

# **Antiviral Activity of Herbal Extracts**

Project Proposal

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## Introduction

### Background

There has been growing concerns about a possible pandemic of virulent influenza especially after outbreaks caused by the H5N1 and H5N2 virus which have now occurred across much of Asia and Europe.

It has been documented by Dharmananda (2006) that currently, when the H5N1 and H5N2 flu virus infect humans, there is a greater than 50% death rate associated with it. Extensive efforts to control the avian flu such as destroying infected poultry populations and contaminated animals in the immediate vicinity were not fully effective in solving the problem.

According to Balicer et al (2005), vaccines such as Tamiflu, have a low efficacy rate on the viruses and they are great in demand but short in supply.

Dharmananda (2006) also reported that Chinese herbal therapies provide general actions, such as boosting the immune response system, so that it is able to eliminate the virus faster. At high enough dosage the herbs may have some direct inhibitory effects on viral reproduction.

### Rationale

According to the Institute for Traditional Medicine and Preventive Health (2005), Chinese Herbs have great potential to destroy virus and boost the human immune system. At high enough dosages, these herbs may have direct inhibitory effects.

Furthermore, Chinese herbs have mild or no side effects and are generally more affordable compared to certain Western medicine for treating viral infection (Institute for Traditional Medicine and Preventive Health, 2005). In this project, bacteriophage Lambda gt10, a virus that infects *Escherichia coli* bacteria, will be used. Using a software, EMBOSS (<http://sbcr.bii.a-star.edu.sg/emboss/>), that compares the nucleotides of different viruses to check their similarities, Lambda gt10 was found to be **57.4%** similar to the avian flu virus H5N1, and **65.3%** similar to the avian flu virus H5N2. Therefore, herbs that inhibit or kill the Lambda gt10 virus may have a similar effect on viruses such as H5N1 or H5N2.

This project will provide a platform for further research on traditional Chinese medicine (TCM), especially on their antiviral properties. Lastly, it attempts to address the global threat posed by the avian flu and offers possible alternative remedies.

### Hypothesis

Herbs used in traditional Chinese medicine have antiviral properties.

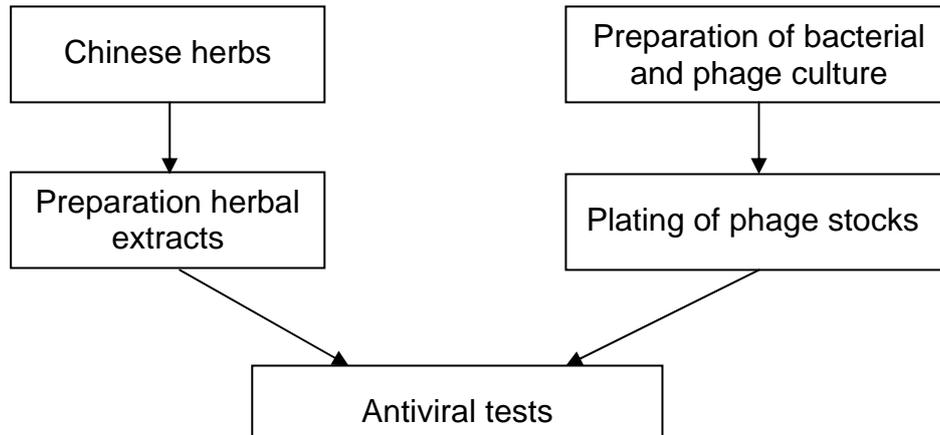
### Objectives

The objectives of this project are:

1. To screen various Chinese herbs for antiviral activities
2. To study the antiviral properties of different Chinese herbs and suggest a combination of herbs that has good antiviral properties

## Outline of method

The following is an overview of our method:



The following four Chinese herbs will be used in this study as they are known for their antiviral activities( Han, 1992; Hing, 2005 and Wiart et al, 2005):

1. "Chuan Xin Lian" - *Andrographis paniculata*
2. "Huang Qi" - *Astragalus membranaceus*
3. "Hu Zhang" - *Polygonum cuspidatum*
4. "Jin Yin Hua" - *Lonicera japonica*

Water extracts will be prepared using the selected herbs. Extracts prepared will be screened for antiviral activities against the bacteriophage, Lambda gt10. The strength of the antiviral activities of the herbal extracts will be quantified by the determination of reduction in the number of plaques in a co-culture of *E.coli* and Lambda gt10 in the presence of the extract. The greater the reduction in the number of plaques, the stronger the antiviral activity of the extract. Combinations of herbal extracts that have antiviral activities will then be examined for synergistic or antagonistic effects.

### Safety precautions

During the experimentation, latex gloves will be worn when handling microorganisms. All microbial cultures and vessels used to contain them will be decontaminated using an autoclave before disposal.

### References

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Wiat ,C., Kumar, K., Yusof, M.Y., Hamimah, H., Fauzi, Z.M. & Sulaiman, M. (2005). Antiviral properties of ent-labdene diterpenes of *Andrographis paniculata* nees, inhibitors of herpes simplex virus type 1. *Phytotherapy Research*. Vol.19(12) p.1069-70. [On-Line] Available: [http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list\\_uids=16372376&dopt=Abstract](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=16372376&dopt=Abstract). Last accessed 30<sup>th</sup> Jun 2006.

### Timeline

Period	Activity
Literature review	Jan 07
Write proposal	Feb 07
Confirm methods	Feb 07
Begin experimentation	Mar 07
Complete experimentation	July 07
Analyse results, write up research paper	July 07