Vasanthi C *et al.* / *International Journal of Pharmacy & Therapeutics*, 6(1), 2015, 1-3.

e- ISSN 0976-0342
Print ISSN 2229-7456

International Journal of Pharmacy & Therapeutics

Journal homepage: www.ijptjournal.com

IJPT

IN VITRO ANTIOXIDANT ACTIVITY OF VILDAGLIPTIN BY NITRIC OXIDE FREE RADICAL SCAVENGING METHOD

C.Vasanthi[1], D.Anusha[2] and Darling Chellathai[1]

[1]Professor, [2]Assistant Professor (Selection Grade), Dept. of Pharmacology,
Sri Ramachandra Medical College and Research Institute, Porur, Chennai-600116, Tamilnadu, India.

ABSTRACT

Diabetes mellitus type 2 is one of the leading causes of metabolic and cardiovascular complications. Vildagliptin is a dipeptidyl peptidase (DPP-4) inhibitor improves glycemic level. This study evaluates the antioxidant activity of Vildagliptin by its free radical scavenging activity on nitric oxide free radicals generated in the assay. Various Concentrations of Vildagliptin (100 µg/ ml, 200 µg /ml, 400 µg/ml, 800 µg/ ml, and 1000 µg/ml) was evaluated for nitric oxide free radical scavenging and the following percentage of activity was observed 45.6%, 66.97 %, 71.37 %, 84.82%, 95.49 % respectively which shows significant antioxidant activity.

Key Words:- Vildagliptin, Antioxidant, NO free radical scavenging assay.

INTRODUCTION

Diabetes mellitus type 2 leads to hyperglycemia which in turn is responsible for metabolic and cardiovascular complications. A new oral antidiabetic agent Vildagliptin which enhances pancreatic islet response to glucose. Vildagliptin inhibits dipeptidyl peptidase –IV reversibly and competitively with high selectivity. The drug increases glucose dependent insulin level and improves Beta cell sensitivity. It leads to increase in incretin hormones, GLP 1 (He *et al.*, 2007). By this it slows the progression of metabolic and cardiovascular complications. There is a lower risk of developing hypoglycaemia. Studies involving approximately 22,000 patients on exposure to vildagliptin have shown that the drug is tolerated and efficacious in controlling blood glucose level (Mathieu and Evy Degrande, 2013).

Animal Studies have shown that Vildagliptin has antiatherosclerotic and anti-inflammatory activity which may be due to increase in incretin level. It also interferes with lipoprotein metabolism .It suppresses oxidative stress and systemic inflammation response (Florentina Lupascu *et al.*, 2013). Many oral hypoglycaemic drugs like sulfonyl ureas, biguanide, glitazones are available in market. Each group has its own adverse effects like episodes of hypoglycaemia, hepatic changes, weight gain, lactic acidosis etc. This leads to development of newer drugs with less adverse effects and good efficacy (Ligueros-Saylan *et al.*, 2004). Studies shown that Vildagliptin does not show significant increase in liver enzymes (Najah et al., 2013). In this study evaluation of Antioxidant activity assay of Vildagliptin using nitric oxide free radical scavenging method was done.

Corresponding Author

C. Vasanthi
Email:- vasanthi.c@gmail.com

Aim and Objective

To evaluate the antioxidant activity of Vildagliptin by using nitric oxide free radical scavenging method.

MATERIALS AND METHODS

The nitric oxide radical scavenging activity was done using the method of Alderson *et al* (2013). 3ml of

reaction mixture containing sodium nitroprusside (10mM in phosphate buffered saline) and various concentrations (100µg/ml, 200µg/ml, 400 µg/ml, 800µg/ml, 1000µg/ml) of Vildagliptin were incubated at 37^0C for 4 hours. To the incubation solution, 0.5ml of Griess reagent was added and the absorbance was read at 546nm in a spectrophotometer. The percentage inhibition was calculated using the formula

Percentage Inhibition =

(Abs control- Abs sample) / Abs control×100

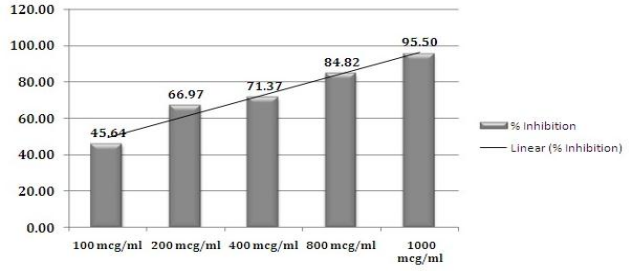
RESULTS

Concentrations (100µg/ml, 200µg/ml, 400µg/ml, 800µg/ml, 1000µg/ml) of Vildagliptin showed and inhibition of 45.64%, 66.97%, 71.37% & 84.82% respectively. The lowest concentration of 100 µg/ml showed 45.64% inhibition.

Table 1. *In vitro* antioxidant activity of Vildagliptin by NO free radical scavenging method

Concentration [µg/ml]	Optical Density	% Inhibition
Control	0.4862	----------
100	0.4583	45.64 %
200	0.562	66.97 %
400	0.5834	71.37 %
800	0.6488	84.82 %
1000	0.7007	95.50 %

Figure 1. % Inhibition by Vildagliptin at various Concentrations



DISCUSSION

The presence of free radical scavenging activity of Vildagliptin is evident by the change in color of the reaction mixture. It showed significant activity at the lowest concentration as well corresponding to 45.6% which signifies that considerable activity is exhibited right from the lowest concentration of Vildagliptin considered to be evaluated in this study. There is a clear dose dependent increase in the activity which shows 95.5% inhibition at 1000 µg /ml. Dose dependent activity clearly highlights antioxidant activity in possession of Vildagliptin and which may contribute to its therapeutic profile apart from the Mainstream DPP4 Inhibition activity.

Diabetes mellitus type 2 has been postulated to have a free radical basis of injury in its pathogenesis and Vildagliptin can obviously attenuate these deleterious effects of free radicals formed in the body on the islets of pancreas. Various concentrations of Vildagliptin (100µg/ ml, 200µg /ml, 400µg/ml, 800µg/ ml and 1000 µg/ml) was evaluated for nitric oxide free radical scavenging and the following percentage of activity was observed 45.6%, 66.97 %, 71.37 %, 84.82% and 95.49 % respectively which shows significant antioxidant activity. The lowest concentration of 100µg/ml showed 45.64% inhibition .It shows significant antioxidant activity at highest concentration also.

CONCLUSION

The antioxidant property of Vildagliptin was found to be dose dependent and significant. This study concludes that Vildagliptin has antioxidant properties which can add on to the therapeutic efficacy of Vildagliptin in Diabetes mellitus and also add on to the therapeutic armamentarium for disease which has oxidant stress as their pathological basis.

REFERENCES

Dodd, Seetal, Maes, Michael, Anderson et al, Putative neuroprotective agents in neuropsychiatric disorders, *Clinical & Experimental Cardiology*, 2013, 4, 601.

Florentina Lupascu, Oana Maria Dragostin *et al*, Synthesis and evaluation of antioxidant activity of some new Benzylidine thiazolidone xanthine derivatives. *Rev Med Chir Soc Med Nat Iasi*, 2013, 117(1).

He YL, Serra D, Wang Y, Campestrini J, Riviere GJ, Deacon CF, Holst JJ, Schwartz S, Nielsen JC, Ligueros-Saylan M. Pharmacokinetics and pharmacodynamics of vildagliptin in patients with type 2 diabetes mellitus. *Clin Pharmacokinet*, 2007, 46(7), 577-88.

Ligueros-Saylan M, Foley JE, Schweizer A, Couturier A, Kothny W. An assessment of adverse effects of vildagliptin versus comparators on the liver, the pancreas, the immune system, the skin and in patients with impaired renal function from a large pooled database of Phase- II and phase- III clinical trials. *Diabetes Obes Metab*, 2010, 12(6), 495-509.

Mathieu and Evy Degrande. Vildagliptin, A new oral treatment for type-2 Diabetes mellitus , Vascular Health risk management in on Atherosclerosis progression in high cholesterol-fed male rabbits, *Clinical & Experimental cardiology*, 2013, 4(6), 1349-1360.

Najah R Hadi, Hussain Abdulkadhim et al, Effect of Vildagliptin on Atherosclerosis progression in high cholesterol – fed male rabbits, *Clinical & Experimental cardiology*, 2013, 4, 6.