March/April 2011 Issue No. 13

The LAByrinth

Indiana State Department of Health Laboratories Newsletter

Human-Kinkajou Blastomycosis Disease Transmission

By Douglas Landau, Jon Radosevic, Amari Malone, and Kiran Khurana

Kinkajou *(Potos flavus)*

(Photo courtesy of National Geographic)

Blastomycosis is a fungal infection caused by the organism *Blastomyces dermatitidis*. It frequently begins at a pulmonary site due to inhalation of the fungal spores. The infection may be asymptomatic for many individuals or they may have mild flu-like symptoms and then resolve. However, the organism can disseminate via the blood to other organs or locations in the body and lead to extra-pulmonary lesions, particularly for immunocompromised individuals.

This disease is also called North American Blastomycosis, Gilchrist's Disease, Chicago Disease, and/or Namekagon River Fever. The disease was described in 1894 by Thomas Gilchrist, a dermatology professor at Johns Hopkins Hospital in Baltimore.

The organism has a worldwide distribution, with a predominant occurrence in North America, primarily in the midwestern U.S. and the states that border the Mississippi River basin. The endemic nature of the organism is thought to be associated with moist organic soil areas, particularly near rivers where more human cases have been documented. In addition, hunting dogs in these regions show a higher incidence of Blastomycosis than humans. There have been several documented cases of transmission of *Blastomyces* to humans from dogs and cats, but no human to human transmission.

In September of 2009, an Indianapolis zoologist was bitten by his pet kinkajou, developed an infection, and became ill. The animal was noted by the owner as being very ill at the time. He was holding the animal in a way to provide comfort. The animal, being near death, gave a mild bite to the owner on his finger, just breaking the skin and then passed away.

Kinkajous reside in the tropical forests of Central and South America. They are primarily nocturnal animals that eat mainly fruit and insects, and spend most of their time in trees. The kinkajou also has a prehensile (gripping) tail that it uses much like another arm. This animal has traits of a primate but is related to the raccoon. These animals are imported to the U.S. and due to their docile nature, are used as pets.

The pet owner was accustomed to working with animals and did not think the bite was remarkable until several days later when the wound became inflamed and swollen. He sought medical attention, but he did not respond to the initial treatments. He was later admitted to a local hospital where an axilla aspirate culture grew a fungal organism which was submitted to the Indiana State Department of Health Mycology lab for further testing. The ISDH Mycology Laboratory identified the organism by examining the culture growth characteristics and the microscopic morphology. In addition, the Accuprobe/Genprobe DNA hybridization test for *Blastomyces dermatitidis* gave a positive result.

Blastomyces dermatitidis is a dimorphic fungus, meaning it has two growth forms depending on the temperature of growth. At a lower (room) temperature of 25-30ºC,

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Indiana State Department of Health Laboratories

Gregory N. Larkin, M.D.
State Health Commissioner

Judith Lovchik, Ph.D
Assistant Commissioner & ISDH Lab Director

Our Mission:

The Indiana State Department of Health Laboratories partners with other public health agencies to provide timely and accurate information needed for surveillance and outbreak investigations to protect and improve Hoosier health.

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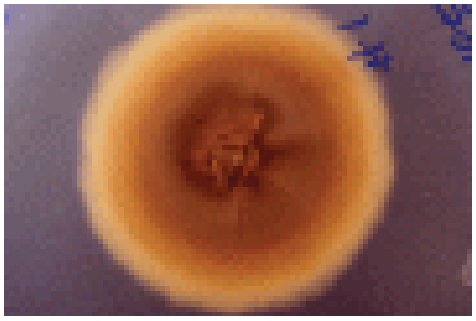
Human-Kinkajou Blastomycosis Disease Transmission *(continued)*

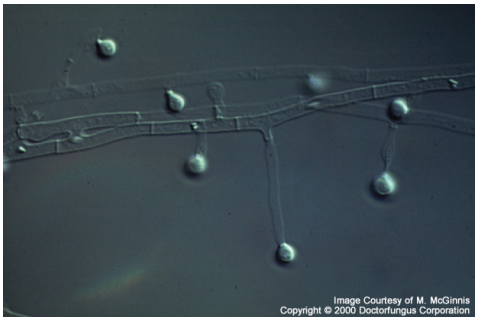
the growth is a in a mycelial/hyphae-like phase. At the temperature of the human body, 35-37ºC, the growth is in a yeast phase. This characteristic can be used to aid in the identification of the organism but is often time consuming.

Blastomyces grows at a moderate rate, generally three to seven days, at 25-30ºC on potato dextrose medium. It normally shows a whitish cottony appearance with a tannish outer ring of growth. The backside of the medium growth plate is usually a tannish brown color. Microscopically, the organism displays short conidiophores at right angles to the hyphae growth, with a single conidia (spore) at the tip. This is often described as a balloon on a string or a lollipop like appearance. See the photos below for examples.

Top view of culture plate
(*Source: CDC)*



Backside view of culture plate
(Source: CDC)



Microscopic appearance
(Source: Dr. Fungus Website)

Due to the unusual potential source of infection, a kinkajou bite transmission, the Centers for Disease Control requested tissue samples of the animal and the culture isolate for confirmatory testing. *Blastomyces dermatitidis* was confirmed by the CDC by analyzing various tissue samples from the animal. In addition, the culture isolate submitted by the ISDH Mycology lab to the CDC was confirmed by additional molecular testing. The case history was published in the Emerging Infectious Diseases journal, CDC, February 2011.

ISDH Mycology Lab Data

***Blastomyces dermatitidis* from 2005 to 2010.**

Source	Total	Male	Female	Unknown Gender	Percent of Total
1. Pulmonary	49	26	22	1	63.6
2. Cutaneous-like	18	12	6	0	23.4
3. Sterile site	10	9	1	0	12.9
All Sources	77	47	29	1	100

1. Pulmonary source

Includes 38 Bronchial alveolar wash, 13 B. wash, 1 B. brush, 6 Lung biopsy, 2 Pleural fluid, 3 Sputum

2. Cutaneous-like source biopsy/aspirate

Includes 1Leg, 2Hand, 5Wound, 2Skin, 1Tissue, 1Toe, 1Muscle, 1Clavical, 1Elbow, 1Biopsy, 1Arm, 1Abcess

3. Sterile site, organ, body fluid

Includes 3Blood, 1Marrow, 1Spinal fluid, 1Thyroid, 1Tumor, 2Unkown, 1Urine

The Water Laboratory Alliance: "Protecting Our Most Valuable Resource"

By Mark Glazier

Even though clean water is the most valuable resource in the world, it is often taken for granted in developed countries. Natural disasters like Hurricane Katrina and the recent earthquake and tsunami in Japan demonstrate just how quickly all the potable water in a very large geographic area can become potentially contaminated. To better deal with these natural events of water contamination, along with intentional or unintentional chemical, biological or radiochemical contamination of water, the U.S. Environmental Protection Agency (EPA) launched a nationwide laboratory program in the autumn of 2009.

The EPA Water Laboratory Alliance (WLA) provides the Water Sector with an integrated nationwide network of laboratories who have the capacity and capability to analyze water samples for a broad range of contaminants. The WLA is comprised of public health, environmental, and select commercial laboratories. The WLA focuses exclusively on drinking water and wastewater and is an essential part of the Environmental Response Laboratory Network (ERLN), which also addresses contamination in other environmental matrices, like soil and air.

Participation in the WLA provides many benefits to its members, such as improved water utility and laboratory preparedness for response to emergency situations. The WLA provides access to validated methods for unregulated water contaminants of interest to the Water Sector, as well as improved communications with peer laboratories to help address emerging laboratory security, analytical, or laboratory operation challenges. Other benefits for WLA members include analytical support for analyses not performed by their laboratory, priority access to EPA water security-related training, and standardized analytical methods.

A variety of resources and tools have been developed by EPA to support the WLA and the Water Sector that enable laboratories, water utilities, and emergency personnel to respond more effectively to potential water contamination events:

Water Contaminant Information Tool (WCIT): A password-protected online database with information on more than 100 contaminants that may pose a serious threat if introduced into water systems.

National Environmental Methods Index for Chemical, Biological and Radiological Methods (NEMI-CBR): A secure, web-based tool that enables easy comparison of methods for drinking water contaminants.

EPA Compendium of Environmental Testing Laboratories (EPA Lab Compendium): A secure, web-based tool that provides laboratory capability, capacity, and contact information.

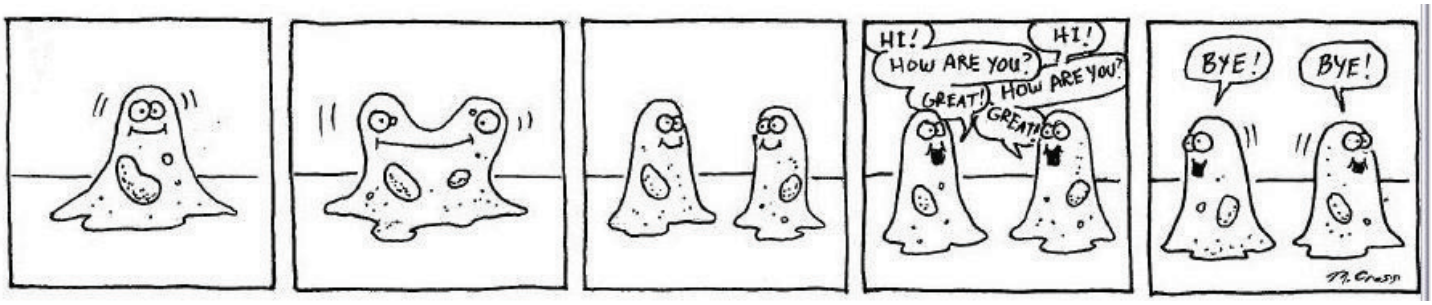
Ultrafiltration Quality Control (QC) Criteria Development Project: Enhances laboratory capability and capacity for select agent water analyses.

Chemical Method Development and Validation: Includes rapid screening for unregulated contaminants and adaptation of methods that are already being used for water analyses.

Sampling Guidance for Unknown Contaminants in Drinking Water: Provides detailed guidance on sample collection, preservation, and transport procedures for drinking water contaminants.

For detailed information on becoming a member of the WLA/ERLN, go to www.epa.gov/erln/join.html. or contact Mark Glazier, Indiana WLA Liaison, at mglazier@isdh.in.gov.

Microtoon by Mike Cross



Water Quality—Where Healthy Living Begins

By Dianna Zamani

In August 1854, a severe outbreak of cholera occurred in the Soho district of London. Dr. John Snow investigated the outbreak and was convinced that it was spread by water. In three days, 127 people died of cholera. By September, his studies convinced authorities to disable the Broad Street pump. They removed the handle, and ended the outbreak. This incident is often pointed out as the beginning of public health and epidemiology. It is also marks the discovery that disease could be spread by water.

Indeed, whenever improvements in public health are being sought in Third World countries, the first item on the list is safe drinking water. Most of us are aware of the cholera epidemic now occurring in Haiti. According to the Haitian Ministry of Public Health (MPH), 248,442 cases of cholera have occurred, with 4,627 deaths as of March 4, 2011. The MPH is predicting a peak incidence of 400,000 cases.

Safeguarding the drinking water supply is a critical function of public health that the Water Microbiology Laboratory supports. We perform routine testing of drinking water, swimming pools, lakes, bathing beaches, and ambient waters. Our work supports many other agencies, including Indiana Department of Environmental Management, Department of Natural Resources, Department of Transportation, Bureau of Animal Health, Department of Corrections, as well as various program areas within the Indiana State Department of Health and local health departments. Ever stop at a rest area along the highway and fill your water bottle or just make a pit stop and wash your hands? We support DOT by testing the water to insure it meets the requirements of the Safe Drinking Water Act. Ever go to a state park picnicking, swimming in the pool or at a beach, or drink from a water fountain? We analyze the drinking water, pool water, and beaches for the DNR. We also test processing water used in facilities that process meat or poultry products and dairy product producers for the BOAH.

The IDEM monitors all public water supplies, not just municipal supplies but any place the public may be served water. That includes, but is not limited to: the fountain at church, the bank, a restaurant and a gas station. If they have water available to the public, for any purposes, they are a public water supply and are often tested at the ISDH Laboratories. During the flooding of 2008, we were very busy testing samples collected from private residential wells in the flooded areas across Indiana to ensure they were not contaminated. The work we do protects the lives of Hoosier's every day.

More information about the ISDH Water Microbiology Laboratory and other ISDH laboratories can be found at the website www.in.gov/isdh/22421.htm.

2011 Chemistry Career Shadow Overview

By Mike Oberthur

The Indiana State Department of Health Metals Laboratory participated with the Sycamore School in its Career Shadow program for the second consecutive year during March. The program allows an eighth grade student with an interest in studying chemistry the opportunity to spend a morning observing the various procedures performed by the laboratory, and to learn more about the instrumentation employed throughout the analyses. The student also learns about the laboratory's role in the department's Public Health Initiatives.

As a part of the program, the student has a chance to speak with the chemists and ask questions about their observations. They witness the instrumentation in operation and receive a better understanding of the day-to-day workings of the laboratory. Hopefully this experience will aid the student in planning their educational future and career goals.

One particular observation of interest this year concerned the number of steps and the amount of time it took to actually prepare a sample for analysis. The student commented that, "…on CSI, they simply inject the sample into the instrument and out come the results by the end of the episode." Sometimes people just don't realize that our work is not so simple.

The ISDH Metals Laboratory is looking forward to partnering with the Sycamore School in its Career Shadow Program again in 2012.

Employee Spotlight–

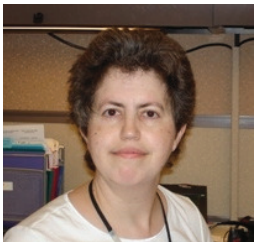
Jocelyn is one of our newest employees, starting in December 2010. She comes to us with a degree in biological sciences from Arizona State University. Her area of interest was Herpetology. She had an internship at the World Wildlife Reptile Center and is currently a member of the Indiana Herpetological Society.

Here at the Indiana State Dept of Health labs, Jocelyn works as a microbiologist in the STD lab, testing patient specimens for Chlamydia and N. gonorrhea. She assists other areas of the lab as needed. She hopes to eventually pursue an advanced degree in forensic pathology.

At home, Jocelyn continues her interest in herpetology. She has three large snakes; a Red Biak Green Tree Python, a Nicaraguan Red Tailed Boa and a White Labyrinth Albino Burmese Python. She also has a cat, who seems to get along with the snakes quite well.

In her free time, Jocelyn enjoys reading, viewing foreign horror movies, camping and spending time with her family. She and her mother meet for breakfast at Dunkin Donuts every Saturday and when the weather is nice, she enjoys riding motorcycles with her father.

Employee Spotlight–



Tina Pickett has held a variety of positions during her 24 years working for the State of Indiana. She began working for the Indiana Department of Environmental Management in 1987. Three years later she transferred to ISDH, working first in the Correspondence Center and then in the Procurement Office. Tina transferred to the Labs in 2006 as a secretary. Currently she takes care of all the reports from the Water Bacteria lab and Clinical Microbiology labs.

Tina grew up and still resides in Brownsburg, Indiana. She lives near her parents and brother & his family. She takes an interest in many varied topics. Using the internet and local library, she enjoys studying military history. At present, she is studying World Wars I and II. Tina likes photography, freshwater tropical fish, and gardening. Someday she would like to install a water garden in her backyard, including Koi fish.

Tina does not cook but buys her meals pre-made. This gives her more time to spend doing the things she enjoys most.

The LAByrinth

The LAByrinth is published bi-monthly by the editorial staff of Indiana State Department of Health Laboratories.

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