Screening of Vitamins based on Structure-Activity Relationship as a potential therapeutic molecule against oxidative stress-mediated neurodegeneration

A DISSERTATION

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OF

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IN

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Submitted by:

PARUL SHARMA

2K17/BME/04

Under the Supervision of

PROF. PRAVIR KUMAR

DEPARTMENT OF BIOTECHNOLOGY

DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)

Bawana Road, Delhi-110042

JUNE, 2019

DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)

Bawana Road, Delhi-110042

CANDIDATE'S DECLARATION

I, Parul Sharma, Roll No.2K17/BME/04, student of M. Tech (Bio-Medical Engineering), hereby declare that the Project Dissertation titled "**Screening of Vitamins based on Structure-Activity Relationship as a potential therapeutic molecule against oxidative stress-mediated neurodegeneration**" which is submitted by me to the Department of Biotechnology, Delhi Technological University, Delhi in partial fulfillment of the requirement for the award of the degree of Master of Technology, is original and is not copied from any source without proper citation. This work has not previously formed the basis for the award of any Degree, Diploma Associateship Fellowship, or other similar title or recognition.

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Date:

DEPARTMENT OF BIOTECHNOLOGY

DELHI TECHNOLOGICAL UNIVERSITY

(Formerly Delhi College of Engineering)

Bawana Road, Delhi-110042

CERTIFICATE

I hereby certify that the Project Dissertation titled "**Screening of Vitamins based on Structure-Activity Relationship as a potential therapeutic molecule against oxidative stress-mediated neurodegeneration**" which is submitted by Parul Sharma, Roll No.2K17/BME/04, Department of Biotechnology, Delhi Technological University, Delhi in partial fulfillment of the requirement for the award of the degree of Master of Technology, is a record of the project work carried out by the student under my supervision. To the best of my knowledge, this work has not been submitted in part or full for any Degree or Diploma to this University or elsewhere.

PROF. PRAVIR KUMAR

SUPERVISOR

PROF. JAI GOPAL SHARMA

HEAD OF DEPARTMENT

DEPARTMENT OF BIOTECHNOLOGY

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ABSTRACT

Oxidative Stress is a condition developed by the outrage of free radicals giving rise to several diseases, neurodegeneration being prominent of all. Due to high oxygen consumption, restricted availability of antioxidants and abundant production of free radicals, brain cells fall prey to the attack of oxidants more rapidly than any other organ of the body. This may result in aging, inflammation, neurodegeneration and apoptosis. Several drugs have been employed for different neurodegenerative disorders including AD, PD, ischemia etc. But the hunt is still on for a more reliable and effective molecule against the oxidative injury caused. This study aims at establishing the role of Vitamins as substances of efficient biological potential in ameliorating the damage caused to the neuronal cells by putting into use the concept of Structural-Activity Relationship. Based on the predicted activities and docking results, it has been found that Vitamin K1 may serve a significant role as a potent therapeutic molecule against the free radical damage induced by arachidonic acid pathway and reducing the oxidative damage caused to the cells.

Keywords: Oxidative Stress, Neurodegeneration, Free Radicals, SAR, AD, PD, Vitamins

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AD	Alzheimer's disease
PD	Parkinson's disease
HD	Huntington's disease
FR	Free Radicals
ROS	Reactive Oxygen Species
RLS	Reactive Lipid Species
RNS	Reactive Nitrogen Species
RSS	Reactive Sulphur Species
PUFA	Poly Unsaturated Fatty Acids
LOX	Lipoxygenase
COX	Cyclooxygenase
NOX	NADPH Oxidase
SAR	Structure-Activity Relationship