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microBYTES™

A Hardy Diagnostics eNewsletter

HARDY
DIAGNOSTICS
a culture of service...

June 2019

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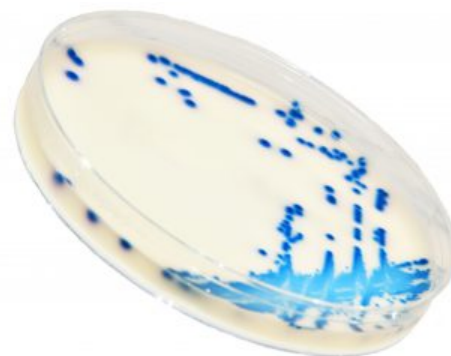
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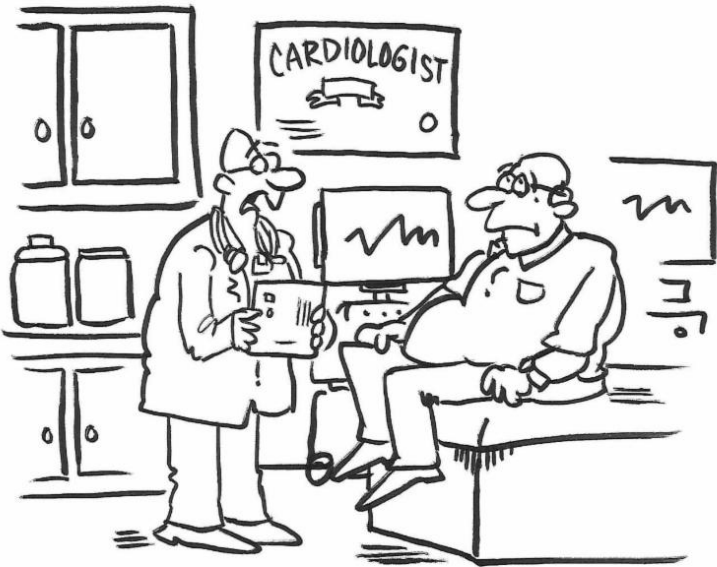
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"You need a bypass. Bypass the buffet and head to the salad bar."

A Transgenic Approach to Malaria Control

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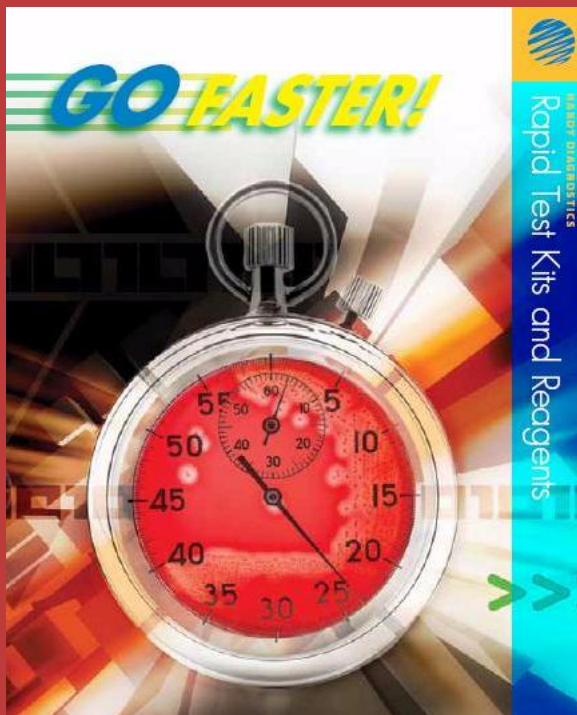
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Malaria Control

Researchers enlist the help of bacteria, fungi, and venomous spiders to eliminate deadly mosquitoes.

According to the World Health Organization (WHO), malaria affects nearly 219 million people in roughly 87 countries each year, resulting in approximately 400,000 deaths globally (1). This is the fourth leading cause of death from infectious disease worldwide; behind infectious hepatitis, Tuberculosis, and HIV/AIDS. Malaria is caused by parasites, *Plasmodium* species, which can enter human blood once an infected mosquito vector penetrates the skin surface with the proboscis for a blood meal.

Historically, malaria has been treated with antimalarial drugs, such as chloroquine and sulfadoxine-pyrimethamine. While these drugs are highly effective and have ample opportunity to cure, it is difficult to distribute these drugs to high risk areas.



Vector control with use of insecticides allows some improvement but has also played a supporting role in recent drug-resistance among *Plasmodium* species (2). Resistance causes a decrease in effectiveness of drugs, which ultimately challenges our creativity in combating resistant organisms. The use of transgenic approaches to target malaria hasn't had much success until now.

A recent study, published in *Science Daily*, describes malaria control using a different tactic - transgenic fungus - to battle mosquitos carrying the deadly *Plasmodium* parasite. According to Lovette et al., the use of fungus as a pest control has been in the tool box for years and its capabilities are finally being tested in the field. The study took place in Burkina Faso, a western-African territory, one of the six leading countries reporting high mortality rates from malaria (1).

Researchers have identified a strain of fungus, *Metarhizium pingshaense*, which can identify mosquitos that harbor the *Plasmodium* species. Furthermore, these researchers have engineered this fungus to produce a toxin that is lethal to mosquitos. Yes, you read that correctly, the fungus can actually detect when it is on a mosquito and activate its penetrative hyphae to enter the host and produce toxins, thus eradicating the mosquito and parasite. But don't worry, the research team found that, because of the specificity of the fungus, there is no harm done to beneficial species like the honeybee (3).

How did they do it? *M. pingshaense*, native to the East African region, was altered to express either green fluorescent protein (GFP) or red fluorescent protein (RFP). Next, the GFP strains were also altered to express the toxin under a hemolymph-specific promoter, and the RFP strains served as a wild-type strain (4). A bacterium was used to transfer the DNA that codes for the toxin. Hybrid, the toxin name, is "derived from the venom of the Australian Blue Mountains funnel-web

spider (pictured below) and has been approved by the Environmental Protection Agency (EPA) for application directly on crops to control agricultural insect pests." (3,5)



During testing in Burkina Faso, both Hybrid-producing and wild type

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Hydral producing and wild type strains were tested in parallel for virulence against mosquitos. Results found that adult male and female mosquito populations dropped by 80 percent in just 45 days.

This transgenic approach to decrease the mosquito population serves as a huge leap for researchers who strive to find another angle to target malaria. With the help of *M. pingshaense*, the application of fungal use to combat disease is just beginning.

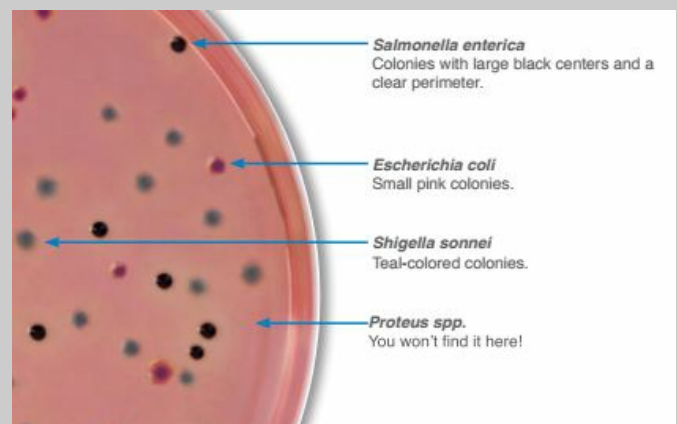
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By Natalie Sienko
Technical Support Specialist
HARDY DIAGNOSTICS

* * *

Stool cultures with no interference from Proteus!

HardyCHROM SS NoPRO



NOTE: New study shows **50% less in colony work-ups**, for an overall **cost savings of 80%!**
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- Reduces costly false-positive work-ups, due to *Proteus* spp.!
- Less colony picking, subculturing, and identifications


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* * * * *

Trio Bas Air Samplers



Two heads are better than one!

Now with Bluetooth capability!

Trio Bas from Orum International has a robust impact air sampler for every type of use. Single, double, or triple heads are available from Hardy Diagnostics.

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- [Please have a sales rep contact me](#) about air samplers.

Testimonial from a Pharmaceutical Lab worker...

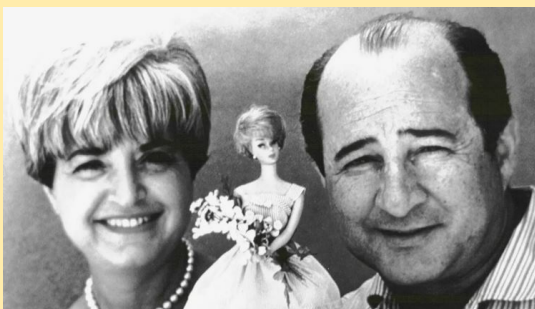
"The two heads of TRIO BAS DUO air sampler was one of the best investments during the last two years. The laboratory staff responsible of the bacteriological sampling is able to double the number of environmental microbial cycles per day. This means more efficiency and lower cost, together with the possibility to increase in the future the number of sampling in other areas of the premises."

"Ken and Barbie"

You probably have never heard of Kenneth and Barbara Handler; but, undoubtedly, you have heard of Ken and Barbie, the most famous of all toy couples. The original Ken and Barbie were not boyfriend and girlfriend; they were brother and sister. Their mother was Ruth Handler, who created the Barbie Doll in 1959. Two years later, she introduced the Ken doll. Both were named after her actual daughter and her son. Ruth and her husband, Elliot (pictured below), were the founders and owners of the Mattel toy company. When the Barbie doll was released, it sold for \$3. Today, an original Barbie from 1959 has been known to fetch as much as \$27,000 from dedicated collectors.



Both children grew up to hate the association of their names. Aside from most of the world thinking they were lovers instead of siblings, they claimed to hate what the dolls represented. Barbara complained that Barbie was a bimbo airhead. Kenneth was annoyed at Ken's squeaky clean, boring persona. Both children felt that the naming of the dolls after them ruined their lives.



Do you perform colony counts?

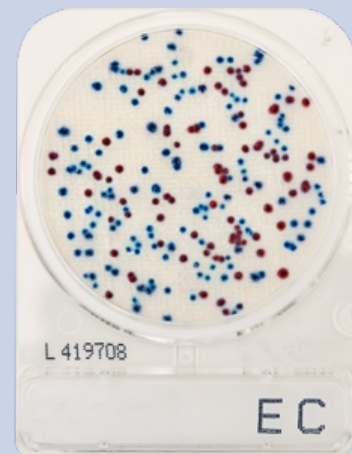


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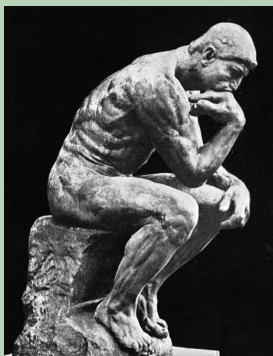
Brainteasers



In need of some gray matter stimulation?

[Get it here...](#)

Think about it...



* I used to eat a lot of natural foods until I learned that most people die of natural causes.



Linda Gutherz has meticulously created some remarkable microbiology lab miniatures in order to teach her students about the great accomplishments of microbiologists in the past.

[Click here to be amazed!](#)

RUBES



"Price as marked, eh? Is that the best you can do? What if it were to have, shall we say, some 'light defects'?"

* There are two kinds of pedestrians: The quick and the dead.

* Life is sexually transmitted.

* Healthy is merely the slowest possible rate at which one can die.

* The only difference between a rut and a grave is the length and depth.

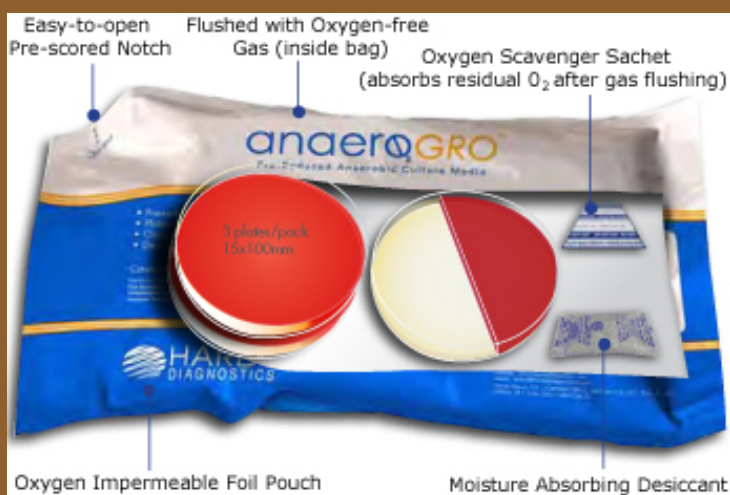
* Health nuts are going to feel stupid someday, lying in hospitals dying of nothing.

* Whenever I feel blue, I start breathing again.

* All of us could take a lesson from the weather. It pays no attention to criticism.

* * *

Culturing for Anaerobes?



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Warning:
**PUN ZONE
AHEAD**



~ A prisoner's favorite punctuation mark is the period, because it marks the end of his sentence.

~ I'm glad I know sign language. It's pretty handy.

~ A new type of broom came out, and it's sweeping the nation.

~ So what if I don't know what apocalypse means!? It's not the end of the world!

~ The roundest knight at King Arthur's round table was Sir Cumference.

~ A man just assaulted me with milk, cream, and butter. How dairy.

#

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Marcel Marceau

1923 ~ 2007

A French actor and mime artist most famous for his stage persona as "Bip the Clown." He referred to mime as the "art of silence" and he performed professionally worldwide for over 60 years. During WWII he fought with the French resistance. Later in life he befriended Michael Jackson, who incorporated some of Marceau's moves into his dance steps.

"It's good to shut up sometimes."

"To communicate through silence is a link between the thoughts of man."

"Do not the most moving moments of our lives find us without words?"

"Music and silence combine strongly because music is done with silence, and silence is full of music."

"Mime makes the invisible, visible; and the visible, invisible."

Bacteria-Killing Glass for Healthcare-Associated Infections

Much is being done to control Hospital Acquired Infections (HAI), yet a prevalence survey performed by the Centers for Disease Control and Prevention (CDC), estimates that on any given day 1 in 31 hospital patients has at least one HAI.

Fortunately, these numbers have started to decline in significant numbers over recent years, but nevertheless, nosocomial infections are an evil we must continue to diagnose and combat every day.

Efforts to fight HAI come in many different shapes and sizes. Medical device manufacturers, such as Hardy Diagnostics, supply a multitude of **diagnostic tools** used for the detection of resistant microorganisms. These tools can help guide antimicrobial therapy or determine which surfaces may require heightened sanitation procedures. Additionally, pharmaceutical companies have designed a wide array of both specific and broad spectrum antimicrobials used to help treat infections when they occur. Since their discovery in the early 1900s, over 100 antibiotics have been introduced into the pharmaceutical market.

However, it's not just health-care professionals and scientists

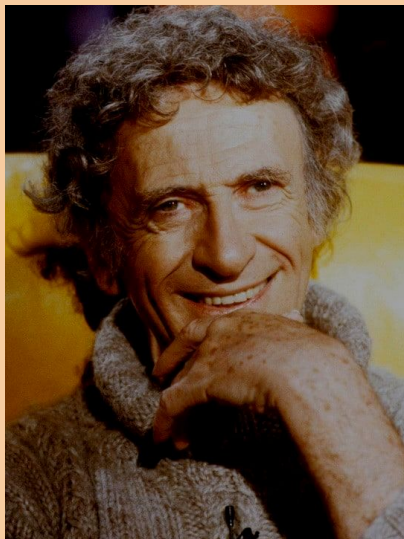
"Life is a cycle, and mime is particularly suitable for showing fluidity, transformation, metamorphosis. Words can keep people apart; mime can be a bridge between them."

"Mime, like music, knows neither borders nor nationalities."

"Chaplin made me laugh and cry without saying a word. I had an instinct. I was touched by the soul of Chaplin - Mime is not an imitator but a creator."

"Never get a mime talking. He won't stop."

"A mime is a terrible thing to waste."



* * *

Online Ordering Made Easy!



Watch a short video
to learn how easy it is
to order from Hardy on-line!

Pick. . . Click. . .
And your order is on its way!

* * *

Did you know?



contributing to the war efforts: bioengineers also play a major role. Studies on "bioactive glasses" have demonstrated their statistically significant antimicrobial activity. Bioactive glass can be applied to a range of hard and soft tissue applications and is gaining traction in the biomedical arena. It is a durable, nonporous material composed of silicon dioxide, sodium dioxide, calcium oxide, and phosphorous. In addition to these backbone components, antimicrobial metallic ions can be incorporated into the glass such as silver, copper, zinc, and most recently studied - cobalt.

Silver- and copper-doped glasses have shown bacteriostatic and bactericidal properties against strains of *Escherichia coli*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*, but resistance has emerged. A novel bioactive glass that can be incorporated into the health-care setting has great potential as a means of combating nosocomial infections.



Adding cobalt to glass to produce a beautiful blue hue has been used for centuries in the making of stained glass windows for the cathedrals of Europe. It can now be used to prevent devastating hospital acquired infections (HAI).

Researchers from the United Kingdom (Raja et. al) successfully demonstrated the antimicrobial activity of cobalt-doped bioactive glass against clinically relevant strains of bacterial and fungal organisms. The data show antimicrobial activity (R value ≥ 2) of the treatment becomes significant at two hours of exposure for *E. coli*, as early as six hours for *S. aureus*, and as early as four hours for *C. albicans*.

These results are engaging because they support the use of



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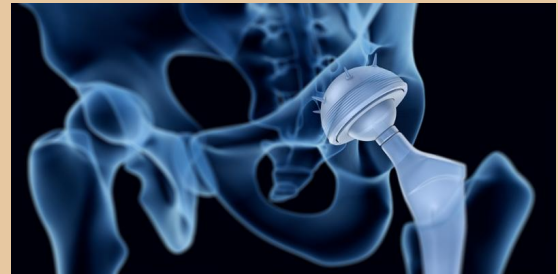
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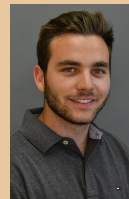
These results are encouraging because they support the use of cobalt-doped bioactive glass in the health-care setting, potentially for devices such as catheters. Although the catheter is sterile when inserted, microorganisms can multiply in the filled bag and travel upwards toward the bladder, causing a urinary tract infection. Inserting a cartridge of antimicrobial bioactive glass into the line would serve as a preventative measure in this scenario. The bioactive glass would prevent bacteria from traveling up the catheter into the patient. Another proposed application utilizes bioactive glass's ability to bond to living bone to promote healing of bone fractures and cracks.



Due to the strength and antimicrobial properties of bioactive glass, its applications in the health-care setting are expanding as biomedical research continues in this field. As antibiotic resistance and the prevalence of multi-drug resistant microorganisms increases, the detection and prevention of HAI are of the utmost importance.

References: [1](#), [2](#), [3](#), [4](#), [5](#), [6](#), [7](#)

by Dylan Campbell



R&D Microbiologist
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George Burns

