Inside This Issue

- ZIKA: A Mosquito-borne Emerging Virus
- Bacteremia and Meningitis in an Infant
- Probiotics – Understanding Our Inside Story
Contents

34 Cases in Clinical Microbiology
36 Article 429
ZIKA: A Mosquito-borne Emerging Virus
by Kathy L. Sutton and Mary P. Hudson
40 Questions for Article 429
42 Article 430
Case Thirty: Bacteremia and Meningitis in an Infant
by Eleanor A. Powell and Joel E. Mortensen
45 Questions for Article 430
46 Article 431
Probiotics – Understanding Our Inside Story
by Alice Macomber

CENTER PULLOUT SECTION
Memphis Convention Preliminary Program
49 Questions for Article 431
50 Article 432
Cystic Fibrosis: Basics, Testing, Treatment
by Deborah Janeczko
57 Questions for Article 432
58 Abstracts From the Current Literature
62 AMT Directory

Editor
Gerard P. Boe, PhD
Associate Editor
Diane Powell

Business Office
American Medical Technologists
10700 W. Higgins Rd., Suite 150
Rosemont, IL 60018
847-823-5169
e-mail address:
mail@americanmedtech.org
Web Site:
http://www.americanmedtech.org

Journal of Continuing Education Topics & Issues (ISSN 1522-8606) is published in January, April, and August under the sponsorship of the American Medical Technologists, 10700 W. Higgins Rd., Suite 150, Rosemont, Illinois 60018. Copyright 2016 by American Medical Technologists. Subscriptions include three issues of Journal of CE Topics & Issues and three issues of AMT Events: $50.00/year + $10 postage for foreign countries. Members may not deduct subscription price from dues. Postmaster: Please send change of address to AMT, 10700 W. Higgins Rd., Suite 150, Rosemont, Illinois 60018. Moving? Be sure AMT publications move with you. Send your new address and old mailing label from an AMT publication to AMT six weeks before you move.

Cover photo: Cetialpha microscape, © Eric Clark, National High Magnetic Field Laboratory, Florida State University, Tallahassee.
A two-month old female presented to the Emergency Department with fever (102°F), irritability, and decreased feeding. A blood culture from a recent emergency room visit had recently become positive with gram-negative bacilli, and the family was instructed to immediately return. Physical examination revealed a bulging fontanel and elevated heart rate. The patient’s history was unremarkable. The patient’s mother reported having a family dog that sometimes licked the baby. Additionally, the patient’s older siblings had been to a fair several weeks earlier and had contact with pigs at a petting zoo. Initial head ultrasound findings suggested inflammation of the ventricles of the brain, and an external ventricular drain (EVD) was placed. Blood was collected and sent for a complete blood count with differential (Table 1). Spinal fluid was collected and sent to the clinical microbiology laboratory for analysis and culture (Table 2). A Gram-stained smear of the centrifuged spinal fluid showed white blood cells and very few Gram-negative bacilli. Spinal fluid was plated on 5% sheep blood agar (BBL) and chocolate blood agar (BBL) and was inoculated...
Abstract
At this time, ZIKV is spreading “explosively” in the Americas. An emerging disease of arbovirus origin in greater than 40 countries and Territories, including the United States. A frightening concern regarding ZIKV is that it has been associated with devastating congenital birth defects and Guillain-Barre Syndrome (GBS). For the purposes of this article, we will look at the history of ZIKV, its mode of transmission, population at risk, complications and prevention measures now being published by the CDC.

Disclaimer
The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any agency of the U.S. government.

Early History of Virus
In 1947, the ZIKV was identified in the Zika Forest of Uganda and named after that forest. At the time, scientists were performing routine yellow fever surveillance when they obtained labs from a group of sentinel rhesus monkeys with fever. The monkeys were carried back to the lab where mice were exposed to their serum and within 10 days all mice were sick. Following that was the discovery that the virus could be transmitted to humans. The mode of transmission to humans was by the Aedes mosquito. Mosquito-borne diseases once identified only with the tropics are now globalized as a result of trade and travel networks connected to international “hot spots” of infectious disease. The World Health Organization (WHO) reports that globally, Dengue is the most common mosquito borne viral disease, with an estimated 40% of the world population at risk annually. However, ZIKV may soon be the most common mosquito borne viral disease as it has changed in character and with rapid geographical expansion during the last few years.

The first documented human cases identified in 1952 by genetic disease identification of ZIKV in Uganda. It was learned that the mosquito incubation period was about 10 days. Incubation in humans was determined to be between 2 and 7 days. There has been no vaccine or treatment developed for ZIKV with infection management focused on relieving symptoms.

Symptoms
The infection is spread through the bite of an infected Aedes species mosquito. These species of mosquitoes are commonly found in the United States in Florida, along the Gulf Coast, and in Hawaii although it has been found further north in hot weather. Some scientist have speculated that increased temperatures resulting in climate change may play a role in spread of the ZIKV carriers. This breed of mosquito has been shown to thrive in warm, moist climates. Signs and symptoms of ZIKV disease are a low grade fever, swelling in joints of the hands and feet, a transient rash that spreads from the face to the body, conjunctivitis resembling pink eye, including general symptoms such as myalgia, and headaches.

With most positive cases exhibiting generally mild symptoms and others asymptomatic; the virus can easily be misdiagnosed as dengue or...
Probiotics have become very popular. A trip to the pharmacy or to your local grocery store can enlighten or confuse you, as you examine to products on the shelf. The questions most often asked are:

1. Who needs probiotics?
2. What do they do?
3. Do I need them, and if so "why"?

Many of us first heard of probiotics from ads for yogurt. Yogurt was added to our diets for many reasons and often without “reason”. We accepted that this was a food product that was good for us.

Probiotics go far beyond yogurt. As healthcare professionals, most of us have a basic understanding of normal flora. Understanding how normal flora works and the possible use of probiotics in the treatment of medical disorders is important.

Normal flora are “good” bacteria and are beneficial to the environment and all living species. These microorganisms consist of bacteria, fungi and protozoa and together they are called normal flora. These normal flora do not cause disease but the mixtures of normal flora may change and disease may result.

No two people have the same normal flora. Our diet, body chemistry, age and other unknown factors influence our particular mixture.

Not every physician agrees with the use of probiotic and leaves the decision of the use of probiotics to the patient. The more information gathered before the purchase of the products may be beneficial the individual to choose the right probiotic for their particular need.

During the birth process, the infant encounters the first know bacteria. The mother begins to experience increased bacteria about half way through the pregnancy. At birth the development of normal flora begins. The mother's nipples develop bacteria that are natural antibiotic chemicals and acid the help repel bacteria that could be harmful. Bacteria develop on the infant’s tongue on the first day of life that prevents colonization of other bacteria. Babies that are delivered by Caesarean section and babies that are formula fed differ and most of the bacterial development are from environmental exposure. By the age of 2 years, all healthy toddlers have similar normal flora of healthy adults.

Peyer’s patches are in portions of the intestinal tract. These Peyer’s patches are similar to lymph nodes and are composed of T cell lymphocytes. These Peyer’s patches develop beneficial bacteria. By the ages of 12-15, the number of Peyer’s patches reach their peak and begin to decline.

Clostridium difficile is a bacteria found throughout the environment. Older patients who are taking antibiotics and are in hospitals or long term care facilities are at greater risk for developing C. diff illness. This can be a life threatening infection.

Probiotics means is a Greek term meaning “for life”. The World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) have defined probiotics as “live microorganisms, which, when administered in adequate amounts, confer a health benefit to the host. The International Scientific Association for Probiotics and Prebiotics (ISAPP) organized the meeting to review the relevance of the FAO/WHO definition of probiotic, 12 years after it was initially published and made this recommendation.
Cystic Fibrosis is a genetic disease passed on through a defect in chromosome 7 from carrier parents to their unborn child. Genes supply the body with instructions for making certain proteins that affect our body’s health, growth, and development as well as physical looks such as eye and hair color. Genetic information is stored and coded in a chemical called deoxyribonucleic acid (DNA). DNA is coded with letters that spell out the entries of everyone’s unique genetic encyclopedia.

CF is the mutation in both copies of the CF gene (1 from each parent). When a person inherits only one mutation, with the other normal, the result is a CF carrier. When no mutations are present, there is no diagnosis of CF and no carrier. Each time two CF carriers have a child there is a one-in-four (1:4) chance of passing both CF mutations (1 in 4 = 25% risk of CF). There is a 1:4 (25%) chance of passing no gene mutations and a 2:4 chance of passing 1 mutation (2 in 4 = 50% risk of carrier).

This article will introduce the basics of cystic fibrosis (CF), a variety of mutations within the defect, discuss testing for the disease through Sweat Test versus genetic testing, and modes of treatments and therapies.

CF Basics

Approximately 30,000 Americans have cystic fibrosis (CF). It is the most common severe recessive genetic disorder among Caucasians. Fifty (50%) of CF patients are expected to survive to 36.9 years of age. Approximately 71% are diagnosed within 1 year of birth and 92% are diagnosed by age 10. The disease is caused by mutation in CF transmembrane conductance regulator (CFTR) that encodes a transmembrane chloride channel. Seventy percent (70%) of Caucasians diagnosed have the $\text{X}F508$ mutation. In total there are greater than 1,800 mutations. The mutations lead to excessively thick and sticky mucus leading to frequent lung infections. While the disease affects both the pulmonary and gastrointestinal systems, 90% of CF deaths are caused from obstructive lung disease. There is NO CURE for CF.

Clinical Presentations

The following symptoms are important in leading to testing and diagnosis of CF. The disease ultimately affects the entire body.

Pulmonary System: Chronic sinopulmonary disease
- Wheeze
- Cough
- Repeated lung infections
- Nasal polyps
- Finger clubbing

Gastrointestinal Abnormalities
- Pancreatic exocrine insufficiency - >85%
- Chronic pancreatitis

Prevention of digestive enzymes reaching small intestine
- Poor digestion
- Retarded growth
- Persistent diarrhea

Bowel obstruction
- Newborns: meconium ileus and failure to thrive

Liver
- Clogging of biliary ducts
- Cirrhosis

Gallbladder Disease
- Fecal loss of bile acids leading to reduced bile-salt pool

By Deborah Janeczko

Deborah Janeczko, RMA, BS, M.Ed., Program Director, Midway College, Midway, KY.