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Opinion Article

Pharmacological Analysis on Treatment of Diabetic Retinopathy by Berberine

Edgar Allan*

Department of Regulatory & Clinical Operations, Kibow Biotech Inc, Pennsylvania, USA

DESCRIPTION

Diabetic Retinopathy (DR) is the leading cause of visual loss in patients with diabetes mellitus with characteristic micro vascular dysregulation, progressing from non-proliferative to proliferative with loss of proper glycemic control. Vascular Endothelial Growth Factor (VEGF) is thought to play a dominant role during the initiation and progression of DR, and its transcriptional expression in the retina was regulated by Hypoxia-Inducible Factor 1α (HIF1α). Retinal VEGF induces neo vascular system and leakage from adjacent capillaries, which subsequently destroys retinal structures and thus stops visual acuity. Currently, anti-VEGF treatment is approved for the latest proliferative DR, reducing retinal photocoagulation and new angioplasty after vitrectomy as primary DR treatment. Although anti-VEGF monoclonal antibodies have been shown to be effective in clinical trials, their use is limited due to high treatment costs or inadequate response rates in some patients.

Proper glycaemia control in diabetic patients shows improvement in DR incidence. Insulin therapy is the important mean of glycaemic control of diabetic patients. Biosynthetic or animal source insulin is the most effective way for the management of type I diabetic patients as well as in patients with advanced type II diabetes who fail to responds to oral hypoglycemic agents. However, insulin therapy is deemed to be unsuccessful in controlling the incidence of DR and likely to be one of its risk factors. Diabetic patients in the United States who received insulin treatment experienced risk of DR progression unexpectedly. Patients with type II diabetes who used insulin were more likely to develop DR than those who did not receive insulin treatment. A Latin-American study of familial type II diabetes showed that the prevalence and severity of DR was associated with their residual endogenous insulin secretion. Recent meta-analysis to collect insulin showed a significant association between DR risk and insulin intervention. Experimentally, insulin is HIF1α in human retinal endothelial cells that form new blood vessels during DR progression. And it has been reported to induce retinal angiogenesis through inducible expression of VEGF. Insulin activates the phosphatidylinositol-3-kinase/rapamycin target a signaling pathway for inducing HIF1α and VEGF. Moreover, rapid accumulation of insulin via exogenous administration triggers VEGF expression.

Berberine is an herbal bioactive alkaloid derived from quite a few Chinese Medicinal herbs together with Rhizoma Coptidis. Synthetic manufacturing of BBR permits the compound to be broadly to be had as a low cost Over-The-Counter (OTC) drug in China for years. It has been said with numerous pharmacological outcomes which include anti-inflammation, anti-oxidation, hepatic safety and anti-most cancers. The hypoglycemic effect of BBR become intensively said by the means of a sequence of experimental research, systematic overview and meta-evaluation confirmed the incomparable glycaemia manage of BBR than different oral hypoglycemic capsules. Recent research confirmed BBR induced retinal endothelial cells from leukocytes attack, which in addition decreased capillary degeneration in diabetic sufferers. Although the scientific indication has but to be concluded, experimental proof on deteriorating DR situation in insulin-handled Diabetic Mellitus has been found in diabetic mice. It was unknown whether or not BBR can enhance DR in type I and type II diabetes with insulin therapy.

Type 2 diabetes is a complex metabolic disorder characterized by impaired glucose utilization and gluconeogenesis. Berberine has been reported to be as active as sulfonylurea and metformin in lowering blood sugar levels in Chinese diabetics. Administration of berberine at the beginning of each major diet has been shown to reduce Fasting Blood Glucose (FBG) in newly diagnosed adult patients with type 2 diabetes.

Correspondence to: Edgar Allan, Department of Regulatory & Clinical Operations, Kibow Biotech Inc, Pennsylvania, USA, E-mail: allan@gmail.com

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