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microBYTES™

A Hardy Diagnostics eNewsletter



October, 2016

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Pre-filled and ready to go...

Dilu-Loks



Micro Musings...



"Looks like these little critters are not asexual after all."

*Hardy announces
a new chromogenic medium....*

Hardy's Dilu-loks are pre-filled dilution blanks that save you the headache of making your own. The flip-lid makes it easy to open with one hand while you pipette with the other.

Available formulas include:

- Butterfield's Buffer
- Phosphate Buffer with MgCl
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- Sterile water

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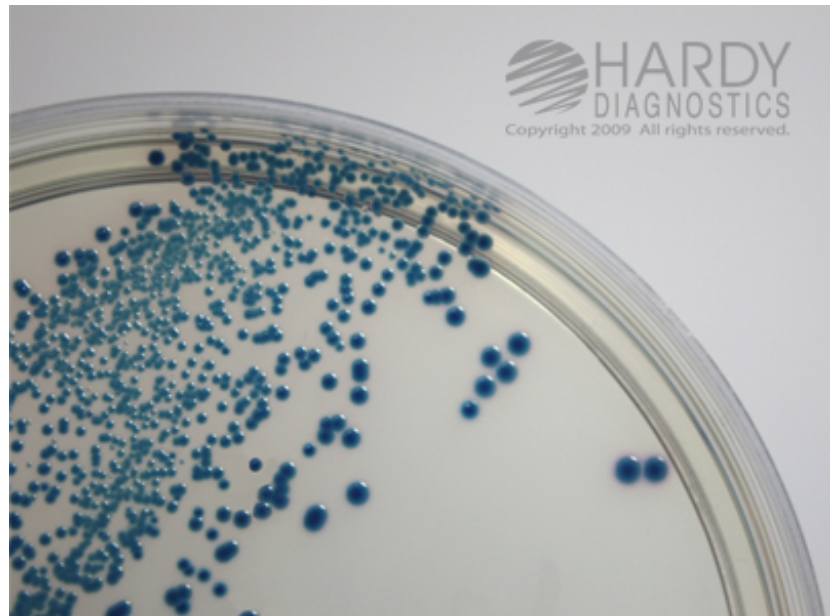
* * *

HardyCHROM ESBL

Hardy Diagnostics is pleased to inform our customers that HardyCHROM ESBL (Cat No. G321) has recently received clearance from the FDA.



ESBL E. coli on the new HardyCHROM ESBL Agar plate.



ESBL Klebsiella pneumoniae on HardyCHROM ESBL.

The GramPRO 1

Gram Stains... Consistent and Fast



Hardy's GramPRO 1 will rapidly stain your smears and get it right every time! Our patented technology judges the thickness of the smear and adjusts the decolorization step to

HardyCHROM ESBL serves as a selective and differential chromogenic medium containing a broad-spectrum beta-lactam intended for the qualitative and presumptive detection of *K. pneumoniae*, *K. oxytoca*, and *E. coli* that produce an extended-spectrum beta-lactamase (ESBL). In addition, it tests for Enterobacteriaceae that are

perfection. Not only that, there are no messy clean-up or maintenance procedures. The GramPRO 1 will produce a perfect slide every time in about 4 minutes.

[Find out more about the GramPRO 1](#)

[Watch a brief video on GramPRO 1](#)

[View the brochure on all of Hardy's automated stainers.](#)

[Please contact me to discuss automated slide stainers.](#)

Hot off the press...

New Culture Media Catalog



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potentially non-susceptible to broad-spectrum cephalosporins.

This chromogenic medium is to be used with fecal specimens and is intended as an aid in the detection, identification of colonization, and control of these bacteria in a healthcare setting.

Subculture to non-selective media is required for confirming identification, antimicrobial susceptibility testing, and epidemiological typing.

Hardy is the only media manufacturer to offer a selective medium to detect ESBLs. To try a sample of HardyCHROM ESBL in your lab, inquire about HardyCHROM ESBL with your Sales Rep today!

[Find more information](#) on HardyCHROM ESBL.

[See the Instructions for Use \(IFU\).](#)

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[See all](#) of Hardy's Chromogenic Media.

* * *

Trio Bas Air Samplers

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* * *

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* * *



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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.

* * *

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

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Comments from our Readers...

Last month, we published an article about Heat vs Methanol fixation for preparing microscope slides.

Here is a sampling of the comments we received...

"Methanol fixation is superior, especially from blood culture bottles. If you like I can send you two convincing examples of bottles with heat versus methanol.

They are images from a gram stain workshop I have presented at ASM and SWACM."

*Steven D. Dallas, PhD, D(ABMM), MT(ASCP)SM
Associate Professor, Departments of Clinical
Laboratory Sciences and Pathology
UT Health Science Center San Antonio, Texas*

* * * * *

"Jim Mangels convinced me back in the early 80s. He was working at Good Samaritan at the time.

I think most hospitals in the Bay Area (I hope) use methanol."

*Bill Horbaly
O'Connor Hospital, California*

* * * * *

"I've worked in a hospital since 1971 and in Microbiology since 1972. During the early 1980's I attended a wet workshop on anaerobes. Our instructor recommended methanol fixing for morphology. Once back in my lab, I experimented by making two slides on various specimen types with one receiving heat fixing and the other methanol fixing.

There was definitely an adjustment when reviewing our slides. Once we instituted methanol fixing as our method of choice, we observed a variety of positive findings. There was less debris on our slides; the morphology was a little crisper; great capsules; we found Giardia on our stool gram stains when we were looking for WBC.

I taught Microbiology seminar classes for a

* * *

Optical oddities...



**Learning is a result of Teaching,
but can they be the same thing?**

*"Believe half of what you see
and none of what you hear."
~ Benjamin Franklin ~*

Watch resistance happen...

Alarming Video!



[Watch a time lapse video](#) from Harvard Medical School that shows how bacteria can develop resistance with alarming speed to antimicrobials due to mutations!

* * *

Community College for 27 years starting in 1980. Some of these students also rotated through our hospital for their lab training. Initially, some of the students were conflicted because I was teaching something different from their Microbiology class at the college. Their instructor inquired about our method. I continued to use methanol fixing in my lab and taught both methods to the students with explanations as to the why. Several years ago, the college found the methanol mentioned in a text and moved forward to teach the students both methods.

I appreciate the studies confirming what I already knew."

Carol Frantz, Microbiology, Milford Hospital, CT

Here is the original article in case you missed it...

Which do you do?...

Heat Fix or Methanol Fix

Microbiologists are a very opinionated group of individuals, and it is, at times, difficult to get consensus and standardization on certain procedures. Whether to heat fix or methanol fix slides in preparation for Gram staining is one of those controversial procedures.

Prebiotics: Good sense or nonsense?

Like many scientific principles introduced to popular culture, the idea of probiotics has become chaotic and confusing. Most of us know that probiotics are the "good" bacteria that help keep the digestive system healthy, but what are **prebiotics**? A quick Google search will tell you that prebiotics are everything from chicory root, Jerusalem artichokes, under-ripe bananas, to my personal favorite, chocolate. It is basically the same thing nutritionists have been telling us for years: high fiber greens are good for you.



So what exactly is the definition of a prebiotic??

The concept of prebiotics was first introduced by Marcel Roberfroid and Glenn Gibson in 1995 where they defined prebiotics as "a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon and, thus, improves host health."¹ Roberfroid's paper only lists two prebiotics that fit this definition, trans-galactooligosaccharides and inulin. Since then, the definition of prebiotics has been revised and broadened. Currently, specific compounds and substances are being researched and listed as prebiotics. These compounds include the fructans, oligofructose and inulin, FOS, lactulose, as well as the galactan, galactooligosaccharide, resistant starch, pectin and other fiber components, and milk oligosaccharides.

Which organisms feast on prebiotics?

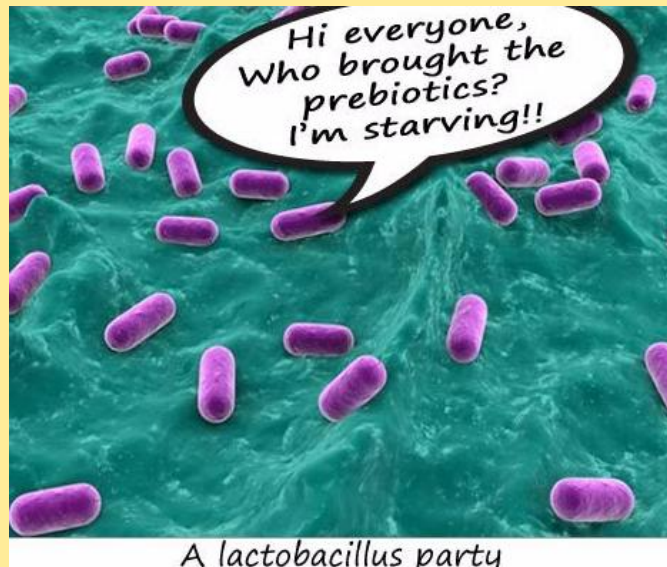
Current research suggests that *Lactobacillus* and *Bifidobacterium* are the healthy target organisms, although there is also evidence to suggest we may want to research other target organisms for optimum health (e.g. the vegan vs. meat diet gut microbiome and their effects on health). In addition, *Faecalibacterium prausnitzii* and *Akkermansia muciniphila* have been shown to respond to specific prebiotics, indicating that different prebiotics may select for different target organisms. A study by Bird suggests we should consider prebiotics as "undigested dietary carbohydrates that are fermented

by colonic bacteria yielding short chain fatty acids as end products," further broadening the definition.²

Which foods contain prebiotics?

The discussion on exactly what constitutes a prebiotic continues, but generally most scientists agree on at least some variation of Roberfroid's original definition. So what foods actually fit into this category? Surprise surprise, it's high fiber green things! It seems we just can't escape them. However, while most prebiotics are fiber, not all fiber is a prebiotic. To be beneficial, prebiotics must resist gastric acidity, be fermented by intestinal microflora, and provide some sort of support/stimulation for intestinal bacteria potentially associated with health and well-being.

Foods high in prebiotics include leeks, asparagus, chicory root, Jerusalem artichokes, garlic, onions, dandelion greens, wheat bran, and legumes. Chicory may be the best since it is 65% fiber. Sadly, chocolate is not on this list, although you can always use the antioxidants in dark chocolate as an excuse in a pinch.



So why do we care?

In 2010, Roberfroid published another paper summarizing the potential health benefits of prebiotics in conjunction with information we now know about the link between the gut microbiome and health. He claims that increases in

Bifidobacterium are a marker of good intestinal health, and their presence reduces symptoms associated with inflammatory bowel disease and irritable bowel syndrome. In infants, increases in the fecal concentration of *Bifidobacterium* correlates with improved stool quality, which Roberfroid defined as pH, SCFA, frequency and consistency. The presence of this microorganism in higher concentrations is also believed to reduce an infant's risk of gastroenteritis, infections, allergic symptoms, and eczema. He cites studies that have reported a reduction in the incidence of tumors and cancers, an increase in postmenopausal women's calcium absorption, and even an effect on weight loss.

As much as we try to reason it's OK to eat more mac and cheese, dietary health really does seem to come back to those leafy fibrous greens.



It was never fully documented as to why one method would be superior over the other...

Until now!

Jeanne Minnerath et. al. at the Biology Department at St. Mary's University of Minnesota decided to settle the matter. They examined heat and methanol fixed slides for two parameters; adherence of the bacterial cells to the slide and the ability of the gram positive bacteria not to become over decolorized.

Their results showed that methanol fixation won by a long shot! There were 2.5 times as many *Staphylococcus aureus* cells present on the slide with methanol fixation compared to heat fixation. This number increased to a factor of 10 when *E. coli* was tested. The methanol fixation was superior in causing the specimen to adhere securely to the slide.

In addition, they found that Gram positive bacteria were far less likely to become over-decolorized with methanol rather than heat fixation. This confirmed the findings of Mangels, et al in 1984.

Heat fixation tends to damage and distort the delicate cell wall structures of bacteria. This distortion also happens with tissue and blood cells which can create background debris that may be confusing or misleading.

Some have a concern for the toxicity and flammability of methanol in the lab. However, now that fume hoods are usually available and Bunsen burners are mostly used for museum displays, this should not be a problem. So why do some microbiologists insist on heat fixation?

Curiously, Minnerath mentions in her study that of the 15 microbiology manuals that they examined, all of them recommended heat fixation. Only two of them even mentioned methanol as an alternative.

What is your opinion? [Send](#) in your comments and MicroBytes will publish some of them in the next edition in October.

[Minnerath Study](#)

[Mangels Study](#)

* * *

*By Kate Massey
Technical Support Specialist
Hardy Diagnostics*

1. Dietary modulation of the human colonic microbiota: introducing the concept of prebiotics.

Gibson GR, Roberfroid MB

J Nutr. 1995 Jun; 125(6):1401-12.

2. Resistant starch, large bowel fermentation and a broader perspective of prebiotics and probiotics.

Bird AR, Conlon MA, Christophersen CT, Topping DL

Benef Microbes. 2010 Nov; 1(4):423-31.

3. Hutkins RW, Krumbeck JA, Bindels LB, Cani PD, Fahey G Jr., Goh YJ, Hamaker B, Martens EC, Mills DA, Rastal RA, Vaughan E, Sanders ME (2016). "Prebiotics: why definitions matter". Curr Opin Biotechnol. 37: 1-7. doi:10.1016/j.copbio.2015.09.001. PMC 4744122 . PMID 26431716.

4. British Journal of Nutrition, Volume 104, Issue S2

August 2010, pp. S1-S63

Prebiotic effects: metabolic and health benefits

Marcel Roberfroid et al

DOI: <http://dx.doi.org/10.1017/S0007114510003363>

Published online: 01 August 2010

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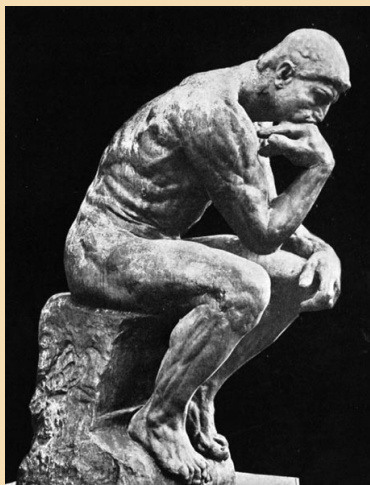
Brain teasers



Try out Part III of the numbers game...
You should be good at this by now!

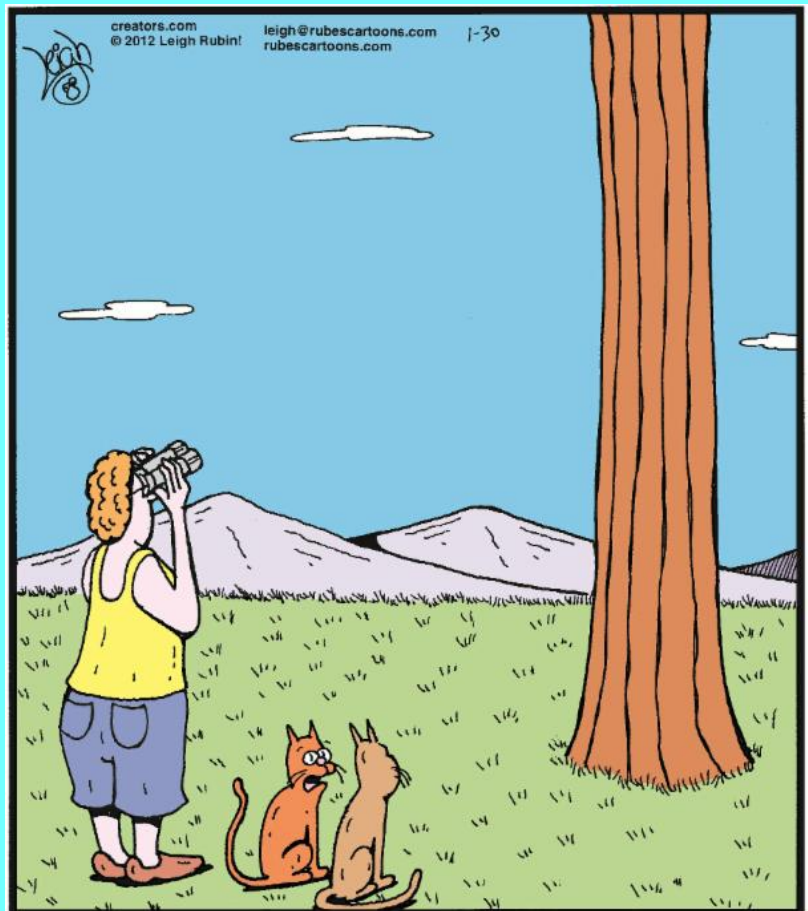
[Enter here.](#)

Think about it...



* In winter, why do we try to keep the house as

RUBES

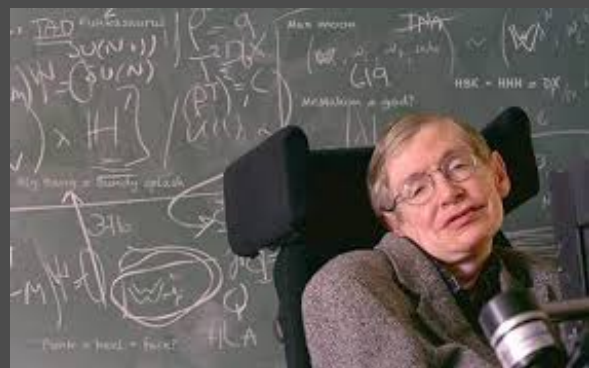


"Bird-watching ... I don't get it. It's kinda like going to a restaurant, looking at the menu and not ordering."

[Find more](#)

of Leigh Rubin's cartoon humor.

Want to [book Leigh](#) as a speaker at your next event?



"I have noticed that even people who claim everything is predetermined and that

warm as it was in summer when we complained about the heat?

* How come you never hear father-in-law jokes?

* Why do people keep running over a string a dozen times with their vacuum cleaner, then reach down, pick it up, examine it, then put it down to give the vacuum one more chance?

* Why is it that no plastic bag will open from the end on your first try?

* How do those dead bugs get into those enclosed light fixtures?

* * *

Wisdom to Ponder...



Alan Turing
1894 ~ 1962

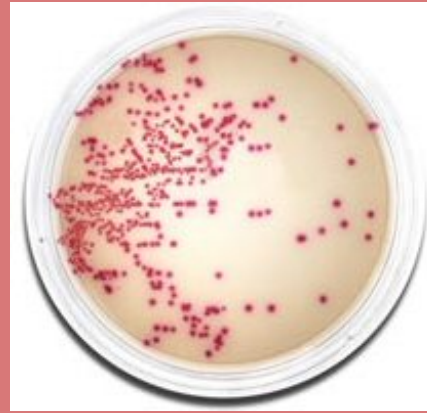
English computer scientist, mathematician, logician, and cyptographer. He is credited with breaking the secret Nazi "Enigma" code during WWII. His discovery was thought to shorten the war by about two years, thus saving millions of lives. He is known as the father of theoretical computer science and artificial intelligence.

"Sometimes it is the people no one can imagine

we can do nothing to change it look before they cross the road."

~Stephen Hawking, physicist

HardyCHROM MRSA



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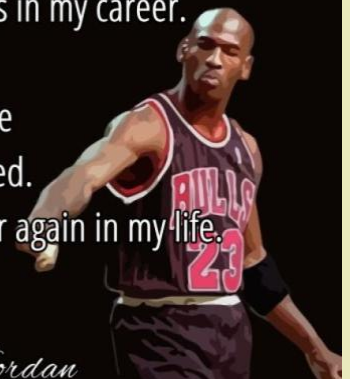
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I've missed more than 9000 shots in my career.
I've lost almost 300 games.
26 times, I've been trusted to take
the game winning shot and missed.
I've failed over and over and over again in my life.
And that is why I succeed.

~ Michael Jordan



anything of, who do the things no one can imagine."

"We can only see a short distance ahead, but we can see plenty there that needs to be done."

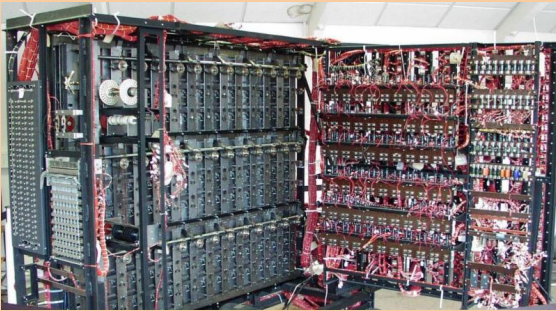
"Those who can imagine anything can create the impossible."

"A computer would deserve to be called intelligent if it could deceive a human into believing that it was human."

"We are not interested in the fact that the brain has the consistency of cold porridge."

"No, I'm not interested in developing a powerful brain. All I'm after is just a mediocre brain, something like the President of the American Telephone and Telegraph Company."

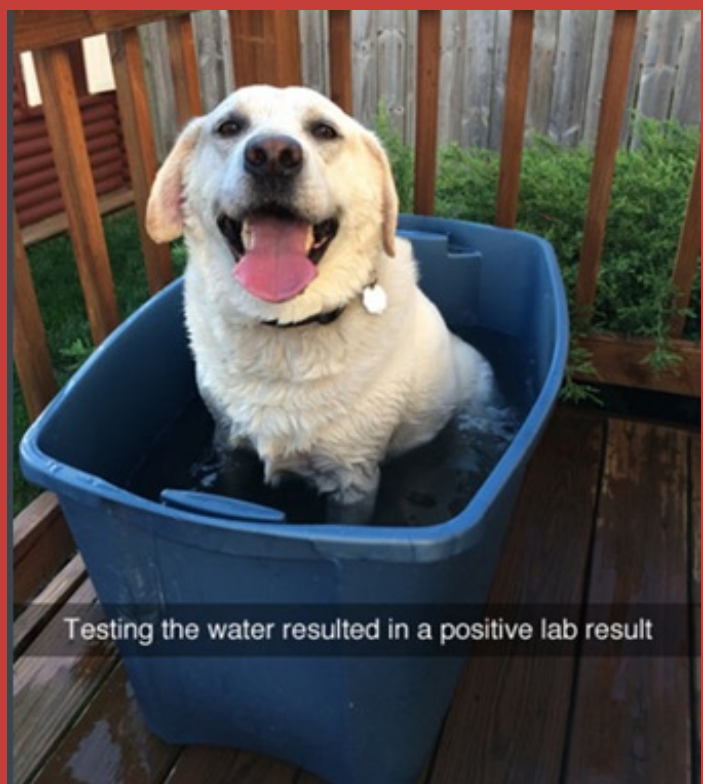
"Machines take me by surprise with great frequency."



A working replica of Turing's machine, known as the "bombe," that broke the German "Enigma" code.

* * *

Did you know?



Submitted by Rebecca Rodriguez

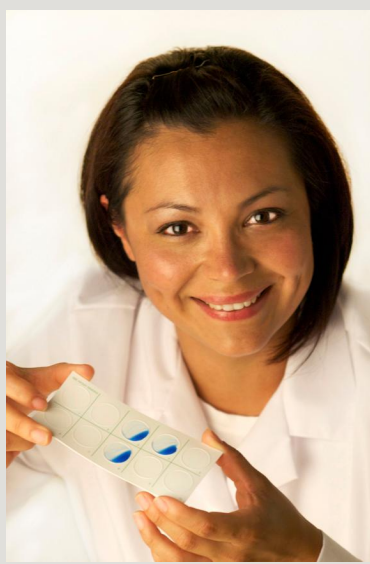
Warning:
**PUN ZONE
AHEAD**



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

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

*The biggest 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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If there is any way we can improve or expand upon our service, would you please let me know?"

[Send Jay a message...](#)



Jay Hardy, CLS, SM(NRCM)
President
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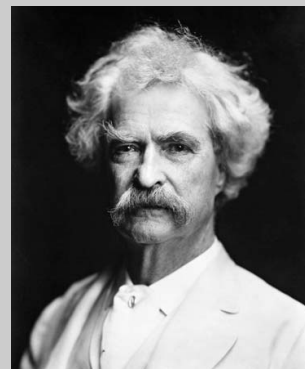
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"Be careful about reading health books.
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~ Mark Twain ~

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