Raise Your Immune I.Q.®*

4Life® products featured in the *Physicians' Desk Reference*®

4LIFE TRANSFER FACTOR® TRI-FACTOR® FORMULA PRODUCT DESCRIPTION

4Life Transfer Factor Tri-Factor Formula combines proprietary transfer factors and NanoFactor® molecules extracted from bovine colostrum and chicken egg yolk sources. These molecules contain antigen information which educates, enhances, and helps maintain immune system balance.

TECHNICAL DESCRIPTION

Transfer factors are molecules that communicate antigenic immunological information intercellularly and from a donor to a recipient. They support immune function through cell mediated immunity. Transfer factors, which carry antigen specific information to which all tested immune cells respond, are produced by mononuclear cells and serve to support and improve immune mediated pathways. Mammalian transfer factors, including those of humans are small molecules between 3,500 and 10,000 daltons. (1; 2) Transfer factors are polypeptides that consist of 40 to 44 amino acids (3) and have a conserved region and a variable region. From a molecular biological standpoint, these two properties are analogous to antibodies; however transfer factor's functions of cell mediated immunity (CMI) and non-specific immunological activity differ almost completely from the functions of antibodies. The molecules that have a molecular weight of less than 3,500 daltons modulate immune response but they do not transfer delayed-type hypersensitivity (DTH). (1)

4Life's transfer factors are sourced from the ultra-filtration of colostrum and from egg yolks. (4; 5) The molecules obtained from the spray dried ultra-filtrate of bovine colostrum are of two classes; the transfer factors present in the ultra-filtrate of ≤10,000 daltons and the nanofraction molecules that are present in the nano-filtrate of ≤3,500 daltons.

Transfer factors were first discovered in 1949 by H. Sherwood Lawrence when he demonstrated that CMI could be transferred from one individual to another by way of low molecular weight extracts of white blood cells. Transfer factors could transfer DTH of a specific form from a skin test positive individual to a skin test negative individual who subsequent to the transfer would skin test positive for that antigen. (6) In a subsequent study in 1955 he demonstrated that DM could be passed serially, first from a skin test positive individual to a test negative individual, who became test positive, then 6 months later from the second individual to another test negative individual who became test positive. (7) At the time antibodies were the focus of immune research and little was known of the importance of DTH and of the involvement of T-cells in immune response. Transfer factors promote wellness via cell mediated immunity. These compounds are components of colostrum, an infant's first meal. They bridge the generational gap by passing cell mediated immunity from mother to infant.

***THESE STATEMENTS HAVE NOT BEEN EVALUATED BY THE FOOD AND DRUG ADMINISTRATION. THESE PRODUCTS ARE NOT INTENDED TO DIAGNOSE, TREAT, CURE, OR PREVENT ANY DISEASE.**

BIOLOGICAL AND PHYSIOLOGICAL ACTION

Transfer factors' preparations contain more than 200 different moieties of polypeptide molecules with a molecular weight of <10,000 daltons; each moiety potentially having a great number of epitotic variations. These antigen specific factors are synthesized in monocytes and stored in the cytoplasm or on the cell membrane. A significant body of evidence indicates that the primary biological function of transfer factors is to recruit and specifically sensitize previously uncommitted lymphocytes. These sensitized T-lymphocytes initiate the events of cell-mediated immunity, thereby, promoting immunity not only at the site of antigen challenge but also throughout the body. (8) The effect of transfer factors on antigen mediated immunity, via B-cells, is not completely understood; however, a clinical test has reported an increase in particular antibodies, such as IgA and IgG, during transfer factor administration.

Clinical studies have demonstrated that transfer factors' unique ability to express DTH and promote cell-mediated immunity can be transferred from a sensitized donor to a non-immune recipient. (1; 9) This antigen specific effect is well documented and is likely produced through activation of the CD3-antigen site of T-cells, increased macrophage activation, and interleukin production—which can also enhance natural killer cell function. (1; 10)

Although the exact mechanism of action is unknown, research has shown that transfer factors will bind to antigens. However, the antigen specificity that is "transferred" to recipients is mediated by T-lymphocytes. (3) Current structure function models propose that transfer factors have a variable region and a conserved amino acid region, which determines the antigenic specificity for an estimated 8^{18} epitopes (1) and serves as a binding target far immune cell receptors respectively. (2; 11) These highly conserved regions presumably allow transfer factors to be administered across a species barrier without any loss of potency. ***In fact, research has demonstrated that bovine transfer factors are structurally analogous to human-derived transfer factors with equivalent physiological activity.*** This is further supported by several studies, which used transfer factors extracted from bovine lymph nodes and colostrum to confer cell-mediated immunity to specific antigens in animals and human recipients. (12; 13)

Although most clinical trials with transfer factors have used parental administration; oral administration has also demonstrated successful transfer of DTH and cell mediated immunity I recipients. (14) Dose response studies, which compare in various routes of administration, have been performed in both human and animals. Results of these experiments refute any arguments that the acidic or enzymatic environment of gastrointestinal tract effects oral administration of transfer factors. (14)

CLINICAL AND EXPERIMENTAL STUDIES

Natural Killer Cell Activity

Peripheral blood mononuclear cells were isolated and pooled from several healthy donors. Sixty thousand cells were added to each well of 96-well microtiter plate. Various immune modulating ingredients, including 4Life Transfer Factor Tri-Factor Formula, were added to select wells on the plate and 48 hour incubation started. At the end of the incubation period 30 thousand K562 cells were added to each well. MTT assay techniques were used to determine the cytotoxic index. The various 4Life Transfer Factor products resulted in cytotoxic indices of 80-98%. By comparison, mononuclear cells incubated with IL-2 for the same 48 hour period produced a cytotoxic index of 88%.

CD4 T Helper Cell Research

Multiple studies were performed using the FDA-approved diagnostic CD4 T Helper cell assay kit and/or a T Cell Memory (CD8) assay kit under development by the same company. Similar to the NK cell research described above these *in vitro* studies were performed on 96-well microtiter plates measuring ATP production via a luciferase-based luminescence reaction.

The CD4 assay utilizes PHA-stimulated cells isolated from whole blood via the use of Dynabeads™ An 18 hour incubation of these isolated, stimulated CD4 cells with the 4Life Transfer Factor products has resulted in a modulation of immune cell activity as exhibited by a decrease in ATP production without a negative impact on cell viability. It is hypothesized that this reduction on ATP production is a result of a redirection in immune cell focus, essentially diminishing the distraction induced by the addition of PHA to the microtiter wells.

Salivary Secretory IgA-Preliminary Investigation

Twenty-four subjects naïve to transfer factor supplementation were enrolled in a small-scale, preliminary test. Twenty-one were included in the final analysis. Salivary samples were collected from each subject weekly at roughly the same time of day and day of the week. Saliva was collected over a 5 minute period via passive drool while subjects chewed on a piece of Parafilm™. The samples were put on ice and then frozen at -70°C until assay. The commercial Salimetrics™ salivary IgA assay kit was used for analysis. Subjects were given 4Life Transfer Factor Tri-Factor Formula at 2 capsules per day for two weeks and then transitioned to 4Life Transfer Factor RioVida Tri-Factor Formula at 60m1 per day for an additional 2 weeks. At the end of the 4 week supplementation period the group showed an average 73% increase in salivary secretory IgA (SIgA) production over their baseline value. Furthermore, none of the 21 subjects showed SIgA production rate less than their baseline value at the end of the test.

Wellness Research

A study conducted with 30 college students found that either lx 15 days or 2x 15 days (with 2 weeks break in between) of transfer factor administered according to label dose helped them maintain their health. In both groups, transfer factor administration improved the number of CDS+ T cells and NK cells to healthier levels. Particularly, those that took the product for 2x 15 days showed prolonged health maintenance and improvement of immune cells markers than those who took it for 15 days. Specifically, the maintenance of good health and improvement of immune cells markers remained for up to 3 months after stopping transfer factor administration in those that took the product for 2x 15 days in comparison to 1 month in those that took the product for 1x 15 days. (15)

Safety

In a study of acute toxicity rats were assessed for fourteen days following a single gavage of 4Life Transfer Factor. Five female SD rats were each gavaged with a dose of 2,000mg/ kg. No treatment-related mortalities occurred and there were no clinical signs of toxicity. No significant difference in body weight occurred. No gross lesions were found at necropsy in any of the animals. Thus, acute toxicity is considered to be greater than 2,000mg/kg (human equivalent dose of approximately 320 mg/kg). (16)

Another similar single-dose oral toxicity study was conducted in mice. Six female Wistar mice each received 2,000mg/kg via oral gavage and monitored for fourteen days. No observable toxicity occurred as assessed by mortality, body weight gain, histopathology of brain, liver, kidneys and lungs, and clinical signs of aggression, lethargy, breathing difficulties, diarrhea, mobility and shivering. Thus, the no-observed adverse effect level was considered to be greater than 2,006mg/kg in mice, which is equivalent to approximately 9.7g/kg in humans. (17) The use of transfer factors is contraindicated in person receiving immunosuppressive therapy, though actual interactions have not been documented. The use of transfer factors during pregnancy and nursing has not been evaluated.

HOW SUPPLIED

4Life Transfer Factor® can be found in the following products:

4Life Transfer Factor® Tri-Factor® Formula
4Life® Transfer Factor Plus® Tri-Factor® Formula
4Life Transfer Factor® RioVida® Tri-Factor® Formula
4Life Transfer Factor® Chewable Tri-Factor® Formula
4Life Transfer Factor® Classic
4Life Transfer Factor® Immune Spray
4Life Transfer Factor® KBU®
4Life Transfer Factor® Belle Vie®
4Life Transfer Factor® Cardio
4Life Transfer Factor® GluCoach®
4Life Transfer Factor® MalePro®
4Life Transfer Factor® ReCall®
4Life Transfer Factor Reflexion®
4Life Transfer Factor Vista®
Renuvo®
RiteStart® Men
RiteStart® Women
RiteStart® Kids & Teens
PRO-TF®

4Life Transfer Factor is protected by U.S. Patents 6,468,534 and 6,866,868, with other patents pending.

REFERENCES

1. **Fundenberg, H. and G. Pizza.** 1994, Progress in Drug Research, Vol. 42, pp. 309-400.
2. **Lawrence, H.S. and W. Borkowsjy.** (1-3), 1996, Biotherapy, Vol. 9, pp. 1-5.
3. **Kirkpatrick, C.H.** 4, 2000, Mel Med, Vol. 6, pp. 332-41.
4. **Hermon, W. and Ell. Lisonbee.** s.l. U.P. Office, Editor., 2002, 4Life Research, LC:USA.
5. **Wilson, G. and G. Paddock.** S.l.: U.P. Office, Editor., 1989, Amtron, Inc' USA.
6. **Lawrence, H.S,** 4, 1949, Proc Soc Exp Biol Med, Vol. 71, pp. 516-22.
7. **Lawrence, H.S.** 2, 1955, J Clin Invest, Vol, 34, pp, 219-30
8. **Levin, A.S., L.E. Spitler, and H.H. Fundenberg.** 1973, Annu Rev Med, Vol. 24, pp. 175-208,
9. **Fudenberg, H. and H. Fudenberg.** 1989, Ann Rev Plharmacol Toxicol, Vol29, pp. 475-516.
10. **See, D, S. Mason, and R. Roshan.** 2, 2002, Immunol Invest, Vol. 31, pp. 137-53.
11. **Dwyer, John M.** 1-3, 1996, Bietherapy, Vol. 9, pp. 7-11.
12. **Wilson, G.B., R.T. Newell, and N.M. Burdash.** 1, 1979, Cell Immunol, Vol. 47, pp. 1-18.
13. **Radosevich, J.K., G.H. Scott, and G.D. Olson.** 4, 1985, Am J Vet Res, Vol, 46, pp. 875-8.
14. **Kirkpatrick, C.H.** 1-3, 1996, Biotherapy, Vol. 9, pp. 13-6.
15. **Klimov, V. and E. Oganova.** in Euromedica Hannover 2004. Hannover, Germany : s.n., 2004. pp. 1.5-16.
16. **Kabirov, K.K.** 2009, unpublished: University of Illinois at Chicago.
17. **Burbano, Z. and G. Sarmiento.** 2013. Facultad de Ciencies Quirnicas, Universidad de Guayaquil, Ecuador.

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