

# An Analysis of Curcumin, a Polyphenol Curcuminoid Preventive Properties and Molecular Processes in Diabetic Nephropathy

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## Abstract

Diabetic nephropathy is the most common cause of end-stage renal disease and has a significant impact not only on patients but also on society as a whole. Due to the limited availability of medical treatment, effective alternative therapeutic approaches for the treatment of Diabetic nephropathy are urgently required. Research on diabetic nephropathy has shown that curcumin, a polyphenol curcuminoid, has anti-inflammatory, anti-oxidative, anti-apoptotic, and anti-fibrosis properties. This review has gone over the clinical and preclinical trials, as well as the mechanisms by which curcumin affects Diabetic nephropathy. Curcumin's pharmacological effects on diabetic nephropathy may be better understood, which could lead to more effective treatments for the condition.

**Keywords:** Curcumin • Polyphenol curcuminoid • Diabetic nephropathy

## Introduction

Diabetic nephropathy is the most common cause of end-stage renal disease and has a significant impact not only on patients but also on society as a whole. Due to the limited availability of medical treatment, effective alternative therapeutic approaches for the treatment of Diabetic nephropathy are urgently required. Research on diabetic nephropathy has shown that curcumin, a polyphenol curcuminoid, has anti-inflammatory, anti-oxidative, anti-apoptotic, and anti-fibrosis properties. This review has gone over the clinical and preclinical trials, as well as the mechanisms by which curcumin affects Diabetic nephropathy. Curcumin's pharmacological effects on diabetic nephropathy may be better understood, which could lead to more effective treatments for the condition [1].

Hyperglycemia is a hallmark of a group of common metabolic diseases known as diabetes mellitus. This disease is now a serious threat to human life and health due to its rapidly rising incidence and fatal complications. Diabetes affects estimated adults between the all adults in this age range will have diabetes. As a result, the medical costs associated and its complications total at least [2].

## Description

90% of diabetics have type diabetes, while have type diabetes. It is essential to emphasize the seriousness and complexity of diabetic complications, which include both acute and chronic ones. Patients who suffer from acute complications like diabetic ketoacidosis, hyperosmolar hyperglycemia, or lactic acidosis typically require prompt and critical treatment. Diabetes patients suffer from macroangiopathy, microangiopathy, and neuropathy, all of which have a negative impact on their quality of life. This is in addition to the chronic complications of diabetes mellitus [3].

Diabetic nephropathy, a common complication of diabetes mellitus brought on by diabetic microangiopathy, is one of the main causes of death and disability in diabetic patients. Albuminuria, glomerular lesions, tubulointerstitial fibrosis,

and lower renal filtration rates are all symptoms of a multifunctional degenerative syndrome. Worldwide, diabetes-related chronic Diabetic nephropathy disease was responsible, and disability-adjusted life years. According to the findings of recent studies, the prevalence of in diabetic patient's ranges anywhere a result, Diabetic nephropathy has already weighed heavily on healthcare systems all over the world [4].

Diabetic nephropathy a common complication of diabetes mellitus brought on by diabetic microangiopathy, is one of the main causes of death and disability in diabetic patients. The most common cause of end-stage renal disease is Diabetic nephropathy, a multifunctional degenerative syndrome that is characterized by in patients with diabetes, genetic predispositions, in addition to environmental factors, play a role in the onset of Diabetic nephropathy and the rate of progression to end-stage renal disease. The renin-angiotensin-aldosterone system dysfunction, fibrosis, excessive oxidative stress, abnormal apoptosis and autophagy, and inflammation are thought to be the causes of Diabetic nephropathy. Abnormal hemodynamics and metabolic disorders brought on by persistently high glucose levels are the root causes of all of these conditions. The basement membrane thickens, podocytes are injured, the mesangial matrix dilates, and the glomerular filtration rate decreases in diabetic nephropathy. These changes accelerate renal hypertrophy, glomerulosclerosis, and tubulointerstitial fibrosis [5].

Currently, renal replacement therapy, lifestyle modifications, and medical therapy are used to treat Diabetic nephropathy. In order to maintain a healthy lifestyle, medications are required in addition to dialysis and renal transplantation for RRT. Drugs that are frequently used can be categorized as hypoglycemic or non-hypoglycemic. Gliquidone, which has a lower renal metabolism, and insulin preparations are frequently utilized in the treatment of Diabetic nephropathy patients. In addition, a selection of non-hypoglycemic medications is required [6]. Blood pressure is reduced by taking angiotensin-converting enzyme inhibitors or receptor blockers. Regulating cholesterol levels is done with statins and pancreatic kininogenase, calcium dobesilate, and sodium ferulate are used to reduce proteinuria and delay the disease's onset. Taraxerol, resveratrol and myricitrin are just a few of the drugs that are being developed to target the pathogenesis of Diabetic nephropathy which has recently become a hotspot. Nevertheless, Diabetic nephropathy prevalence and mortality rates have not been effectively managed. To reduce the incidence and progression of diabetic nephropathy, effective therapeutic approaches must therefore be investigated [7].

## Conclusion

Diabetic macrovascular and microvascular complications account for the majority of patients' morbidity and mortality. Multiple pathologic pathways are connected to long-term hyperglycemia, which is a significant risk factor for diabetic microvascular complications. Polyol activation, endoplasmic reticulum stress, hyperglycemia-provoked redox insults, non-enzymatic glycation,

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Received: 02 January, 2023, Manuscript No. jdc-m-23-90486; Editor assigned: 04 January, 2023, PreQC No. P-90486; Reviewed: 17 January, 2023, QC No. Q-90486; Revised: 23 January, 2023, Manuscript No. R-90486; Published: 31 January, 2023, DOI: 10.37421/2475-3211.2023.08.195

and accumulation of advanced glycation end products appear to be similar mechanisms in diabetic neuropathy, diabetic cardiomyopathy, and diabetic retinopathy. Curcumin has been shown to regulate hyperglycemia and lipid metabolism, reduce insulin resistance prevent formation and AGE-mediated destruction, improve oxidative stress, inflammatory pathways, and apoptosis, and alleviate insulin resistance. Curcumin's effects on diabetic neuropathy are unknown, despite growing evidence that it protects multiple pathologic mechanisms in diabetic neuropathy. As a result, the molecular mechanisms and the role curcumin plays in relieving Diabetic nephropathy were outlined in this review.

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## Acknowledgement

None.

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## Conflict of interest

None.

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**How to cite this article:** Cohen, Tervaert. "An Analysis of Curcumin, a Polyphenol Curcuminoid Preventive Properties and Molecular Processes in Diabetic Nephropathy." *J Diabetic Complications Med* 8 (2023): 195.