

EPITOPES PREDICTION

**FOR *Potato leaf roll virus* (PLRV) AND DEVELOPMENT OF
POLYCLONAL ANTIBODIES FOR VIRAL DETECTION**

By

Youssef Mohamed Bakr Eldoree

THESIS

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Master of Science

IN

Genetic Engineering and Biotechnology

(Bioinformatics – Databases)

Bioinformatics Department

Genetic Engineering and Biotechnology Research Institute

Menofia University

Egypt

2011

Supervision sheet

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Supervisors:

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Professor of Molecular Genetics, Head of Bioinformatics Department,
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Professor of Operations Research and Decision Support,
Dean of Faculty of Computers and Information, Menofia University.

**Bioinformatics Department
Genetic Engineering and Biotechnology Research Institute
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Approval sheet

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ABSTRACT

This work aims to enhance the antibodies production for diagnostic kits using epitopes prediction approaches to design immunogenic peptides that can be injected into animal to produce antibodies that cross react with target protein. Epitopes prediction using machine learning approach was adopted due to the increasing availability of experimentally identified epitopes in addition to low performance of previous methods. In this work, we use support vector machine (SVM) and string kernel to build models for predicting linear B-cell epitopes. The obtained models were tested by 10 fold cross validation method then applied to the coat protein of *Potato leafroll virus* (PLRV) and one of the predicted epitopes was chemically synthesised and injected into mice and the obtained antibodies cross react successfully with PLRV infected plant tissue.

Keywords: Immunoinformatic, Epitopes prediction, Support vector machine, String kernel.

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Dedication

The thesis is dedicated to my parent, my sisters, my brother, my dear wife and my daughter Sama, thanks a lot for the patience, the support and for helping me to believe in myself. I would like also dedicate this thesis to the Free Software Foundation (FSF) and open source community for inspiring me and for let me see the world from different prospective.