I was intrigued by the request to make a presentation to this conference. Mainly because of a certain fascination with the overall concept of adhesion, and secondly, because I happened to have used literally millions of pressure sensitive tapes over the past 33 years of my career in the testing of consumer products for both safety and efficacy.

There is no need to list the myriad of uses for pressure sensitive tapes in the medical community; from the many forms of basic everyday bandages to the transepidermal delivery of drugs into the system, to ostomy devices...and so on.

When asked to make a presentation, I immediately thought of my particular use of pressure sensitive tapes, one that I have been closely associated with over the past several decades...that of Repeated Insult Patch Testing. This procedure may not be familiar to many of you. It is a rather unique procedure, one that has only been in use since the late 1940’s as a means for predicting the potential for a test material to induce clinically significant skin irritation and/or to induce immunologically mediated allergic contact dermatitis. Even though unique, the procedure literally utilizes many millions of individual units within one year’s time.

Patch testing, per se, has evolved over the past century as a commonly used diagnostic tool by allergists and dermatologists. Credit for the start of diagnostic patch testing is given to a German physician in the late 1890’s and has remained basically unchanged for nearly 50 years.

On the surface, patch testing appears quite simple. A material is placed on an appropriate pad attached to a pressure sensitive adhesive tape, the unit is applied to the skin, left in place for a certain period of time, is removed, and the skin is examined for any visible changes that may have taken place.

If it were only that simple. In reality, and when performed properly, patch testing is a complex scientific procedure that requires a great deal of expertise in both it’s conduct and in the interpretation of results.

Patch testing is divided into two very distinct areas of endeavor, one medical and one scientific. These two divisions are DIAGNOSTIC and PREDICTIVE patch testing. Although both appear to be quite similar, there are numerous major procedural differences and, ultimately, major differences in both the purpose of testing and in the interpretation of results.

Let us now take a look at what predictive patch testing is all about, how it is conducted, what kind of results are obtained.

SLIDE 2.

Early development of patch test procedure – BandAids/Elastoplast.
SLIDE 3.
Early development of patch test procedure –
Semi-Occlusive/Webril/Micropore tapes.

SLIDE 4.
Early development of patch test procedure –
Occlusive/Blenderm/Scanpor.

SLIDE 5.
Early development of patch test procedure –
Paper Disks/Blenderm/Scanpor.

Literally dozens of various pressure sensitive tapes and modifications of the patch test units were experimented with to come up with an optimized system for conducting the Repeated Insult Patch Test procedure. Personally, I opted for a relatively thick Blenderm type of adhesive (then manufactured by Parke-Davis) and Scanpor Surgical Tape (by Norges Plaster, Norway).

Let us now take a look at the procedure called “Repeated Insult Patch Testing”

SLIDE 6.
Surgical Pen Marking of the Back.

SLIDE 7.
Two rows of occlusive Blenderm/Webril pads.

SLIDE 8.
Two rows of tapes – occlusive and semi-occlusive.

The RIPT test procedure is divided in distinct phases.

SLIDE 9.
Phases of RIPT testing.

SLIDE 10.
Types of skin reactions that are observed.

SLIDE 11.
Skin response scoring system.

SLIDE 12.
Two rows of irritant skin reactions (mod. to marked).

SLIDE 13.
Two rows of possible allergic types of skin reactions.
Spreading type of severe allergic contact sensitization.

The past several slides gave you an example of test product-induced irritant and allergic types of skin reactions observed during or following the RIPT procedure.

Now let’s take a look at some “pressure sensitive tape” types of reactivity:

Skin reactions can be traced to three possible sources. One, the test subjects themselves may be previously sensitized by a component or components incorporated into the product being tested.

Two, the product itself may induce irritant or allergic type of reactivity in persons not previously sensitized by the test material, and

Three, the patch test units themselves, basically the adhesive materials being used, may also trigger a pre-existing sensitivity and/or be manufactured and distributed in an inappropriate manner.

Let’s take a look some skin reactions to the pressure sensitive tapes themselves –

SLIDE 16.
Tape reactor. When we encounter a test subject who exhibits this type of tape sensitivity, we must discontinue using that person from participating in any future RIPT studies. With an important exception – such as specifically recruiting a panel of such reactive panelists to help support the complex and often challenged term “HYPOALLERGENICITY”

SLIDE 17.
Another pressure sensitive tape reactor – exhibiting moderate to severe hypersensitivity to adhesive tapes.

SLIDE 18, 19, and 20.
Simultaneous skin reactivity to various types of tapes.

The previous three slides were an example of people’s sensitivity to tape materials.

Now let’s take a look at “when the tapes themselves have gone wrong!”

SLIDE 21.
Severe reactivity to the adhesive material itself. In this case there were numerous similar severe reactions observed. When we traced some of the possible reasons, we were told by the manufacturer that the adhesive might not have been properly “cured” – resulting in a high concentration of unpolymerized monomer – with a rather notorious history of allergic contact dermatitis.

SUMMARY

In summary, pressure sensitive tapes are extensively used by the product safety skin testing industry. As an industry there have been many times where appropriate tape materials no longer become available and/or where the potential buyer market does not appear to be a profitable venture for the manufacturer. Regardless of this periodic problem, my industry will continue to use pressure sensitive tapes as the optimum method of applying test materials to the skin.