

Diagnosis of Food Allergy

The most important step in the diagnosis of food allergy is obtaining a careful medical history. This is usually undertaken by your family doctor, who will then decide if a referral to an allergist is warranted.

An allergist usually relies on tests to determine whether you or your child has allergies. Standard skin and blood tests for allergies due to allergens such as pollens, animal dander, dust mites, mold spores, and other inhalants that cause respiratory allergies such as hay fever and asthma, are considered fairly reliable and are routinely used in determining the treatment that is most appropriate for your allergies. However, because the tests for determining which *foods* may be responsible for a person's symptoms are not so reliable, many allergists do not perform laboratory tests for food allergies. If tests are carried out for food allergy, they always need to be followed by direct challenge (when eating the food is followed by the development of symptoms) to determine their accuracy.

Allergy Tests

There are few reliable laboratory tests available for the determination of the specific foods that are responsible for the symptoms of food allergy. The tests used by allergists are designed to detect allergen-specific IgE^a, and involve either applying an extract of the allergen to the skin and pricking or scratching the surface to allow the allergen to come into contact with the underlying immune cells, or using immunological techniques to detect allergen-specific IgE antibodies in a sample of blood. None of these tests alone are sufficiently accurate to identify the specific foods that are triggering symptoms.

Skin Tests

Tests for IgE antibody can be informative, but carry limitations that make them unreliable as indicators of the precise foods responsible for symptoms¹. The tests detect only *sensitization* to the allergen (meaning that the immune system has formed IgE antibodies to the allergen) but do not necessarily indicate that symptoms will appear when the food is eaten. A positive test correlates with reactions less than half of the time². Positive test results are therefore “false positives” in some cases³.

^a Allergen-specific IgE is the antibody that is formed in response to one specific allergen in a food. When a person has allergies, the immune system makes these more of these specific antibodies every time the food enters the body. When the allergen and the antibody couple together, chemicals (called inflammatory mediators) are released that cause the symptoms of allergy.

Reasons for a false positive test include:

- Release of inflammatory mediators from mast cells in the skin caused by factors (including physical contact with the pricking device) that do not cause their release in the digestive tract or other internal organs⁴
- Differences in the form in which the allergen encounters the immune cells (e.g. the extract may be from a raw food, when the food is normally eaten cooked; the allergen may be derived from an unstable plant extract)
- Some commercial allergen extracts may contain small amounts of histamine⁵, which produces a reaction in the skin exactly like the histamine released from a skin mast cell

Reasons for a false negative test

On the other hand, false negative tests may occur, even when symptoms are induced when a particular food is eaten; this may be due to a variety of reasons, including:

- The reaction is not based on the production of allergen-specific IgE
- The wrong foods were tested
- The test was not sensitive enough
- The commercially prepared allergen extract may not contain any of the allergen⁶ because it became changed or degraded during the extraction process

Given these limitations, many allergists consider that skin tests may be useful in determining that a person has IgE-mediated allergy, but that they are not accurate enough to be used for detecting the precise foods that are responsible for the reactions.

What to Expect in a Skin Test

Several techniques are used for allergy skin testing, but research indicates that the most reliable is the *prick/puncture method*⁷.

Scratch tests in which the skin is scratched and an allergen extract applied to the scarified skin are rarely used nowadays.

Intradermal tests, in which the allergen extract is injected into the skin, are frequently used for the diagnosis of inhalant allergies in which the allergen is air-borne matter such as pollens, molds, dust mites, animal danders, etc. in adults. However, this method is definitely not recommended for the diagnosis of food allergy because of the high number of false positive results, and the danger of inducing a life-threatening anaphylactic reaction as the allergen encounters immune cells within the circulatory system. Intradermal testing should not be used in the diagnosis of food allergy in babies and children.

The Prick/Puncture Skin Test (PST)

Some allergy medicines, including over-the-counter antihistamines, may stop allergic reactions, therefore you should take them for a few days before the test. Talk to your doctor about discontinuing allergy medicines prior to the test. If certain medications cannot be discontinued, even for a few days, the doctor or nurse may perform a separate "control" test to determine if that particular drug will interfere with the skin test results.

The entire procedure will take about an hour. The allergen placement part of the test takes about 5 to 15 minutes. Then you will have to wait about 15 or 20 minutes to see how your skin reacts.

The Procedure

- First, a doctor or nurse will examine the skin on your forearm or back, and clean it with alcohol
- Areas of the cleaned skin are then marked with a pen to identify each allergen that will be tested
- A drop of extract for each potential allergen is placed on the corresponding mark
- A small disposable pricking device is then used to puncture the skin so the extract can enter into the outer layer of the skin, called the epidermis. A number of devices can be used to apply the allergen, including 25- to 27-gauge hypodermic needles, metal lancets, plastic pricking devices, and forked scratching devices (called bifurcated scarifiers).
- The skin prick is not a shot and should not cause bleeding

To properly interpret prick tests, both a positive and a negative control test are needed.

- The negative control should be the fluid used for diluting the allergen extract (diluent). This measures nonspecific reactivity induced by the diluent or by the force or technique of the tester. If this negative test causes a 3-mm or larger reddened area around the site, the prick tests are difficult to interpret, and the test is usually considered to be invalid.
- Positive controls are used to detect the skin's reactivity to histamine. The usual positive control is histamine phosphate (2.7 mg/mL equivalent to 1 mg/mL of histamine base)

The test may be mildly irritating, but most people say it doesn't hurt too much. After the results are read, the doctor or nurse may apply a mild cortisone cream to relieve any excessive itching or pain at the sites of the skin pricks.

In a positive test, a wheal and flare reaction can be seen at the site of the puncture:

- The wheal (edema) is a central raised area like a small blister
- The flare (erythema) is a flattened, reddened area extending outwards from the central "blister"

This reaction is caused by the release of inflammatory mediators, especially histamine, from mast cells in the skin. The allergen couples with IgE molecules attached to

receptors on the mast cells' surface, and triggers the release of the inflammatory mediators stored within the cells. Histamine acts on cells in the surrounding tissue, resulting in the local inflammation of the wheal and flare.

For specific allergens, a wheal-and-flare reaction that is equal to or larger than that seen with a histamine control test, which appears 15 minutes after the prick, indicates a positive response. Although a large wheal-and-flare response might suggest a more marked hypersensitivity, significant clinical allergic symptoms may be seen in people who have only small wheal-and-flare reactions.

Several different scoring systems are used to record the skin test results, and many allergists like to use their own methods. Some measure the size of both the wheal and flare, usually grading the reaction from 1+ to 4+. Others simply look for a positive response which is considered to be a wheal of 3 mm or larger compared to the negative control⁸.

It is virtually impossible to quantify the exact amount of injected material used in prick tests. Therefore, the reliability of the test depends on the device used, the depth and force of the puncture needle, the duration of force, the angle of the application device, and the stability of extracts⁹. Because of the impossibility of standardizing the test, the size of the wheal and flare reaction cannot be used as a measure of clinical reactivity (severity of the response) to the food when it is consumed. At best, the skin test is merely an indicator of the presence of allergen-specific IgE and the potential for clinical reactivity to the allergen.

Although small amounts of allergens are introduced into your system through the skin puncture, allergists generally consider that skin tests are safe when performed properly, although recently experts have begun to question this assumption.

Systemic (whole body) reactions to skin testing are extremely rare, although sometimes such things do happen. You should immediately call your doctor if you (or your child) develop symptoms soon after the test, such as:

- Fever
- Lightheadedness
- Wheezing
- Shortness of breath
- Extensive rash
- Swelling of the face, lips or mouth
- Difficulty swallowing

Skin testing of babies

Prick tests are sometimes carried out on children as young as 1 month of age, although they are rarely used in this age-group, and the results are not considered to be very reliable. Children under the age of two or three are more likely to have a negative skin test and a positive food challenge¹⁰. Allergen-induced skin test reactions are smaller in infants and young children than in adults. This is believed to be related to the lower levels

of IgE and hyporeactivity of the infant's skin to histamine. Because data on the effect of age on skin reactivity to allergens are lacking, at the present time there are no age-related guidelines for what constitutes a positive reaction¹¹

Skin tests cannot, and should not be carried out on sites of active dermatitis or severe dermatographism.

Note on allergen extracts used in skin tests

Allergen extracts used by allergists in their offices and clinics are produced by a number of companies in the U.S.A. and other countries according to a set of guidelines developed by the manufacturer. The FDA is currently working to better standardize allergen extract products made by different manufacturers.

Sterile aqueous stock solutions comprise the vast majority of allergen extracts. A typical aqueous extract solution as prepared by Bayer Laboratories, will contain the active ingredients or allergens as noted on the label (pollen, dander, molds, dust etc.). The preservative is 50% V/V glycerin, 0.4% phenol or in a few instances where phenol cannot be used 0.1% thimerosal. Additional ingredients include 0.5% sodium chloride and 0.275% sodium bicarbonate.

The perfect allergenic extract has been defined as one that contains all the potential allergens in their native form, in the proper ratio and with all irrelevant material removed. At the present time there is a great deal of variability in the allergen extracts manufactured by different companies, which inevitably leads to discrepancies in the results obtained by one allergy clinic compared to another. The Food and Drug Administration (FDA) working with the World Health Organization (WHO) and the International Union of Immunologic Societies are in the process of developing procedures for establishing reference preparations for comparison (“standardization”^b), but at present such standards are not in place.

Prick-in-Prick (Prick+Prick) Test

Another type of skin test that is often used in situations where the allergen is likely to become readily degraded, and would thus invalidate the test, is called the prick+prick test. In this, a sterile needle is inserted in the fresh food, for example an apple, and then used to prick the patient’s skin. This transfers the fresh food material directly without any extraction or processing of the allergen. This test is principally used for identification of the raw foods that might be responsible for oral allergy syndrome. However, because the sensitizing allergen is an air-borne pollen, and IgE to the food

^b “Standardization” refers to the quality of an extract product being comparable to an appropriate reference preparation of assured potency.

itself may not be present, false positive and false negative reactions in this test are common.

Atopy Patch Test (APT)

A test that is beginning to be explored in the attempt to find a more predictable identifying marker for food allergens, is the atopy patch test. Patch tests have been in use for many years for the identification of materials that cause a local reaction when they come into direct contact with the skin or mucous membranes, such as poison ivy and other plant contact allergens, nickel, latex, materials in cosmetics, detergents, dyes and other chemicals. Because these reactions are typically delayed, the patch stays in place for up to 72 hours. The atopy patch test for foods was developed in an attempt to identify “late phase reactions” that were not apparent in skin tests that typically reveal immediate-onset reactions that are visible within about 15 minutes of the allergen being applied to the skin. Since the atopy patch test for foods is designed to identify a reaction that occurs after the food is ingested, a “carrier” solvent is necessary to transport the material across the dermal barrier to reach the immune cells within the skin tissues. Petrolatum (Vaseline) is most commonly used for this purpose.

The test entails application of the allergen suspended in the carrier substance, as a coated patch, directly onto the skin (usually the back). The patch stays in place for up to 48 hours¹². A local reddened area indicates a positive reaction. It is thought that this would allow identification not only of the immediate, IgE-mediated, but also the delayed, possibly IgG-mediated, reactions responsible for some types of food allergy. The test is most frequently used to identify food allergens as triggers in atopic eczema.

At the present time this test lacks standardization not only of the food allergen extracts used in the tests, but also the type of suspension material employed, as well as the technique itself. Some researchers have reported good results, most agree that the “APT is time consuming and demands a highly experienced test evaluator¹³” before it can be used successfully. There is no indication that this test has any advantage over the skin and blood tests currently employed in food allergy diagnosis.

Blood Tests for Food Allergy

Blood tests for food allergy involve analysis of the patient’s blood, or blood serum (the straw-colored fluid that remains after blood has clotted). Various immunological techniques are used to detect antibodies in the blood or serum that have been formed in response to a specific food. In most cases, the tests detect allergen-specific IgE, which indicates the potential for allergy. In addition, the test will provide a measure of the total IgE level in the patient’s blood, which gives a general idea of the likelihood that the person will be allergic, without specifying the exact allergens to which he or she has formed the antibodies.

Occasionally other components in the blood are tested for, including other antibodies such as IgG, and sometimes components of the complement system. The most commonly employed testing technique is the radioallergosorbent test (RAST).

Because RAST and other blood tests are expensive in comparison to skin tests, blood tests are not used routinely in allergy diagnosis. They are usually reserved for situations in which skin testing is likely to be invalid, for example, when the patient has skin conditions such as eczema, urticaria (hives), and dermatographism (reddening and welting when the skin is scratched or exposed to heat or cold). In most cases, your doctor will select just a few allergens for the test. Usually the “major allergens” (egg, cow’s milk, peanut, soybean, wheat, shellfish) are tested first, and further tests ordered based on the initial results. Sometimes mixtures of allergens are tested in the first instance (e.g. “vegetable mix”; “fruit mix”; “nut mix”, “grain mix”, etc). If the mixture is positive, the doctor may then decide to test allergens within the mixture separately, for example, peanut, hazelnut, walnut if the nut mix is positive, or distinct grains if the grain mix is positive.

The RAST

A RAST requires blood to be drawn from a patient and sent to a laboratory for analysis. The results will usually be reported 7 to 10 days (or sometimes longer) after the blood is collected.

The RAST uses radioactive or enzyme markers to detect levels of IgE antibodies in the blood. Allergen in the test reagent binds to its own antibody (called homologous antibody) in the blood forming a complex. The added radioactive substance then binds itself to the allergen-antibody complex in the patient’s blood. The amount of radioactivity associated with the complex is reported as a numerical value¹⁴.

The Test Procedure

During the test, a blood sample is drawn. For most blood tests, the sample is drawn from a vein in a process called *venipuncture*. During a venipuncture, a health provider (usually a nurse or laboratory technician) wraps an elastic band around the patient’s upper arm to stop blood flow through the upper veins. This keeps the lower veins full of blood and less likely to collapse, making them ideal sites for drawing a sample.

The site chosen for withdrawing the blood is swabbed with alcohol. The needle is inserted into the vein. In some cases the needle may have to be removed and inserted again to ensure it is properly placed, or if the health provider cannot obtain enough blood from the original site. Patients may feel a brief sting as the needle is inserted, but discomfort is usually minor.

Once the needle is in place, a collection tube is attached and blood flows into it. Sometimes, more than one tube will be collected. Once the required amount of blood has been obtained, the rubber band is removed. The needle also is removed from the vein and a cotton ball or gauze pad is applied to the puncture site. Direct pressure is applied to the puncture spot for several minutes to help the blood clot, and a sterile bandage is placed over the site. The blood samples are then sent directly to the laboratory for analysis.

Usually there are very few risks or side effects. Occasionally, bruising is reported at the injection site. This can be minimized by keeping direct pressure on the spot for several minutes after the needle has been removed

Interpretation of the Results

The laboratory provides a numeric value for total IgE, and for each allergen tested. Each lab has its own standards for “normal” levels of IgE, and provides a scale for “low”, “medium” and “high” levels.

As with any test for food allergy, the RAST may not be entirely accurate because the level of antibody in the blood does not necessarily indicate the severity of the allergic reaction when the food is eaten. Sometimes even low levels of IgE can be associated with a severe reaction, and occasionally, when the patient eats a food to which higher levels of IgE have been recorded, he or she has no reaction. As with skin tests, the RAST is primarily used to predict the likelihood of a reaction. In general, the lower the level of allergen-specific IgE, the less likely a reaction is to occur.

It is usually thought that of all the patients showing a suspected adverse reaction to a food, only half will have a positive specific IgE result, even if the doctor has chosen the right allergens to test for. The other half of patients will have some other non-IgE mechanism causing their adverse reaction, in which case, of course, the specific IgE tests will be negative.

Other Blood Tests for Allergen-specific IgE

There are other blood tests that are now available in some areas that use slightly different analytical techniques which may prove to be more effective at pinpointing specific antibody/allergen reactions, or detect other components in blood that may be involved in triggering an allergic response. Some of the more common of these include:

Immuno Cap RAST manufactured by Pharmacia. This is considered by some authorities to be the most sensitive of the RAST procedures currently in general use¹⁵

Fluorescent allerge sorbent test (FAST). This blood test is similar to RAST but uses fluorescent instead of radioactive compounds to detect the allergen/antibody complexes in the blood. This makes the equipment suitable for use in an office (instead of a laboratory), where results can be delivered in about six hours.

CAP-RAST FEIA. This blood test is similar to RAST but includes a fluoro-enzyme immunoassay (a method in which an added enzyme reacts with its substrate, linked to the allergen/antibody complex, and detected with a compound that fluoresces, producing a visual method of analysis) which may increase its sensitivity in determining reactivity to certain foods.

Radio allerge sorbent procedure (RASP): This blood test is a variant of the RAST but usually includes a measurement of immunoglobulin G (IgG) complexes in addition to IgE. However, the role of IgG complexes in symptoms of allergy is not entirely clear in many cases and therefore this test may not always provide valid results.

Multiple antigen simultaneous test (MAST). This is a type of RAST that allows testing for 38 allergens at a time, whereas RASTs look at only a single allergen per test. It has not yet been proven useful in the diagnosis of food allergy, however.

Immunoassay capture test. One of the newest blood tests. The technique is in use for the detection of specific antigens, especially in the diagnosis of infectious diseases. Essentially, it is an immunological technique in which monoclonal antibodies specifically formed against the allergenic molecule in food are used to “capture” the antigen. By means of a “sandwich” (antibody + antigen + antibody complex) enzyme-linked immunosorbent assay (ELISA) [see Glossary for information on the ELISA], the presence and level of the allergen-specific IgE can be detected. Proponents say the process used to make the patient’s blood and the test medium react provides results that are more accurate than either skin tests or blood tests for the diagnosis of allergy. At the present time, this procedure is used mainly in the research setting and is merely in the developmental stage for use in the diagnosis of food allergy.

The Meaning of the Results of Blood Tests: General comments

Test results are always evaluated in relation to the “normal range” for that test used in the lab performing the test. The range of values considered to be normal is the range of test results from the blood of normal, active healthy people. At the present time there are no standardized differences in values between adults, babies, and children, nor between different ethnic groups, although research is beginning to indicate that “normal ranges” may indeed vary based on age and racial background.

- IgE levels may indicate that an allergic response is taking place (the patient has been sensitized to the allergen) but if there are no physical symptoms being experienced, the individual does not have an allergy.
- If a person’s IgE test is negative, there is still a small possibility that the individual does have an allergy if he or she experiences symptoms after consuming the test food.
- The level of IgE present does not predict the potential severity of an allergic reaction in the patient.

Non-Conventional Tests

When faced with their allergic symptoms, but confused and frustrated with the apparent lack of definitive answers from conventional allergy testing, many patients understandably turn to alternative methods of diagnosis in order to find relief for their

distress. Advice from well-meaning friends and searches on the InterNet will reveal a number of different types of protocols that promise amazing results from a variety of methods of diagnosis and treatment. Many of these pseudoscientific procedures sound very plausible, but unfortunately carry the risk of misdiagnosis, inappropriate treatment, and the potential for harm, so caution and diligence is strongly advised when considering any that are not scientifically validated by accepted methods of investigation.

Some of the most popular tests which are frequently used in the diagnosis of food allergy include:

- Provocation-neutralization procedures
- Reaginic Pulse Test
- Cytotoxic tests
- ALCAT
- Applied kinesiology
- Electroacupuncture (Vega Test)

Details of these tests and their possible value in practice are provided below.

Other tests, although popular in some circles for diagnosis of food allergy in adults, are rarely used in pediatric food allergy management. These include:

Provocation-neutralization Procedure

Subcutaneous provocation-neutralization testing may be defined as a technique for the diagnosis and treatment of allergic disease in which a subcutaneous injection of antigen of sufficient quantity is administered to elicit symptoms corresponding to the patient complaints. This is followed by the immediate injection of weaker or stronger dilution of the same antigen to relieve the provoked symptoms.

Sublingual provocation-neutralization testing consists of placing three drops of 1:100 (w/v) aqueous extracted and glycerinated allergenic extract under the tongue of the patient and waiting 10 min for the appearance of symptoms. When the physician is satisfied that he/she has determined the cause(s) of the symptoms, he/she then administers a neutralizing dose, which is usually three drops of a dilute solution (e.g. 1:300,000 w/v) of the same extract. The symptoms are expected to disappear in approximately the same sequence in which they appeared. If the neutralizing dose is given prior to challenge (e.g. eating a meal containing the offending food), the prevention of symptoms is also expected.

Reaginic Pulse Test

The test involves taking the patient's pulse before and after ingestion of the suspect food. An increase in the pulse rate (usually an increase in excess of 10 beats per minute) is considered to be indicative of a positive reaction to the food.

Cytotoxic Test

Cytotoxic testing, also called Bryan's test, the Metabolic Intolerance Test, or sensitivity testing. This test was popular during the early 1980s, especially in private clinics for alternative medicine, and some medical doctors' offices. Advocates claimed it could determine sensitivity to food.

The Test

10 mL of a patient's blood is placed in a test tube and centrifuged to separate the white cells (leukocytes)

The cells are mixed with plasma and sterile water and applied to a large number of microscope slides, each of which had been coated with a dried food extract like that used by allergists for skin testing

The cells are examined under a microscope at various intervals over a two-hour period to see whether they change shape or disintegrate. This is considered to be a sign of allergy to the particular food

The test results are used to explain the patient's symptoms and to design a "personalized diet program" that includes vitamins and minerals sold by those administering the test.

Critique of the Cytotoxic Test

The American Academy of Allergy, Asthma and Immunology (AAAAI), the largest group of allergists in the U.S.A. has concluded that cytotoxic testing is ineffective for diagnosing food or inhalant allergies¹⁶. A position paper issued by the group reports:

- One study found that white cells from allergic patients reacted no differently when exposed to substances known to produce symptoms than when exposed to substances to which the patients were not sensitive
- Another study found that cytotoxic test results did not correlate with allergic and other untoward reactions to foods and that the results were inconsistent when repeated in the same patient
- In a double-blind controlled study, positive cytotoxic tests were frequently obtained to foods that produced no clinical symptoms and negative reactions were obtained to foods that did produce symptoms
- Another double-blind study found the test results in the same patient varied from day to day

In 1985 the American Food and Drug Administration (FDA) issued a Compliance Policy Guide stating that cytotoxic testing kits can not be legally marketed without FDA approval and that the agency would consider regulatory action if violative test kits were marketed¹⁷.

These actions greatly stopped the marketing of cytotoxic testing, but some practitioners still use the test.

ALCAT (Antigen Leukocyte Cellular Antibody Test)

The ALCAT TEST is a patented test that measures the blood cells' reactions to a foreign substance under conditions that attempt to mimic what actually happens when the food is consumed in real life.

The Test

White blood cells extracted from a sample of the patient's blood are incubated at body temperature with extracts of foods, molds, food colorings, chemicals and certain medications:

Samples of the patient's blood are taken in a doctor's office or laboratory, and shipped to the testing lab.

In the lab the blood is diluted with 1:5 buffer, and 500 microlitres added to each freeze dried test extract on nylon discs in Coulter type cuvettes^c.

Following 45 minutes incubation at 37 degrees centigrade with constant agitation the cuvettes are incubated for a further 45 minutes at room temperature.

The red cells are then lysed by adding 16 ml of Isotone II containing .5% alkalyse to each cuvette.

The samples are then put through a modified cell counter (Coulter Counter), every 30 seconds with one control every 10 test cuvettes. The counter is linked to a computer program which records the size and numbers of cells in each test sample.

Changes in the size of the cells (smaller or larger) and increase or decrease in the numbers of cells in the sample is compared to the "Master Control" (baseline) graph. Deviations from the standard are evaluated in determining the results, on which a diagnosis is based.

A maximum of 100 substances can be tested but usually a battery of 50 foods is used.

Critique of the ALCAT

Proponents of the ALCAT claim that both immediate reactions to foods, and reactions that may be delayed for hours or days, can be detected by this method. They claim that the elimination and challenge method (the "Gold Standard of food allergy diagnosis) of detecting culprit foods and additives takes weeks or months, while the ALCAT method can provide valid answers in a matter of hours.

Although some practitioners have found this method of detecting foods causing adverse reactions helpful in diagnosis, many consider the technique to be unproven and as such to have the potential to lead to misleading diagnoses and treatments¹⁸. This is of particular concern where babies and young children are the patients.

^c A cuvette is a small cylindrical container made of clear plastic that fits inside a test chamber in the cell counting machine

Applied Kinesiology

Applied kinesiology (AK) is the term most commonly used to identify a system of muscle-testing and therapy. It was initiated in 1964 by George J. Goodheart, Jr. Its basic notion is that every organ dysfunction is accompanied by a specific muscle weakness, which enables diseases to be diagnosed through muscle-testing procedures. AK proponents claim that nutritional deficiencies, allergies, and other adverse reactions to foods or nutrients can be detected by this method.

The Test

The test most commonly involves the patient holding the test material, usually contained in a vial or test tube, close to the body. The practitioner tests the muscle strength of the patient holding the vial by pressing down on their out-stretched arm. Apparently, the food or nutrient in the vial is thought to have an immediate effect: "good" substances will make specific muscles stronger, whereas "bad" substances will cause weaknesses that indicate trouble. Thus, if the patient is able to resist the downward pressure of the practitioner, the muscle is strong, and the test substance has no adverse effect. If the patient is unable to resist the pressure, the substance is a cause of problems, and when AK is used in the diagnosis of allergy, the food is considered to be an "allergen".

For babies and small children a "surrogate" method is used: The baby or child is held by an adult. The vial containing the test substance is placed in the child's sock or other clothing so that it is in close proximity to its body. The arm strength of the adult holding the child is then tested by the practitioner.

Critique of Applied Kinesiology Tests

There have been several controlled trials designed to validate AK testing, particularly with regard to the claim that it can be used to detect nutritional deficiencies. Some have found no difference in muscle response from one substance to another, while others have found no difference between the results with test substances and with placebos. One study, for example, found that three practitioners testing eleven subjects made significantly different assessments; their diagnoses of nutritional deficiencies did not correspond to the nutrient levels obtain by blood serum analysis; and that the responses to nutrient substances did not significantly differ from responses to placebos¹⁹. Another study showed that suggestion can influence the outcome of muscle-testing²⁰.

Detractors of the method think that differences from one test to another may be due to suggestibility; variations in the amount of force, leverage, or follow-through involved; and/or muscle fatigue¹⁶. Distraction can also play a role, for example, touching another part of the body just before pulling down the arm may cause the patient to focus less on resisting. A sudden slight upward movement can cause a "set" muscle to relax so that it can be immediately pulled downward. Apparently, when this is done quickly, the person being tested is unlikely to detect the upward motion

Electrodermal Diagnosis: Electroacupuncture: The Vega Test

Some physicians, dentists, naturopaths, and chiropractors use "electrodiagnostic" devices to help select the treatment they prescribe, which usually includes homeopathic products. These practitioners claim they can determine the cause of any disease by detecting the "energy imbalance" causing the problem.

The first electrodiagnostic device was developed by Reinhold Voll a German physician who had been engaged in acupuncture practice in the 1950s. In 1958, he combined Chinese acupuncture theory with galvanic skin differentials to produce his system. About ten years later, one of his students (another German physician named Helmut Schimmel) simplified the diagnostic system, made small modifications to the equipment, and went on to help create the first model of the Vegatest. Proponents, claim these devices measure disturbances in the body's flow of "electro-magnetic energy" along "acupuncture meridians"

The Test

The Vega test device emits a tiny direct electric current that flows through a wire from the device to a brass cylinder covered by moist gauze, which the patient holds in one hand. A second wire is connected from the device to a probe, which the operator touches to "acupuncture points" on the patient's other hand or a foot. This completes a low-voltage circuit and the device registers the flow of current.

The patient holds the metal cylinder in one hand. The other probe is touched to the patient's other hand or foot, completing the circuit. A galvanometer registers a response, or a bar rises on the right side of a computer screen, accompanied by a noise. The reading supposedly determines the status of various organs of the body.

After the patient's problems are "diagnosed," glass ampoules containing homeopathic solutions are usually placed in a holder connected to the circuit and the tests are repeated to determine whether they are suitable for correcting the "imbalances."

Critique of Electroacupuncture Tests

No randomized, well-designed controlled trials have been able to validate the results of Vega test devices in diagnosing allergies, nutrient deficiencies, or other documented illnesses for which the devices are claimed to function. There have been numerous malpractice suits against practitioners who have caused harm in using the devices for incorrect diagnoses.

Traditional medical practitioners strongly condemn the use of the devices for diagnosis and treatment. A Position Statement from the Australian College of Allergy states:

*"Vega testing (the Vega test method) is an unorthodox method of diagnosing allergic and other diseases. It has no established scientific basis and there are no controlled trials to support its usefulness. Vega testing may lead to inappropriate treatment and expense to the patient and community."*²¹

Other Immunological Procedures

Among the immunologic test procedures that have been misused in allergy diagnosis are:

- Measurements of circulating antigen-specific IgG antibodies
- Serum immunoglobulin concentrations
- Levels of complement components
- Flow cytometry

These tests are not helpful for diagnosis of specific IgE-mediated allergic disease but may be useful in detection of other immunologic processes.

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