep so that you won't develop a pressure sore.

There is yet another dimension to skin: it is the medium through which we initially introduce ourselves to others. Our skin—close to four square meters of it—is the canvas upon which we craft our introduction to the world, often embellishing or altering it with makeup, dyes, tattoos, and other adornments. Skin can be the focus of religious rite, as in ritual circumcision, and the nexus of touch and thus an important means of conveying love and affection. Our skin has enormous social, sexual, and political implications.

It is, of course, through scientific discovery that our knowledge of skin advances. It was fascination with the science of this durable organ that led me eventually to choose to specialize in diseases of the skin. That choice in itself is a tale of discovery. When I was completing my residency in internal medicine at New York's Memorial Sloan-Kettering Cancer Center, I realized how much of the diagnostic knowledge in internal medicine is inferred from tests and scans. I decided that I was more comfortable examining and working with what I could see than what I *thought* I could see.

During my training at Memorial Sloan-Kettering Cancer Center in the early 1980s I was caring for young men dying from a condition then called Gay-Related Immune Deficiency, or GRID. Many had developed purplish skin lesions called Kaposi's sarcoma, which until that time had been seen almost exclusively in elderly men of Mediterranean extraction. The deep purple spots and lumps were popping up everywhere, and the pattern was different than the Old World type of Kaposi's sarcoma.

Something was up, but no one could figure it out. We thought there was a viral connection with the condition affecting these young men, but at that time no one had identified the human immunodeficiency virus (HIV) as a possible cause. Because of my awakening interest in skin and the opportunity to spend some extra time in the lab, I embarked on a project to transplant the tumor cells of Kaposi's sarcoma into immunologically neutered mice. The idea was that the tumors would grow in these mice because their immune system could not reject the tissue. We would then be better able to study the cancer and figure out its cause. I never got the tumors to grow, but my interest in the science of dermatology had been forged forever, as I learned to appreciate how the specialty combined the diagnostic skills of an internist, the technical skills of a surgeon, and the analytical skills of a pathologist.

I'm not sure when I first became aware of skin, but I have come to value the fact that on good days caring for the skin is an art, like the practice of medicine in general. The important difference for us dermatologists is that the results of our art are usually more readily apparent than those of the internist, radiologist, or pathologist.

During my dermatology training in the late 1980s enormous changes were taking place in the field. It might be said that dermatology had finally begun to emerge from being a minor character in the galaxy of medicine to becoming a shining star. New research technology made it possible to better explore some of the mysteries of the skin. For example, one special area of developing knowledge was of the skin as an organ of immunity.

As a dermatology resident at Yale–New Haven Medical Center, I did experiments on a factor isolated from blood that was responsible for fever and other mechanisms that help fight infection. I found that this compound, a type of immunologic chemical called *interleukin*, was elevated in patients with a severe form of psoriasis. Since then, it has become clear that our skin is not only an important component of our immune system, but that it manufactures a broad range of compounds in health and disease.

Another new development that began to focus attention on dermatology in the 1980s was a dramatic increase in the rate of new skin cancer cases. Deterioration of the ozone layer had become an important environmental and political concern and some epidemiologists suggested a link between skin cancer rates and this environmental change. More ultraviolet radiation was reaching the earth's surface, and thus potentially your skin's surface, whether you were lugging bags from the market to your car or golf clubs from the tee to the green.

A third factor affecting the increased importance of dermatology was a direct result of the famous baby boom. As this large group of Americans ages, our desire to continue to look young and turn back the clock of time becomes more pressing, and there are many, many more of us than ever before pursuing the goal of looking young while growing older. Dermatology is the medical field in which the scientific and medical bases for the vast majority of cosmetic procedures have been developed.

For all these reasons dermatology was a legitimate medical career choice for me. Nonetheless, I recall vividly a telephone conversation with my parents around the time I decided not to become a cardiologist or neurologist. When I advised them that I would be entering yet another residency, this time in dermatology, their reaction was dead silence—you could hear a toenail drop. You might have thought I had said I wanted to chuck medicine altogether, buy a motorcycle, and rip across the fruited plains with no meaningful goals. I knew what they were thinking: Dermatology was not really *medicine*. Dermatology was not practiced by “real” doctors. Dermatology was . . . well, it wasn't prestigious.

As my parents' initial reaction showed, dermatology is an area of medicine that in the past was not fully understood by the public. Interestingly, these stereotypes have nothing to do with the complexity of caring for skin.

Over more than a decade—sixteen years that have included collaboration on the discovery of the skin cancer gene, publication of numerous research articles, and involvement in clinical trials assessing new technologies and pharmaceuticals—I have been privileged to experience the

breadth of dermatology and its strong foundation in medical science. The study of skin is, in its own right, the lens through which a wide range of human health and disease problems are continually being addressed.

My goal is that this book will be a handy and useful guide for the skin problems of greatest concern to you and that you will come away from even a brief glance at a specific topic knowing more than you expected. For example, when I discuss poison ivy, a form of contact dermatitis, you'll learn how in many ways it is similar to that rash around your wrist or on your earlobes that developed from your chronic exposure to nickel (and you thought those earrings were pure silver!). When I teach you how to take care of a wound, I will bring to bear all that is currently known about the science of healing. Please don't become skeptical of my credentials if some of the things I advise are at odds with what your grandmother taught you about taking care of wounds (at other times, I assure you, I will be able to corroborate Nana's wisdom).

I hope you enjoy this journey, that it will bring you in closer touch with your own body, and that you will begin to feel more in control of your health and appearance. At the same time, I hope you'll enjoy our brief forays into the world of science and discovery and realize how closely advances we take for granted are related to the research done in university laboratories throughout the world.