

UNITED STATES PATENT OFFICE

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INERT TRANSDERMAL ADHESIVE FOR USE
IN MAKING SKIN TESTS OF SPECIFIC BIO-
LOGICAL REACTIONS FOR VARIOUS DIS-
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poration of ColoradoNo Drawing. Application June 3, 1944,
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2 Claims. (Cl. 167-79)

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This invention relates to a transparent skin adhesive for making skin tests of specific biological reactions of various diseases, allergies, and chemical and drug idiosyncracies; and in particular, transdermal or transcutaneous tuberculin tests.

Important objects and advantages of the invention will be apparent from a reading of the following dissertation and details of preparation.

As an introduction it should be stated that transdermal, or transcutaneous, tests for allergic conditions or for certain diseases in man or animals have not been uniformly successful in the past because the antigen available was unsuitable for such tests, or a suitable adhesive was not available, which could be used as a vehicle for the test antigen or which would adhere to the skin a sufficiently long time, to bring about the desired reaction of the skin of the patient.

Moreover, the antigen, or the adhesive itself, causing irritation of the skin or interference with the normal and proper functioning thereof, did induce abnormal or erroneous reactions confusing to the test.

The absence of a suitable antigen has been a point in the unsatisfactory development of transdermal tuberculin tests until the autolytic, or plasmolytic, tuberculin was discovered. This new autolytic tuberculin and a process for preparing the same is described and claimed in my copending application Serial No. 643,744 filed January 26, 1946, as a continuation in part of my copending application Serial No. 479,117 filed March 13, 1943, now abandoned. But this tuberculin requires a suitable vehicle which must not in itself irritate the skin either physically or chemically, or change normal absorption and reaction, nor must it tend to produce skin injury by improper consistency or by pulling on the skin or abrading it or cutting it during the natural movements occurring within the normal period of its application for the transdermal or transcutaneous testing.

The requirements of the vehicle for transdermal testing are the following:

1. The adhesive must adhere to the skin without fail.

2. It must serve to either suspend or dissolve the test antigen without deterioration within a reasonable time.

3. It must be dissolved or suspended in a solvent which in itself produces no untoward effects or reactions on the skin.

4. The solvent must evaporate or be dispersed at the temperature of the skin and under practical conditions of application within a reasonable period of time, about a few minutes.

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5. The adhesive itself, after removal or evaporation of the solvent or vehicle, must not irritate or detrimentally react with the normal skin and it must be of such composition and consistency that it will not cut or abrade the skin in the body or at the edges of the application within the period of reasonable application for the test period.

The adhesive which is transparent, may consist of an agent of a relatively inert material on evaporation of the solvent and is non-irritating to normal functioning skin within reasonable time. Soluble gun cotton, nitrocellulose, or any of the other similarly transparent soluble cellulose derivatives, such as the acetates, which are pervious to water and evaporation, as well as synthetic plastics are suitable.

The solvent may consist of any of the esters of acetic acid and alcohols which are capable of dissolving the cellulose nitrates or acetates or synthetic plastics in relatively clear solution.

Solvents found useful are:

Ethyl acetate B. P. 76-77° C.

N. propyl acetate B. P. 99-102° C.

N. butyl acetate B. P. 115-117° C.

Iso butyl acetate B. P. 115-117° C.

Sec. butyl acetate B. P. 111-113° C.

Iso propyl acetate B. P. 87.5-89.5° C.

Any of these or similar solvents or mixtures thereof are suitable.

The plasticiser or softener is necessary because the transparent adhesive is usually hard and non-pliable and may physically irritate the skin, and the softener agent will convert it to skin consistency and pliability. The agent must be inert and non-irritating to the skin and produce no reactions on a normal skin within reasonable time of many days of application.

The polyoxyalkylene derivatives of hexitol anhydride partial long chain fatty acid esters, and like compounds, are satisfactory and suitably soluble in the solvents to be used for this purpose. Although others of this group can be used, sorbitan monostearate polyoxyalkylene derivative, commercially known as Tween 61, which is a waxy solid of specific gravity 0.98-1.03, is best suited as a plasticiser in the mixture described below. It is a non-electrolyte, and neither a sulfate nor sulfonated product, and is essentially free of soap, excess free fatty acids and inorganic salts.

This transparent skin adhesive consists of:

5% gun cotton, cellulose nitrate,

1.25% plasticiser, sorbitan monostearate polyoxyalkylene derivative, or commercial Tween 61, is dissolved in N. propyl acetate B. P. 99-102° C.

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The foregoing can be varied as to amount and types of materials previously noted for special occasions. This mixture dries rapidly on the skin and leaves a pliable transparent surface firmly attached and without irritating effect upon the normal skin within a reasonable period of several days, during which it naturally remains attached to the skin.

In using this pliable, transparent skin adhesive as a vehicle for transdermal or transcutaneous tuberculin testing, the addition of 20% autolytic or plasmolytic tuberculin in fine suspension is made, so that this tuberculin will be brought in close approximation to the skin when used for tuberculin or tuberculous allergic testing without producing non-specific irritation, extraneous to the specific test being applied.

The pliable transparent skin adhesive can also be used as vehicle for applying other antigens to the skin to elicit specific allergic or biologic reactions in various diseases and food or drug idiosyncrasies.

It is to be understood that such variations as fall within ordinary skill in the art and come within the scope of the subjoined claims be comprehended within the present invention.

Having described the invention, what is claimed as new is:

1. A liquid essentially non-aqueous diagnostic allergic testing material comprising a non-irritating mixture of a cellulose ester derivative pervious to water, a polyoxyalkylene derivative of hexitol anhydride partial long chain fatty acid ester softening agent therefor and an inert volatile organic solvent for said cellulose derivative and softening agent with a transdermally active autolytic tuberculin, said liquid being capable of quickly drying into a skin-adherent film.

2. A liquid, essentially non-aqueous, diagnostic testing material comprising a non-irritating mixture of about 5% cellulose nitrate, about 1.25%

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sorbitan monostearate polyoxyalkylene derivative of specific gravity of 0.98 to 1.03, and propyl acetate, with about 20% transdermally active autolytic tuberculin in suspension, said liquid being capable of quickly drying into a skin-adherent film.

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