

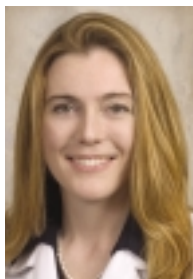
ALLERGEN Focus



Focus on T.R.U.E. Test Allergen #7: Colophony

BY SHARON E. JACOB, M.D., AND STACY CHIMENTO, B.S.

This expert provides an enlightening, practical look at common allergens so that you can better educate your patients about the basis for their allergy and what products they need to avoid.



Sharon E. Jacob, M.D

The thin-layer rapid use epicutaneous (T.R.U.E) Test of 23 common allergens is a valuable, first-line screening tool used by many dermatologists. Although the test focuses on common allergens, frequent questions have arisen from colleagues and patients as to where a specific allergen is derived or what products patients should avoid. With this in mind, this column was developed to provide educational information about the T.R.U.E. Test allergens.

A rich, interesting history accompanies each of the 23 allergens, and understanding these historic perspectives can help to

better educate patients. Each column will also highlight appropriate products that patients should avoid when they are allergic to a specific allergen.

Allergic contact dermatitis [ACD] is an important disease with high impact both in terms of patient morbidity and economics. ACD represents a T-helper cell Type 1 [Th1] dependent delayed-type (Type IV) hypersensitivity reaction.

The instigating exogenous antigens are primarily small lipophilic chemicals (haptens) with a molecular weight less than 500 Da; however, metals do not covalently bind to carrier proteins, instead they complex with proteins similar to the binding of cobalt and vitamin B₁₂.¹

On direct antigen exposure to the skin or mucosa, an immunologic cascade is initiated that includes cytokines, such as interleukin 2 [IL-2] and interferon gamma [IFN- γ], T cells and Langerhan cells. This complex interaction leads to the clinical picture of ACD.

CLINICAL ILLUSTRATION

We present a case in point to make an illustration. An 11-year-old boy was referred to the University of Miami Contact Dermatitis Clinic for a chronic dermatitis restricted to the index finger and thumb on his dominant right hand. He had used corticosteroids with complete resolution of the dermatitis; however, the dermatitis returned upon discontinuation of the creams. Of note, he was an avid pencil artist and gum chewer.

THE HISTORY OF COLOPHONY

Around the world, millions of women are painting their faces with a variety of name-brand eye shadows, lipsticks and rouges. Ballerinas are adorning their feet with pointe shoes, and opera singers are using wig glues for ornate headpieces. Moreover, homes are being filled with products such as shoes, cleaners, soaps and adhesives, all of which contain colophony, one of the most common allergens known to cause allergic contact dermatitis.

Colophony, a sticky amber residue obtained from pine trees, has been, and still remains, one of the earth's most invaluable resources.² Composed of mostly resin acid, which is diterpenes

TABLE 1

ALTERNATIVE NAMES FOR COLOPHONY²

Abietic acid	Granolite SG
Abietic alcohol	Hercolyn D
Abietyl alcohol	Methyl abietate alcohol
Abitol	Resin terebinthinae
Dercolyte ZS	Rosin
Dertomal 18	Staybelite 10
Foral 105	Tall oil

of the pimaric acid and abietic acid type, its extraordinary adhesive properties have made it a desirable product throughout the world for centuries.³

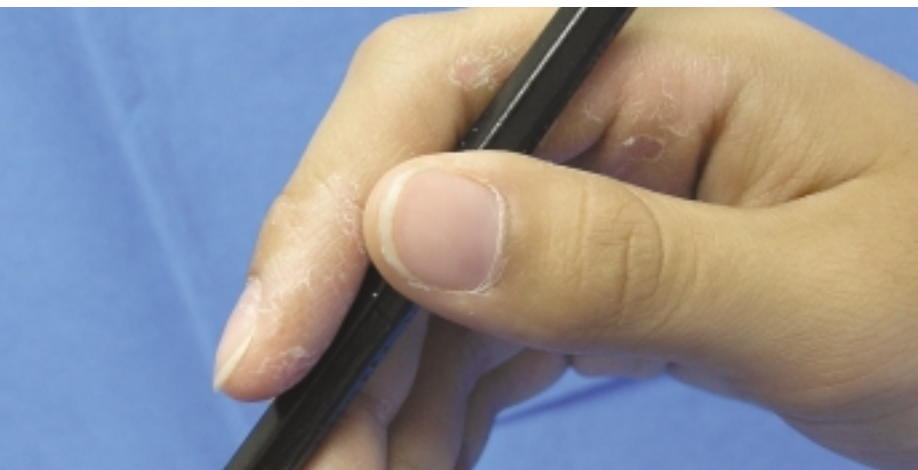
While this substance is more commonly called rosin (see **Table 1 above: “Alternative Names for Colophony”**), it is Latin derived from “Colophon,” an ancient Ionian city off the coast of western Asia Minor that was famous for its cavalry.⁴

Not even Noah could resist the binding properties of pine resin, which he used to create one of the most celebrated structures in Biblical history, the legendary ark. As stated in the Holy Bible, God instructed Noah during the Great Flood to “pitch the ark, within and without with pitch.”

Pitch was a term used to reference non-wood resources derived from a conifer.⁵ Having made an early introduction in history, pines, not surprisingly, and their derivatives such as rosin, have been the topic of folklore and have served an important role not only in the manufacturing industry, but also in ancient art, religion, politics, and medicine.

WARDING OFF EVIL SPIRITS

According to Greek legend, the pine trees were beloved by Zeus and virgins, with the *Pinea corona* species of pine as the official symbol of virginity. The sacred nature of pine was seen throughout ancient Rome, and Roman writers often described the fragrant pine pole of Bacchus and the unspoiled nature of these trees. Today, in various parts of the world such as Guatemala, rosin is burned during religious ceremonies, and in Silesia, Germany, it is burned to protect homes from evil spirits and



A patient's positive reaction to colophony — a component of pine-based pencils.

witches.⁵ Although highly combustible in powder form, rosin is much enjoyed by people in other parts of the world for its pine scent, which is often incorporated into incense sticks.

MEDICINAL USES

Although it was once thought that the fumes could be used to treat respiratory diseases, it is now one of the leading causes of occupational asthma worldwide, particularly among workers in the electronics industry where soldering flux is abundant.⁶

Traditionally, pine resins have been used for medicinal purposes in many countries. In northern Thailand, pitch from *Pinus merkusii* is mixed with other ingredients and used as a remedy for urinary problems.⁷ Resin from *Pinus*

roxburghii has been known to relieve coughing and its related symptoms in parts of Nepal, and resins from other pine species have been used as a plaster for bone fractures and as ointments for ulcers and boils. In fact, rheumatism, bronchitis and ringworms are treated with colophony in Chinese medicine and in parts of Honduras.^{8,9}

ARRIVING IN THE UNITED STATES

Rosin made its way into the United States during the fifteenth and sixteenth centuries, in which the South Carolina and Georgia colonies were important sources of the *Pinus elliotti* and *Pinus palustris* species. The indigenous trees were used to produce a significant supply of resin, also called naval stores. In the 1900s, rosin became one of the

CONTACT DERMATITIS SPECIALISTS: A NEED FOR MORE

We are faced with important workforce economics, there are roughly 14,500 U.S. members of the American Academy of Dermatology and many of these dermatologists serve remote locations. In contrast there are approximately 450 members of the Allergic Contact Dermatitis Society (www.contactderm.org). Providing that everybody practiced there would be roughly one ACDS member patch testing for every 33 dermatologists, if the distribution was evenly cast, which is not the case. Thus, in geographic areas with limited access, the T.R.U.E. test should be recognized and utilized as a basic and necessary screening tool and its limitations understood, as such.

The American Contact Dermatitis Society recognizes the need for comprehensive patch testing and patch test support for the general dermatologists and patients suffering from allergic contact dermatitis. For this reason, the ACDS is actively engaged in maintaining access to this important testing modality by training new providers (ACDS mentorship program) and providing patient education materials to members through the Contact Allergen Replacement Database. ■

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TABLE 2

COMMON PRODUCTS CONTAINING COLOPHONY¹⁵

Asphalt products
Axle greases
Bows for stringed instruments
Car waxes, furniture waxes and stains
Cements and putties
Ceramic inks, marking pens, felt-tip pens, print ink
Chewing gums
Cold sore creams
Corrosion inhibitors
Cosmetics (lipsticks, mascaras, rouges)
Dental flosses
Fly strips
Glues
Hair removing waxes
Hemorrhoid creams
Laundry soaps
Machine belts in industry
Newspapers, glossy papers, photographic papers
Oil-Free sunscreens
Ostomy appliances
Paint, lacquers, varnishes, sealants
Polish for floors
Postage stamp adhesives
Salicylic acid plasters
Sawdust and resin from pine trees
Shoes and shoe polishes
Soft yellow bar soaps
Soldering fluxes and soldering agents
Sport racket handles
Sticking plasters and tapes
Tiles, linoleums
Topical medications in dentistry

most valuable commodities in the United States — a substance that would eventually invade the homes and workplaces of millions — not to mention physician offices.^{4,10}

From Cover Girl and Avon products to Scotch tape and chewing gum, colophony is found in almost everything that comes into contact with the skin.

Its prevalence in such a wide variety of everyday goods often makes it difficult to avoid. (*See Table 2 left: "Common Products Containing Colophony."*)

Today, ACD comprises more than 90% of all occupational related skin diseases, with colophony exposure regarded as one of the 10 most important sensitizations in the majority of countries.^{11,12} Cases of ACD caused by this allergen appear to be significantly linked to patients who have occupations such as jewelers, machine operators, carpenters, electricians, instrumental musicians, and dentists, to name a few.

Quality and safety improvement, as well as patient avoidance of the allergen, with special attention to personal hygiene and protective clothing are important steps in treating these patients.¹³

TESTING FOR COLOPHONY SENSITIVITY

Patch testing for colophony allergy can be accomplished with the T.R.U.E. test [site #7]. The T.R.U.E. test is the commercially available, globally used, allergen screening system. While it is widely used, the discrepancy in allergen prevalence and uncertain relevance have led to scrutiny of its utility. The T.R.U.E. test contains 23 allergens and one negative control.

The T.R.U.E. test is, at best, a minimum screening tool, as it tests only 23 of the more than 3,700 possible allergens that can cause allergic contact dermatitis.

Krob et al. recently demonstrated through meta-analytic techniques that nickel, thimerosal, cobalt, fragrance and balsam of Peru are the most prevalent allergens detected by the T.R.U.E. test. They go on to explain that a significant number of relevant allergens, not present on the T.R.U.E. test, would potentially be missed by this screening tool alone.¹⁴

THE VALUE OF THIS PATIENT CASE

Our patient demonstrated a positive reaction to colophony, a component of his pine-based pencil and chewing gum. On a colophony avoidance regimen, which included a rubber gripper placed on the pencil to prevent contact with his skin and chewing gum discon-

tinuation, the patient improved. This patient underscores the importance of appropriate patch testing and subsequent patient education. Once an allergen is identified, patient education is of the utmost importance because the mainstay of treatment for allergic contact dermatitis is avoidance. ■

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