BioResource Now !

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Introduction to Resource Center 〈NO. 51〉

National BioResource Project "Pathogenic microbes"

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Core-organization
- Medical Mycology Research Center, Chiba Univ. (Fungi and actinomycetes)

Sub-organizations
- Research Institute for Microbial Diseases, Osaka Univ. (Bacteria)
- Gifu Univ., Graduate School of Medicine (Bacteria)
- Institute of Tropical Medicine, Nagasaki Univ. (Protozoa)

Aim and Scope of the Project

The global increase of multiple-drug resistant pathogens, emerging infections, and bioterrorism has made measures to combat infectious diseases more necessary than ever. The research and development of new diagnostic tools and antimicrobial drugs requires the isolation of novel pathogenic microorganisms. New pathogenic strains are also required for research and education on infectious diseases. Therefore, the National BioResource Project (NBRP) Pathogenic microbes focuses on collecting, preserving, and distributing pathogenic bacteria, fungi (including actinomycetes), and protozoa to facilitate such research.

By establishing this collection of pathogenic cultures, the NBRP aims to: (1) expand the range of type strains (or standard strains), (2) collect BSL-2 and BSL-3 (high-risk) microorganisms, (3) exhaustively accumulate strains isolated from clinical samples, and (4) sequence the genomes of important pathogenic strains. Moreover, the "Pathogenic microbes" project is focused on collecting a wide variety of causative agents, to provide a repository of research samples against future outbreaks of infectious disease.

The core and sub-organizations have cooperated with a number of medical institutions in the collection of pathogenic isolates. With the support of clinical sites, isolates are identified, tested for drug sensitivity, and analyzed for the detection of virulence factors. Upon completion of clinical examinations, the isolates are deposited with the core and sub-organizations. Here the strains are preserved and further molecular, morphological, physiological and mycological characterizations are carried out. Through these organizations, high quality microbial strains are distributed to research institutions.

Collection Details for Each Organization

Medical Mycology Research Center, Chiba Univ. (Fungi and Actinomycetes)

The Medical Mycology Research Center at Chiba University possesses a worldwide collection of pathogenic fungi and actinomycetes. The center has an exhaustive collection, and has preserved clinical strains of *Aspergillus, Candida, Cryptococcus*, and *Trichophyton*, which cause deep-seated mycosis. The center also houses fresh clinical strains of the BSL-3 pathogen *Coccidioides immitis*, a causative agent of imported mycosis. Because the symptoms of infections caused by pathogenic actinomycetes are very similar to those of mycoses, actinomycete infections are treated similarly and, therefore, the center has collected and preserved pathogenic actinomycetes, such as *Nocardia*.

Research Institute for Microbial Diseases, Osaka University (Bacteria)

The Research Institute for Microbial Diseases at Osaka University boasts a global collection of pathogenic coliform bacteria, including *Vibrio*, and other enteric pathogens. This collection includes standard strains and clinical isolates, many of which were obtained from outbreaks or returning overseas travelers. These clinical isolates are subject to further molecular and physiological characterization, including identification of virulence factors.

The institute s collection also includes the important enteric bacterial pathogens, such as enterohemorrhagic *Escherichia coli* O157: H7, *Vibrio parahaemolyticus* KX-V237, *Streptococcus pyogenes* SSI-1 and *Bordetella bronchiseptica* RB50. These strains and their genome resources are preserved and distributed to research institutes.

Gifu University, Graduate School of Medicine (Bacteria)

The Gifu University Graduate School of Medicine has the largest collection of pathogenic bacterial type strains, approximately 80% of which are pathogenic to humans.

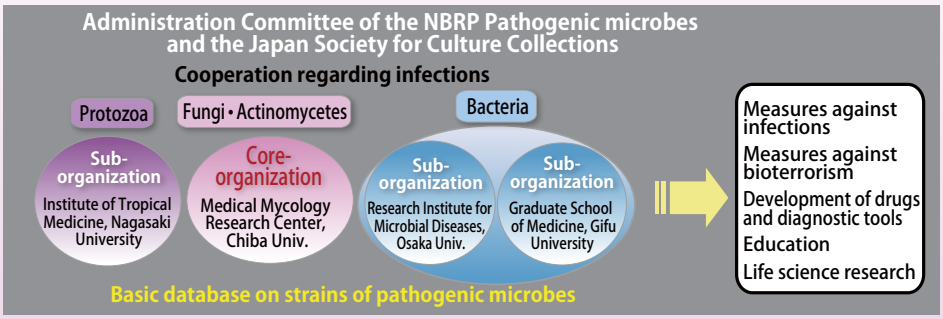
The graduate school has also systematically preserved non-spore-forming anaerobic and aerobic non-fermentative gram-negative bacteria. The graduate school has also focused on collecting BSL-2 and BSL-3 specific pathogens, opportunistic pathogens, attenuated strains for education, and drug-resistant strains. From the collection of opportunistic pathogens, approximately 400 unique strains have been selected for genome sequencing, which will provide a wealth of new sequence data.

Institute of Tropical Medicine, Nagasaki University (Protozoa)

The Institute of Tropical Medicine at Nagasaki University, has collected, preserved, and distributed numerous pathogenic protozoa, including anthropophilic amoebae. Besides the Institute of Tropical Medicine, only the American Type Culture Collection (ATCC) maintains a pathogenic protozoa collection. Therefore, the institute possesses a globally significant and valuable pathogenic protozoa collection. Moreover, all protozoa preserved in Japan have been registered to this institute in cooperation with related organizations across the country.

Protozoan infections such as African sleeping sickness, American trypanosomiasis, amoebiasis, and malaria, are frequently referred to as tropical diseases, which are believed to be "diseases that are not of serious concern to the world" but are "infections that remain difficult to conquer." Therefore, the isolation and distribution of fresh isolates to research institutions is essential. This was illustrated by resent study where a new parasitic amoeba, *Entamoeba nuttalli*, was isolated from foreign and domestic monkeys. Together with findings that *Entamoeba nuttalli* infections are prevalent in wild rhesus macaques, this demonstrates an urgent need to elucidate the mechanisms behind the species-to-species spread of amoeba infection, so that effective measures against zoonoses can be established.

↳To the next page



Construction of a Pathogenic Bacteria Database

In 2013, an advisory committee was established by the Japanese Society for Bacteriology. The focus of the committee is to discuss the development of a new database that will house a collection of pathogenic bacteria in the NBRP, used in the creation of attenuated strains for vaccine development and education. In cooperation with strain-distributing organizations belonging to the Japanese Society for Bacteriology, the committee will assign Japan National Bioresource of Bacterial Pathogen (JNBP) numbers to all project strains in Japan. In the future, the "Pathogenic microbes" project will manage information about strains using the JNBP numbers. The NBRP "Pathogenic microbes" database will also collect user feedback regarding the collection of clinical and environmental isolates, as well as requests for the acquisition of new type strains.

Items in the database for pathogenic bacteria

Gallery for Pathogenic Fungi and Actinomycetes

As a public relations exercise, the Fungus and Actinomycetes Gallery was created and is available on the homepage of the Medical Mycology Research Center, Chiba University.

The gallery contains images of fungi and actinomycetes colonies observed under a light or electron microscope together with mycological explanations. You are welcome to use this gallery for education at the following website;
http://www.pf.chiba-u.ac.jp/gallery/index.html.

(Those who wish to use the contents of the gallery for publications, please contact Takashi Taguchi, Head of Management Unit, Division of Bio-resources through t-yaguchi@faculty.chiba-u.jp.).

Fungus and Actinomycetes Gallery

Useful Websites for Collecting Information on Vulnerabilities

Ongoing Column [No 87] 10min.

Does the software you use have vulnerabilities? If it does, you can sustain actual damage if such vulnerabilities are exploited by a malicious third party. Moreover, vulnerabilities are particularly troublesome because they can arise from a combination of various factors. As a result, you must be constantly on alert for vulnerabilities updates and manage them quickly. Many people adopt defensive measures, such as always using the latest version of particular software, configuring software for automatic updates, and using security programs such as antivirus and personal firewalls. In this article, I attempt to go further and introduce websites that are useful for collecting software vulnerability information proactively.

①JPCERT URL: http://www.jpcert.or.jp/

This website provides resources such as vulnerability alerts, early warning regarding threats to information security, information on countermeasures for vulnerabilities, a weekly report that summarizes security information for the week, and an Internet threat monitoring system.

②DDoS MAP URL: http://www.digitalattackmap.com/

The Distributed Denial of Service (DDoS) monitoring website is operated by Google. On this website, data is shown by country, and therefore, it might not be useful for implementing actual countermeasures. However, anyone can gain an overview of the state of DDoS attacks at a global scale.

For example, the monitoring results for September 16 and 17 of last year can be viewed from the following links:
2013/9/16: Digital Attack Map - DDoS attacks on 9/16/2013
http://www.digitalattackmap.com/#anim=1&color=0&country=ALL&time=15964&view=map
2013/9/17: Digital Attack Map - DDoS attacks on 9/17/2013
http://www.digitalattackmap.com/#anim=1&color=0&country=ALL&time=15965&view=map

③JVN URL: http://jvn.jp/

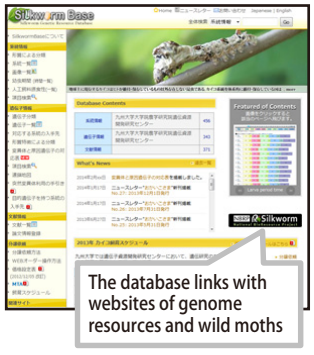
This vulnerability information website is operated collaboratively by JPCERT and JPA. A large volume of security alerts with technical content is provided by JPCERT. In addition, JVN iPedia offers information on vulnerabilities found in software libraries, making such information useful for server managers and software managers. For example, if you use Cisco products, a search using the term “Cisco” allows you to view all vulnerability information related to Cisco products simultaneously.
The details page describes the specifics of each vulnerability, the threat level is represented by severity, and there is a list of affected systems. This enables you to better grasp the effects of the vulnerability on the server equipment of software under your management. IPA’ s information security web page (URL: http://www.ipa.go.jp/security/) regularly distributes information that is useful for combating vulnerabilities. I recommend using this resource as well.

In this article, I have introduced some websites that offer information on vulnerabilities; these websites are useful to anyone who need to enhance their information security.

（Tohru Watanabe）

Database of this Month

National BioResource Project ”Silkworm Base”



Number of strains：456
Number of genes (alleles)：343 (590)
(As of March 2014)

DB名：Silkworm Base
URL ：http://www.shigen.nig.ac.jp/silkwormbase/
Language：Japanese, English
Original contents：
- Information about strain resources for research (mutants)
- Information about genes, alleles, and causative genes
- Information about larval periods and the feeding ability of artificial diets
- Classification of strains by phenotypes and linkage maps
- Okaikosama (newsletter, Japanese only)

Features：Resources can be ordered from the website, with availability according to the rearing schedule, which consists of five phases a year.
Images of eggs, larvae, pupas, cocoons, and adults are available to the public.

Cooperative DB：Research Resource Circulation (RRC)
DB construction group：NBRP Silkworm, NBRP Information
Management organization：Genetic Resource Center, NIG
Year of first DB publication：2005 Year of last DB update：2014

Comment from a developer : The NBRP Silkworm Base stores information about resources that reflect 100 years of silkworm research.. This user-friendly database has been continually improved and updated by dedicated personnel. The Silkworm Base link is available on the NBRP website, providing resources on the silkworm expressed sequence tag database and wild moths. A interface allows for a smooth flow from “studies related to the NBRP resources” to the “website for requesting the distribution of resources”. The banner at the top of the page provides links to the websites that distribute resources of “wild moths” and “DNA clones.” The database contains an annotated image gallery, which would be of considerable interest to a wider audience. We are constantly seeking to improve the user interface of our database. In recognition of our efforts, we continue to receive positive feedback from our users. The database is continuously updated, so please send us your comments and questions using the contact menu option.

Contact Address

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1111 Yata, Mishima-shi, Shizuoka 411-8540, Japan
Tel.: 055-981-6885 (Yamazaki)
E-mail： brnews@shigen.info

Editor's Note

Unlike other bioresources for research, “pathogenic microbes” plays an important role in the close cooperation between institutions,. The National BioResource Project on pathogenic microbes actively collaborates with a number of medical institutions. This project aims to collect as many pathogenic microbes as possible, in order to prepare for the emergence of new infections and the generation of attenuated strains for vital research. It is my understanding that this collaborative research effort is safeguarding our population against the continued threat of new diseases. Although life-threatening, pathogenic fungi and actinomycetes are in fact very beautiful when viewed under a microscope, therefore I would recommend a visit to the Fungus and Actinomycetes Gallery.
Associate Professor Takashi Yaguchi, well known for his TV appearances, kindly wrote this article for the newsletter this month.

BioResource Information

(NBRP) www.nbrp.jp/
(SHIGEN) www.shigen.nig.ac.jp/
(WGR) www.shigen.nig.ac.jp/wgr/
(JGR) www.shigen.nig.ac.jp/wgr/jgr/jgrUrlList.jsp

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