



A Study of Application of Cyclosporine A in Medical Treatment

Cyclosporines contain some unusual amino acids and belonging to family of cyclic undecapeptides antibiotic and it produced by using various strain fungal via fermentation process. Cyclosporine A (CyA), exhibits antifungal, antiparasitic and anti-inflammatory properties and use as an immunosuppressive drugs in medical field. This drug has been used in majority of human organ transplantation surgeries and also in the treatment of autoimmune diseases. It has been shown the great success in recipients of kidney, liver, bone marrow and pancreas transplants. It is used as transplantation medicine. And earlier periods it was most challenging and complex areas of modern medicine because of medical management problems in transplant rejection, as an immune response to the transplanted organ.

Key Words : Cyclosporine A (CyA), medical field, immunosuppressive.

RAJESH K. SRIVASTAVA

Introduction :

The study the impact of different cheap solid medium substrates could help to achieve the optimum fungal growth and maximum product yield and productivity. It can develop by having more information on process development and optimum metabolism stage study. Ismaiel et al has briefly described the optimum fermentation conditions and medium requirements necessary for CyA production by *Fusarium roseum* and studied the different concentrations of the most productive carbon sources range from 2% to 6% (w/v) with eight different nitrogen sources including organic and inorganic ones as substitutes for yeast extract (Ismaiel et al., 2010).

Patient morbidity has come down and also possible to transplant organs such as heart, the liver, the lung and combined heart lung transplants with success rate 20% higher than previously time (Kahan, 1999; Bach, 1999). Cyclosporine action studies has performed to determine whether selective for lymphocytes and to exclude any cytostatic effects on cells other than lymphocytes. Study had showed that in vitro cyclosporine is 300 times more active in preventing the proliferation of spleen lymphoid cells than on nonlymphoid mastocytoma cells (Borel and Wiesinger, 1977). Another study had done to analyze the effect of cyclosporine on bone marrow cell count and haematopoietic myeloid stem cell proliferation in mice. Effects were minimal. Even at high doses, no effect was found on haematopoietic myeloid stem cell

proliferation and bone marrow cell count was only slightly reduced (Borel et al 1976). Cyclosporine A is used to treat people with rheumatoid arthritis who have not responded well to other medications. It also is used to treat other rheumatic conditions and severe forms of psoriasis (Misra et al., 2007).

Cyclosporine A :

The drug-receptor complex specifically and competitively binds to and inhibits calcineurin, a calcium- and calmodulin-dependent phosphatase. They lead to reduce transcriptional activation of cytokine genes for interleukin (IL)-2, tumor necrosis factor (TNF)-alpha, IL-3, IL-4, CD40L, granulocyte-macrophage colony-stimulating factor, and interferon-gamma (Mochizuki et al., 1993).

In vitro study of cells of CyA-treated animals has manifested a vigorous proliferative response by inhibition by the addition of a large panel of anti-cytokine mAb. This cells from CsA-treated animals has shown enhance secondary response to the priming alloantigen, which undergone clonal expansion in vivo. Although CTL activity was markedly suppressed in cells from CsA-treated animals, after a 36-h culture in the absence of CsA, Cytotoxic T lymphocytes (CTL) activity was detected in cells from nontreated animals. It supports the existence of an alternative IL-2-independent, CsA-resistant pathway of T cell activation/differentiation may play a prominent role in the generation of certain T effector functions in vivo (Pereira et al., 1992).

Department of Biotechnology, GIT, GITAM University, Gandhi Nagar Campus, Rushikonda, Visakhapatnam (Andhra Pradesh)

Application of Cyclosporin A :

Kidney allograft survival :

Cyclosporin A has to provide to donor for pretreatment prior to organ harvesting or as a graft pretreatment during preservation of canine kidney allografts by hypothermic pulsatile perfusion or hypothermic storage. All recipients should be received for minimal immunosuppression with azathioprine after transplantation (5 to 2.5 mg. per kg. per day) except in Group IX people or recipient having haemophilia B disease. This personal has deficiency of clotting factor IX (where as haemophilia A is due to a deficiency of clotting factor VIII) (Toledo-Pereyra et al., 1984).

Liver Transplanted Patients :

Liver transplant recipients have treated with either cyclosporin or tacrolimus to prevent rejection. Both drugs has inhibited calcineurin phosphatase via the mechanism of their anti-rejection effect and principle toxicities which have shown different pharmacokinetic profiles and potencies. Tacrolimus has found more superior to cyclosporin in improving survival (patient and graft) and preventing acute rejection after liver transplantation, but it increases the risk of post-transplant diabetes.

Treatment of 100 recipients with tacrolimus instead of cyclosporin has avoided acute rejection and steroid-resistant rejection in nine and seven patients, respectively, and graft loss and death in five and two patients, respectively, but four additional patients would develop diabetes after liver transplantation (Haddad et al., 2006).

Conclusion :

Cyclosporines belong to family of cyclic undecapeptides antibiotic having some unusual amino acids in their structure and produced generally via fermentation process. Antifungal, antiparasitic and anti-inflammatory properties are the characteristic of cyclosporine A (CyA) as immunosuppressive drugs and transplanted medicine. Human organ transplantation surgeries as well as autoimmune diseases are cured by this drug. It showed great success in transplantation of recipients of kidney, liver, bone marrow and pancreas. Medical management problems are most challenging and complex process for modern medicine.

References :

- (1) Ismaiel; A.A., El-Sayed, E.S.A., Mahmoud A.A. (2010) : *Some optimal culture conditions for production of cyclosporin a by Fusarium roseum. Braz. J. Microbiol. 41(4): 1112-1123.*
- (2) Kahan, B.D. (1999) : *Cyclosporine: a revolution in transplantation. Transplantation Proceedings, 31: (Suppl 1/2A), 14S-15S.*
- (3) Bach, J.F. (1999) : *The contribution of cyclosporine A to the understanding and treatment of autoimmune diseases. Transplantation Proceedings, 31: (Suppl 1/2A), 16S-18S.*
- (4) Borel, J. F., Wiesinger, D. (1977) : *Regulatory mechanisms in lymphocyte activation. New York Press, 56: 716-721.*

(5) Borel, J. F., Feurer, C., Gubler, H.U. & Stähelin, H. (1976) : *Biological effects of cyclosporin A: a new antilymphocytic agent. Agents and Actions, 6: 468-475.*

(6) Misra, M., Mittal, M., Singh, R., Verma, A., Rai, R., Chandra, G, Singh, D., Chauhan, R., Chowdhary, V., Singh, R., Mall, A., Khan, M.J., Khare, S., Yadav, K., 2007. *Prevalence of rheumatic heart disease in school-going children of Eastern Uttar Pradesh, Indian. Heart J, 59:423.*

(7) Mochizuki, M., Masuda, K., Sakane, T., Ito, K., Kogure, M., Sugino, N., Usui, M., Mizushima, Y., Ohno, S., Inaba, G. (1993) : *A clinical trial of FK506 in refractory uveitis. SOAm J Ophthalmol., 115(6):763.*

(8) Pereira, G.M, Miller, J.F, Shevach, E.M. (1990) : *Mechanism of action of cyclosporine A in vivo. II. T cell priming in vivo to alloantigen can be mediated by an IL-2-independent cyclosporine A-resistant pathway. J. Immunol ,144 (6); 2109-2116.*

(9) Toledo-Pereyra, L.H., Mackenzie, G.H., Gordon, D.A., Gof, S., Bandlien, K. (1984) : *Alternative applications of cyclosporin A to improve kidney allograft survival. J Urol, :131(4):777-80.*

(10) Haddad, E.M., McAlister, VC., Renouf, E., Malthaner, R., Kjaer, M.S., Gluud, L.L. (2006) : *Cyclosporin versus tacrolimus for liver transplanted patients. Cochrane Database Syst Rev. Oct 18;(4):CD005161.*



UGC -

APPROVED - JOURNAL

www.ugc.ac.in/journalist/subjectwise/journalist.aspx?tid=Um6ZWFY2ggTGUsw==8&did=Q3VycmVudCBuXRsZM=

विश्वविद्यालय अनुदान आयोग
University Grants Commission
quality higher education for all

UGC Approved List of Journals

You searched for **Research Link** Home

Total Journals : 1

Show 25 entries Search

View	Sl.No.	Journal No	Title	Publisher	ISSN	E-ISSN
View	1	48965	Research Link	Research Link	09731628	

Showing 1 to 1 of 1 entries Previous Next

For Students About NET UGC NET Online Ragging Related Circulars Fake Universities Educational Loan

For Faculty Honours and Awards UGC Regulations Pay Related Orders M.R.P.

More Notices Circulars Tenders Jobs UGC POs Right to Information Act Other Higher Education Links