Dev Biol. 1984 Jul;104(1):28-36.

Collagen in the egg shell membranes of the hen.

Wong M, Hendrix MJ, von der Mark K, Little C, Stern R.

Abstract

Collagen-like proteins have been found in the egg shell membranes of the hen. Materials similar to types I and V collagens were detected in each of the two layers of this membrane, the thick outer membrane and the thin inner membrane. Collagen was extracted by acid-pepsin digestion and isolated by differential salt precipitation. Identification of type-specific collagen-like material was established by coelectrophoresis on SDS-polyacrylamide gels using known collagen standards. These bands were susceptible to digestion by bacterial collagenase. From differential staining of the gels it was estimated that the ratio of collagen types I:V was approximately 100:1. Further confirmation of these biochemical results was obtained with immunofluorescence microscopy using type-specific antisera against chicken types I and V collagen with the indirect sandwich technique. Both the inner and outer shell membranes contained the two types of collagen. Within each membrane, the large, coarse 2.5-micron fibers contained predominantly type I collagen-like material, while type V collagen was mainly associated with the delicate narrower fibers of approximately 0.6-micron diameter. These tended to be concentrated in the inner membrane. At the electron microscopic level, both types of fibers were coated with glycoproteins that stained positively with ruthenium red. The deposition of these collagen-like substances by the hen oviduct on to the surface of the developing egg is an additional example of interstitial-type collagen synthesis and secretion by epithelial rather than by mesenchymal cells.

Connect Tissue Res. 1991;26(1-2):37-45.

Collagens of the chicken eggshell membranes.

Arias JL, Fernandez MS, Dennis JE, Caplan AI.

Source

Department of Animal Biological Sciences, University of Chile, Santiago.

Abstract

An immunohistochemical analysis of the eggshell membranes shows the occurrence of type X collagen while type I collagen was not detected by using an appropriate monoclonal antibody

with untreated shell membranes. A positive immuno-reaction for type I collagen was obtained after digestion of the shell membranes with pepsin. These observations indicate the possibility that type I collagen epitope was masked by type X collagen and that type X collagen may serve as an inhibitory boundary for biomineralization.

Poult Sci. 2001 May;80(5):681-4.

Extraction of glycosaminoglycans from chicken eggshell.

Nakano T, Ikawa N, Ozimek L.

Source

Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Canada. tnakano@gpu.srv.ualberta.ca

Abstract

The objectives of this study were to analyze glycosaminoglycan (GAG) and mineral composition in the chicken eggshell. Eggshells were decalcified with acetic acid, and GAG was extracted from the decalcified shell by digestion with papain. The eggshell contained an average of 0.024% of its dry weight as uronic acid, a carbohydrate moiety of GAG. The eggshell GAG consisted of approximately 48% hyaluronic acid and and 52% galactosaminoglycan. In the latter, chondroitin sulfate-dermatan sulfate copolymers were the major galactosaminoglycans with dermatan sulfate disaccharide as a relatively minor component. The inorganic material recovered after decalcification accounted for approximately 140% of dry weight of the eggshell and contained 24.11% calcium, 0.04% phosphorous, and 0.23% magnesium, with an undetectable amount of nitrogen.

J Cell Physiol. 1998 Dec;177(3):465-73.

Hyaluronic acid stimulates human fibroblast proliferation within a collagen matrix.

Greco RM, Iocono JA, Ehrlich HP.

Source

Department of Surgery, Hershey Medical Center, Pennsylvania State University College of Medicine, 17033, USA.

Abstract

Human dermal fibroblasts suspended in a collagen matrix exhibit a 4-day delay in cell division, while the same cells in monolayer divided by day 1. The initial rates of 3H-thymidine incorporation by cells in monolayer or suspended in collagen were not significantly different. When suspended in collagen, there was a threefold increase in the proportion of cells in a tetraploidal (4N) DNA state compared to the same cells in monolayer. Flow cytometry analysis and 3H-thymidine incorporation studies identified the delay of cell division as a consequence of a block in the G2/M of the cell cycle and not an inhibition of DNA synthesis. The inclusion of 150 microg/ml of hyaluronic acid (HA) in the manufacture of fibroblast populated collagen lattices (FPCL) caused a stimulation of cell division, as determined by cell counting; increased the expression of tubulin, as determined by Western blot analysis; and reduced the proportion of cells in a 4N state, as determined by flow cytometry. HA added to the same cells growing in monolayer produced a minimal increase in the rate of cell division or DNA synthesis. HA supplementation of FPCLs stimulated cell division as well as tubulin concentrations, but it did not enhance lattice contraction. The introduction of tubulin isolated from pig brain or purchased tubulin into fibroblasts by electroporation prior to their transfer into collagen lattices promoted cell division in the first 24 hours and enhanced FPCL contraction. It is proposed that tubulin protein, the building blocks of microtubules, is limited in human fibroblasts residing within a collagen matrix. When human fibroblasts are suspended in collagen, one effect of added HA may be to stimulate the synthesis of tubulin which assists cells through the cell cycle.

Semin Arthritis Rheum. 2000 Oct;30(2):87-99.

Role of collagen hydrolysate in bone and joint disease.

Moskowitz RW.

Source

Case Western Reserve University, Division of Rheumatic Diseases, University Hospitals of Cleveland, OH, USA.

Abstract

OBJECTIVES:

To review the current status of collagen hydrolysate in the treatment of osteoarthritis and osteoporosis.

METHODS:

Review of past and current literature relative to collagen hydrolysate metabolism, and assessment of clinical investigations of therapeutic trials in osteoarthritis and osteoporosis.

RESULTS:

Hydrolyzed gelatin products have long been used in pharmaceuticals and foods; these products are generally recognized as safe food products by regulatory agencies. Pharmaceutical-grade collagen hydrolysate (PCH) is obtained by hydrolysis of pharmaceutical gelatin. Clinical studies suggest that the ingestion of 10 g PCH daily reduces pain in patients with osteoarthritis of the knee or hip; blood concentration of hydroxyproline is increased. Clinical use is associated with minimal adverse effects, mainly gastrointestinal, characterized by fullness or unpleasant taste. In a multicenter, randomized, doubleblind, placebo-controlled trial performed in clinics in the United States, United Kingdom, and Germany, results showed no statistically significant differences for the total study group (all sites) for differences of mean pain score for pain. There was, however, a significant treatment advantage of PCH over placebo in German sites. In addition, increased efficacy for PCH as compared to placebo was observed in the overall study population amongst patients with more severe symptomatology at study onset. Preferential accumulation of 14C-labeled gelatin hydrolysate in cartilage as compared with administration of 14C-labeled proline has been reported. This preferential uptake by cartilage suggests that PCH may have a salutary effect on cartilage metabolism. Given the important role for collagen in bone structure, the effect of PCH on bone metabolism in osteoporotic persons has been evaluated. Studies of the effects of calcitonin with and without a collagen hydrolysate-rich diet suggested that calcitonin plus PCH had a greater effect in inhibiting bone collagen breakdown than calcitonin alone, as characterized by a fall in levels of urinary pyridinoline cross-links. PCH appeared to have an additive effect relative to use of calcitonin alone.

CONCLUSIONS:

Collagen hydrolysate is of interest as a therapeutic agent of potential utility in the treatment of osteoarthritis and osteoporosis. Its high level of safety makes it attractive as an agent for long-term use in these chronic disorders.

Eur J Biochem. 1999 Aug;263(3):912-20.

Transferrins, the mechanism of iron release by ovotransferrin.

Abdallah FB, Chahine JM.

Source

Institut de Topologie et de Dynamique des Systèmes, l'Université Denis Diderot Paris 7 associé au CNRS, Paris, France.

Abstract

Iron release from ovotransferrin in acidic media (3 < pH < 6) occurs in at least six kinetic steps. The first is a very fast (</= 5 ms) decarbonation of the iron-loaded protein. Iron release from both sites of the protein is controlled by what appear to be slow proton transfers. The N-site loses its iron first in two steps, the first occurring in the tenth of a second range with second order rate constant k1 = (2.30 +/- 0.10) x 104 M-1.s-1, first order rate constant k-1 = (1.40 +/- 0.10) s-1 and equilibrium constant K1a = (60 +/- 6) microM. The second step occurs in the second range with a second order rate constant k2 = (5.2 +/- 0.15) x 103 M-1.s-1, first order rate constant k-2 = (0.2 +/- 0.02) s-1 and equilibrium constant K2a = (39 +/- 5) microM. Iron is afterward lost from the C-site of the protein by two different pathways, one in the presence of a strong Fe(III) ligand such as citrate and the other in the presence of weak ligands such as formate or acetate. The first step, common to both paths, is a slow proton uptake which occurs in the tens of second range with a second order rate constant k3 = (1.22 +/- 0.03) x 103 M-1.s-1 and equilibrium constant K3a = (1.0 +/- 0.1) mM. In the presence of citrate, this step is followed by formation of an intermediate complex with monoferric ovotransferrin; stability constant KLC = (0.435 +/- 0.015) mM. This last step is rate-controlled by slow proton gain which occurs in the hundred second range with a second order rate constant k4 = (1.05 +/- 0.05) x 104 M-1.s-1, first order rate constant k-4 = (1.0 +/- 0.1) x 10-2 s-1 and equilibrium constant K4a = (0.95 +/- 0.15) microM. In the presence of a weak iron(III) ligand such as acetate or formate, formation of an intermediate complex is not detected and iron release is controlled by two final slow proton uptakes. The first occurs in the hundred to thousand second range, second order rate constant k5 = (6.90 +/- 0.30) x 106 M-1.s-1. The last step occurs in the thousand second range. Iron release by ovotransferrin is similar but not identical to that of serum-transferrin. It is slower and occurs at lower pH values. However, as seen for serum-transferrin, it seems to involve the protonation of the amino acid side-chains involved in iron co-ordination and perhaps those implicated in interdomain H-bonds. The observed proton transfers are, then, probably controlled by the change in conformation of the binding lobes from closed when iron-loaded to open in the apo-form.

Eur J Biochem. 1999 Aug;263(3):912-20.

Transferrins, the mechanism of iron release by ovotransferrin.

Abdallah FB, Chahine JM.

Source

Institut de Topologie et de Dynamique des Systèmes, l'Université Denis Diderot Paris 7 associé au CNRS, Paris, France.

Abstract

Iron release from ovotransferrin in acidic media (3 < pH < 6) occurs in at least six kinetic steps. The first is a very fast (</= 5 ms) decarbonation of the iron-loaded protein. Iron release from both sites of the protein is controlled by what appear to be slow proton transfers. The N-site loses its iron first in two steps, the first occurring in the tenth of a second range with second order rate constant k1 = (2.30 +/- 0.10) x 104 M-1.s-1, first order rate constant k-1 = (1.40 +/- 0.10) s-1 and equilibrium constant K1a = (60 +/- 6) microM. The second step occurs in the second range with a second order rate constant k2 = (5.2 +/- 0.15) x 103 M-1.s-1, first order rate constant k-2 = (0.2 +/- 0.02) s-1 and equilibrium constant K2a = (39 +/- 5) microM. Iron is afterward lost from the C-site of the protein by two different pathways, one in the presence of a strong Fe(III) ligand such as citrate and the other in the presence of weak ligands such as formate or acetate. The first step, common to both paths, is a slow proton uptake which occurs in the tens of second range with a second order rate constant k3 = (1.22 +/- 0.03) x 103 M-1.s-1 and equilibrium constant K3a = (1.0 +/- 0.1) mM. In the presence of citrate, this step is followed by formation of an intermediate complex with monoferric ovotransferrin; stability constant KLC = (0.435 +/- 0.015) mM. This last step is rate-controlled by slow proton gain which occurs in the hundred second range with a second order rate constant k4 = (1.05 +/- 0.05) x 104 M-1.s-1, first order rate constant k-4 = (1.0 +/- 0.1) x 10-2 s-1 and equilibrium constant K4a = (0.95 +/- 0.15) microM. In the presence of a weak iron(III) ligand such as acetate or formate, formation of an intermediate complex is not detected and iron release is controlled by two final slow proton uptakes. The first occurs in the hundred to thousand second range, second order rate constant k5 = (6.90 +/- 0.30) x 106 M-1.s-1. The last step occurs in the thousand second range. Iron release by ovotransferrin is similar but not identical to that of serum-transferrin. It is slower and occurs at lower pH values. However, as seen for serum-transferrin, it seems to involve the protonation of the amino acid side-chains involved in iron co-ordination and perhaps those implicated in interdomain H-bonds. The observed proton transfers are, then, probably controlled by the change in conformation of the binding lobes from closed when iron-loaded to open in the apo-form.

Int J Tissue React. 1983;5(1):97-105.

Studies of the antimicrobial activity of ovotransferrin.

Valenti P, Antonini G, Von Hunolstein C, Visca P, Orsi N, Antonini E.

Abstract

The antibacterial activity of ovotransferrin (conalbumin) against different bacterial species was studied in vitro. The most sensitive species were Pseudomonas sp., E. coli, S. mutans; and the most resistant ones S. aureus, Proteus sp., Klebsiella. The bacteriostatic activity of conalbumin in various conditions was also tested. The presence of bicarbonate ions always increased the activity of conalbumin, while an antagonistic effect of citrate was observed in bacteria with a receptor for the iron-citrate complex. Experiments with conalbumin covalently linked to Sepharose 4B indicated that its antibacterial activity may not be due simply to the removal of iron from the medium, but probably involves other metals and an interaction with the bacterial surface. The in vitro studies carried out with conalbumin and lactoferrin demonstrated that the two proteins produced a similar inhibition of growth of E. coli and S. mutans. The in vivo studies showed that the protective effect of conalbumin in newborn guinea pigs with E. coli by gastrointestinal route was similar to that naturally provided by the lactoferrin present in milk.

N Engl J Med. 1997 Sep 25;337(13):874-80.

Efficacy and safety of the neuraminidase inhibitor zanamivir in the treatment of influenzavirus infections. GG167 Influenza Study Group.

Hayden FG, Osterhaus AD, Treanor JJ, Fleming DM, Aoki FY, Nicholson KG, Bohnen AM, Hirst HM, Keene O, Wightman K.

Source

University of Virginia, Charlottesville 22908, USA.

Abstract

BACKGROUND:

The sialic acid analogue zanamivir (GG167) is a selective inhibitor of influenza A and B virus neuraminidases. These viral enzymes are essential for the release of virus from infected cells, and they may also reduce the inactivation of virus by respiratory secretions. When administered experimentally directly to the respiratory tract, zanamivir has potent antiviral effects. We assessed the therapeutic activity of zanamivir in adults with acute influenza.

METHODS:

We conducted separate randomized, double-blind studies in 38 centers in North America and 32 centers in Europe during the influenza season of 1994-1995. A total of 417 adults with influenza-like illness of < or =48 hours' duration were randomly assigned to one of three treatments: 6.4 mg of zanamivir by intranasal spray plus 10 mg by inhalation, 10 mg of zanamivir by inhalation plus placebo spray, or placebo by both routes. Treatments were self-administered twice daily for five days.

RESULTS:

Of 262 patients with confirmed influenza-virus infection (63 percent of all patients), the median length of time to the alleviation of all major symptoms was one day shorter (four days vs. five days) in the 88 patients given inhaled and intranasal zanamivir (P=0.02) and the 85 patients given inhaled zanamivir alone (P=0.05) than in the 89 patients given placebo. Among the infected patients who were febrile at enrollment and among those who began treatment within 30 hours after the onset of symptoms, the median time to the alleviation of major symptoms was four days in both zanamivir groups and seven days in the placebo group (P< or =0.01). Viral titers of nasal washings in the group given inhaled and intranasal zanamivir were significantly lower than those in the placebo group. The topically administered zanamivir was well tolerated.

CONCLUSIONS:

In adults with influenza A or B virus infections, direct administration of a selective neuraminidase inhibitor, zanamivir, to the respiratory tract is safe and reduces symptoms if begun early.

Protein Pept Lett. 2006;13(8):769-72.

The stability curve of hen egg white lysozyme.

Younvanich SS, Britt BM.

Source

Department of Chemistry and Physics, Texas Woman's University, Denton, TX 76204, USA.

Abstract

The physiological stability curve--a plot of the free energy of unfolding versus temperature--is calculated for hen egg white lysozyme from a combination of extrapolated unfolding thermodynamic data from reversible conditions and isothermal titrations with guanidine hydrochloride. The shape of the curve suggests the existence of only one folded conformation.

J Biomater Sci Polym Ed. 2006;17(11):1301-15.

Antimicrobial polypeptide multilayer nanocoatings.

Rudra JS, Dave K, Haynie DT.

Source

Biomedical Engineering, Bionanosystems Engineering Laboratory, Center for Applied Physics Studies, PO Box 10348, Louisiana Tech University, Ruston, LA 71272, USA.

Abstract

A multilayer coating (or film) of nanometer-thick layers can be made by sequential adsorption of oppositely charged polyelectrolytes on a solid support. The method is known as layer-by-layer assembly (LBL). No special apparatus is required for LBL and nanofilms can be prepared under mild, physiological conditions. A multilayer nanofilm in which at least one of the constituent species is a polypeptide is a polypeptide multilayer nanofilm. The present work was aimed at assessing whether polypeptide multilayer nanofilms with specific antimicrobial properties could be prepared by incorporation of a known antimicrobial agent in the film structure, in this case the edible protein hen egg white lysozyme (HEWL). The chicken enzyme is widely employed as a human food preservative. An advantage of LBL in this context is that the nanofilm is fabricated directly on the surface of interest, eliminating the need to incorporate the antimicrobial in other packaging materials. Here, nanofilms were made of poly(L-glutamic acid) (PLGA), which is highly negatively charged in the mildly acidic pH range, and HEWL, which has a high net positive charge at acidic pH. We show that PLGA/HEWL nanofilms inhibit growth of the model microbe Micrococcus luteus in the surrounding liquid medium. The amount of HEWL released from PLGA/HEWL films depends on the number of HEWL layers and therefore on the total quantity of HEWL in the films. This initial study provides a sketch of the scope for further development of LBL in the area of antimicrobial polypeptide multilayer films. Potential applications of such films include strategies for food preservation and coatings for implant devices.

Thermal inactivation of lysozyme as influenced by pH, sucrose and sodium chloride and inactivation and preservative effect in beer (Citations: 11)
F. Makki, T. D. Durance
Thermal stability of lysozyme in aqueous buffer solutions was studied at selected temperatures (73–100 °C), pH values (4.2–9.0) and levels of sucrose (0%, 5%, 15%) and sodium chloride (0, 0.1 M, 1 M). The results, fitted to a first-order model and expressed in terms of decimal reduction time (D), inactivation rate constant (k), decimal reduction temperature (z) and Arrhenius activation energy (Ea) indicated that lysozyme was most stable at pH 5.2, and thermal stability decreased sharply as the pH increased to 9.0. A regression equation for prediction of k as a function of pH and temperature was derived, with the best fit obtained for the model in the pH range of 5.2–7.2 (adjusted multiple r2 = 0.98). At pH 7.2 and 9.0, sodium chloride had a clear stabilizing effect against heat inactivation of lysozyme. Sucrose stabilized lysozyme against heat inactivation at 75 °C but not at 91 °C.Thermal inactivation kinetics of lysozyme and its potential to prevent or delay microbial growth were investigated in beer. Lysozyme at concentrations of 10 and 50 ppm appeared to delay growth of the spoilage bacteria L. brevis and P. damnosus in beer, but did not prevent growth of the bacteria.
Journal: Food Research International - FOOD RES INT , vol. 29, no. 7, pp. 635-645, 1996

Use of Lysozyme to Inhibit Malolactic Fermentation and to Stabilize Wine After Malolactic Fermentation

1. V. Gerbaux,
2. A. Villa,
3. C. Monamy and
4. A. Bertrand

- Author Affiliations

1. *Institut Technique de la Vigne et du Vin (ITV), 6 rue du 16ème Chasseur, 21200 Beaune, France*
2. *Fordras S. A., 20 viale Stefano Franscini, Lugano Switzerland*
3. *Bureau Interprofessionnel des Vins de Bourgogne (BIVB), 12 Boulevard Bretonnière, 21200 Beaune, France*
4. *Institut d'Oenologie de Bordeaux, Université de Bordeaux II, 33400 Talence, France.*

Abstract

Lysozyme was evaluated for its ability to reduce the lactic bacteria flora in musts and in wines after completion of the malolactic conversion. An addition of 500 mg lysozyme per liter of grape must inhibited malolactic fermentation, while the addition of 250 mg/L to red wines, after

malolactic fermentation, promoted microbiological stabilization. Control lots (without lysozyme) had higher bacterial populations. In the wines to which lysozyme was added, there was no increase in the content of acetic acid and biogenic amines during a period of six months at 18°C. Control lots after fermentation and processing had volatile acidity levels 20% higher and a cumulative value for histamine, tyramine, and putrescine four times higher.

Inhibition of spoilage lactic acid bacteria by lysozyme during wine alcoholic fermentation

YUN CAI GAO, GUOPENG ZHANG, SHERI KRENTZ, SUE DARIUS, JENNIFER POWER, GILLES LAGARDE

Canadian Inovatech Inc., 31212 Peardonville Road, Abbotsford, British Columbia, Canada V2T 6K8
Australian Journal of Grape and Wine Research (impact factor: 2.47). 03/2008; 8(1):76 - 83.
DOI:10.1111/j.1755-0238.2002.tb00214.x

ABSTRACT The efficacy of lysozyme against indigenous lactic acid bacteria (LAB) and four inoculated spoilage LAB cultures was investigated in laboratory scale Chardonnay winemaking trials (at pH 3.8). These LAB cultures included Lactobacillus kunkeei, Lactobacillus brevis, Pediococcus parvulus, and Pediococcus damnosus. Three concentrations of lysozyme were used: 0, 125 and 250 mg/L. Alcoholic fermentation of the grape juice was carried out at 20±0.5°C using Saccharomyces cerevisiae. Lysozyme did not have any negative impact on yeast growth and sugar reduction. This enzyme was found to be very effective in inhibiting the growth of all four LAB cultures investigated. Under the given experimental conditions, as high as an 8 log cell reduction was obtained for some of the strains. The acetic acid production by L. brevis and L. kunkeei was significantly reduced in the treatments with 125 and 250 mg/L lysozyme added ($P < 0.01$). The effect of lysozyme on the cells of the LAB cultures was examined under a scanning electron microscope. It is evident that lysozyme had a detrimental impact on the cells of these cultures. Based on these observations, it is concluded that lysozyme may be a useful tool for winemakers to control the growth of spoilage LAB and to reduce the production of volatile acids. The addition of lysozyme may also prevent the increase of volatile acidity during stuck/sluggish alcoholic fermentation. This tool is particularly useful in high pH wines where SO2 is less effective.

Oral Dis. 2002 Jan;8(1):23-9.

Clinical applications of antimicrobial host proteins lactoperoxidase, lysozyme and lactoferrin in xerostomia: efficacy and safety.

Tenovuo J.

Source

Institute of Dentistry and Turku Immunology Centre, University of Turku, Finland.
jorma.tenovuo@utu.fi

Abstract

Innate human salivary defence proteins, lysozyme, lactoferrin and peroxidase, are known to exert a wide antimicrobial activity against a number of bacterial, viral and fungal pathogens in vitro. Therefore, these proteins, alone or in combinations, have been incorporated as preservatives in foods and pharmaceuticals as well as in oral health care products to restore salivas' own antimicrobial capacity in patients with dry mouth. These antimicrobials used in oral health care products, such as dentifrices, mouth-rinses, moisturizing gels and chewing gums, have been purified from bovine colostrum. In this review I critically evaluate the clinical efficacy and safety of this kind of preventive approach against various oral diseases and symptoms.

EXS. 1996;75:433-49.

Pharmacological aspects and therapeutic applications of lysozymes.

Sava G.

Source

Fondozione Callerio, Institutes of Biological Research, Trieste, Italy.

Abstract

The therapeutic effectiveness of lysozyme (large scale manufactured hen egg-white lysozyme) is actually based on its ability to control the growth of susceptible bacteria and to modulate host immunity against infections and depressions of immune responses. If the former is based on the first evidence of the biological activity of this enzyme, the second is a relatively recent

acquisition of extreme importance for the possibilities offered in terms of the regulation of the functioning of the host's immune system. Antibotic activity and immune stimulating effects are also used together, as in the case of the treatment of gastrointestinal infections, including those originated by therapeutical treatments. Based on these biological properties, in addition to the wide range of therapeutic activities for which lysozyme was exploited in the past, at present the most promising data concern the prevention of bacterial cariogenesis and treatment of cancer patients to improve the effectiveness of anticancer drugs or to allow the host to recover from the immune suppression caused by anticancer treatments. However, lysozyme does not yet hold a clear place as an immune modulating agent, in spite of the fact that it has been shown to stimulate immunity with no difference between experimental animals and human beings. The hope is therefore that doctors will understand its potential and that they will take advantage of the existence of this simple and useful molecule.

Auris Nasus Larynx. 1990;17(1):33-8.

Evaluation of the effects of antigen specific immunotherapy on chronic sinusitis in children with allergy.

Asakura K, Kojima T, Shirasaki H, Kataura A.

Source

Department of Otolaryngology, Sapporo Medical College, Japan.

Abstract

The purpose of this study is to evaluate the clinical significance of allergy in children with chronic sinusitis. After allergic examinations, 52 sinusitis children were divided into allergic and non-allergic groups: 37 allergic children were treated with either the combination of antigen specific immunotherapy and medication with lysozyme chloride preparation (AI group, n = 20) or medication alone (AM group, n = 17); 15 non-allergic patients were also treated with lysozyme chloride preparation (NAM group). The treatment results including the radiographic improvements were significantly better in the AI group than in the AM or NAM group. The clinical effects of lysozyme chloride preparation tended to be better in the NAM group than in the AM group.

Biochim Biophys Acta. 2000 Jun 1;1475(1):27-34.

The mode of actions of lysozyme as an immunoglobulin production stimulating factor.

Sugahara T, Murakami F, Yamada Y, Sasaki T.

Source

Department of Biotechnology, College of Agriculture, Ehime University, 3-5-7 Tarumi, Matsuyama, Ehime, Japan. mars95@agr.ehime-u.ac.jp

Abstract

As we demonstrated before, hen egg white lysozyme stimulates immunoglobulin production by a human-human hybridoma line, HB4C5 cells and human peripheral blood lymphocytes. Then, the mode of actions of lysozyme as an immunoglobulin production stimulating factor was investigated. The immunoglobulin production stimulating activity of lysozyme was inactivated by trypsin digestion, even though the enzymatic activity was completely preserved. This fact suggests that the immunoglobulin production stimulating effect of lysozyme is irrelevant to its enzymatic function. Furthermore, this means that the effect is a novel function of this enzyme. Lysozyme enhanced IgM production by transcription-suppressed HB4C5 cells treated with actinomycin D. However, the enzyme was ineffective to accelerate IgM production by translation-suppressed HB4C5 cells treated with cycloheximide or sodium fluoride. In addition, the intracellular IgM content of HB4C5 cells treated with monensin for suppression of the post-transcription activity was obviously increased by lysozyme, although the secretion of IgM was inhibited. These findings suggest that lysozyme accelerates the translation process to enhance immunoglobulin productivity.