

《**生物科学杂志**》
Journal of Biological Sciences



ChengZhu Science™

江西省诚筑环保工程有限公司主办

2022 年 11 月刊物/Serial in November, 2022

出版人： 刘焕 香江出版社有限公司

Publisher: Liu Huan, Xiangjiang Publishing Company Ltd.



Copyrights Statements

Copying and Transferring is Forbidden!

版权申明

禁止复制、转载！

All the intellectual property (mainly including the original academic knowledges and brand logo) are prohibited to copy or transfer into other publications or websites. To cite this article, only short quote is acceptable, but copying or transferring any substantial part of this article is NOT allowed (Defined in <Copyright Ordinance> in Hong Kong). The original academic knowledge is the substantial part of an article as academic journal. For learning purpose, it is allowed to read our website in online video class only. This journal is published by Hong Kong Publisher, and the copyrights is regulated and protected by <Copyright Ordinance> in Hong Kong, China. This PDF document is accessible to public only through Hong Kong domain websites (natural-foundation-science.org), and its printed version is the formally published journal. Without permission, it is NOT allowed to print, issue and sale.

所有形式知识产权（主要包括原创型学术知识和品牌标识）禁止复制、转载到其他出版物和网站。如果需要引用这篇论文，仅仅允许简短引述，但是禁止复制、转载这篇论文中任何实质性部分（香港《版权条例》中定义）。作为学术杂志，这篇论文中的原创型学术知识即为作品的实质性部分。仅仅允许以学习为目的在线视频课堂阅读本公司网站。本杂志由香港出版社出版，其版权受中国香港《版权条例》监管和保护。此 PDF 文档仅仅通过香港主机网站向公众公开 (natural-foundation-science.org)，并且其印刷版本杂志为正式出版物。未经许可，不得印刷、发行、销售。

Article 6-2. The Experiment Procedure for Blood Cell Cultivation in Biophysical Simulation/生物物理实验中血细胞培养方法

Author: Liu Huan (1983-), Master of Science (First Class Honours, 2009), The University of Auckland.

DOI:[10.58473/JBS0009](https://doi.org/10.58473/JBS0009)

Retrieval from official database: www.crossref.org

Latest revised on 29/05/2023.

Method 1.

The blood samples of a rat is abstracted and divided into two samples for the bio-signal simulation:

1. There are two kinds of cultivation conditions simulated in Lab for cell division: one is the ‘comfortable’ condition (Sample 1); the other is under electromagnetism simulation for cell cultivation (Sample 2); the cell samples are collected after sufficient cell division (at least ten generations). For the simulation of moderate electromagnetism condition, cells are cultivated in electrophoresis pipe for cell electrophoresis, in which the external electric field is added. Subsequently, the electrophoresis pipe is horizontally placed under external vertical magnetism field imposed by magnetic instrument.

2. After sufficient cell division process, the electromagnetism simulation stops. Then both sample 1 and sample 2 are separately transferred into the simulation process of physiological saline: cells are cultivated individually in different concentrations of physiological saline in Lab, and different cell environment (salinity stress of cell environment or ‘thirsty’ simulation) are labeled as T1, T2, ..., Tn.

3. Metabolomics tests are conducted in cell samples after simulation process of physiological saline, T1, T2, ..., Tn, respectively, resulting in different zymograms as: M1, M2, ..., Mn. The procedure of the zymograms analysis is described in another article of metabolomics in this journal [1].

Both data processing methods and the underlying theory are designed in my previous articles [2].

However, for the comprehensive assessment of immunology in host cells, the simulation process of physiological saline is replaced by the invasion simulation caused by different families of bacteria (or virus) or different phenotypes of the same genetic pathogen species:

Method 2.

Environmental Physiology/环境生理学

The blood samples of a rat is abstracted and divided into two samples for the bio-signal simulation:

1. There are two kinds of cultivation conditions simulated in Lab for cell division: one is the 'comfortable' condition (Sample 1); the other is under electromagnetism simulation for cell cultivation (Sample 2); the cell samples are collected after sufficient cell division (at least ten generations). For the simulation of moderate electromagnetism condition, cells are cultivated in electrophoresis pipe for cell electrophoresis, in which the external electric field is added. Subsequently, the electrophoresis pipe is horizontally placed under external vertical magnetism field imposed by magnetic instrument.

2. After sufficient cell division process, the electromagnetism simulation stops. Then both sample 1 and sample 2 are separately transferred into the simulation process of bacteria (or virus) invasion: cells are cultivated individually and independently during the pathogen invasion simulation by inoculation of different families of bacteria (or virus) in Lab, and the invasion simulation process of different bacteria (or virus) families are labeled as T1, T2, ..., Tn. After pathogen invasion simulation, centrifuge is used to separate the host cells from the pathogens.

3. Metabolomics tests are conducted in host cell samples after simulation process of bacteria (or virus) invasion, T1, T2, ..., Tn, respectively, resulting in different zymograms as: M1, M2, ..., Mn. The procedure of the zymograms analysis is described in another article of metabolomics in this journal [1].

Both data processing methods and the underlying theory are designed in my previous articles [2].

This comprehensive assessment of immunology is closer to the real situation of disease caused by multiple species of bacteria. Even if the pathology of host cells (such as cancerous blood cells of rat) is not caused by multiple species of invasive virus or bacteria but by one species only, the invasive virus or bacteria of the same genetic strain may also evolve into various phenotypes in host body, which reflects the significance of comprehensive assessment of immunology.

Please note: if all the blood cells have been 'eaten' up (or no cell division rate) by a strain of bacteria during invasion simulation, then the value of this zymogram can be counted as zero for subsequent matrix calculation.

Discussion:

The comprehensive assessment of immunology in host cells also provides indicators of training host cells by adjusting the parameters of biophysical simulation, once the specific zymograms of host cells, indicating the immunology against the specific invasive bacteria or virus (or the specific phenotype of an invasive pathogen), are identified by this method. For the method 1, the higher biochemistry dynamics

Environmental Physiology/环境生理学

(indicated by the sum VCR), the better environmental adaptiveness (in terms of salinity stress tolerance) in host cells; for the method 2, the higher biochemistry dynamics (indicated by the sum VCR), the better immunology against various pathogen species (or various phenotypes of a pathogen genotype).

This is the revised materials in book “Proceedings for Degree of Postgraduate Diploma in Environmental Science (3rd Edition).” Published in 2016. The ‘chapter’ content mentioned in this article is in previous book. Firstly Revised on 05/01/2021; Secondly Revised on 08/02/2021; Thirdly revised on 25/09/2021; Fourthly revised on 22/12/2021. This journal article is previously published as: Liu Huan. (2021). Article 10-2. The Experiment Procedure for Blood Cell Cultivation in Biophysical Simulation. Journal of Environment and Health Science (ISSN 2314-1628), 2021(02)., which is converted into Journal of Biological Sciences (ISSN 2958-4035). Both Journals belong to the same publisher, Liu Huan. The previous journal article is closed to the public, but the previous reference is still valid. Latest revised on 18/04/2023;29/05/2023.

References:

- [1]. Liu Huan. Metabolomics (1) --- The Systematic Chemistry Fingerprints Between Genotype and Phenotype and its Application on the Conservation Genetics. Feb. 2021. Journal of Environment and Health Science. <https://doi.org/10.58473/JBS0005>
- [2]. Liu Huan. (2021). Metabolomics and Immunology Cultivation. Journal of Environment and Health Science (ISSN 2314-1628), 2021(02). <https://doi.org/10.58473/JBS0008>