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Spring/Summer 2015 / TxSSAMT

THE NEW TEXAN 3
A Message from the President

Taffy K. Durfee

Well I can’t believe that it is 2015 already. It seems like just yesterday we were attending the meeting in Mount Pleasant that David Finch hosted for us. He did an amazing job. I am looking forward to our next state meeting which will be held in Huntsville Texas on April 17th and 18th at the Comfort Suites. We should have the programs and registration forms in the mail to the members shortly. It will be our first meeting in Huntsville and we have decided to help sponsor the Sam Houston University Food Bank by deducting $10 from the registration fee if attendees will bring one non-perishable food item.

The next national AMT meeting will be held at the Hapuna Hotel on the Kohala Coast in Hawaii from June 22nd through June 25th, 2015. The room rates are $169 plus tax, which will total $191.67 a night. This year, instead of providing state gift baskets to donate, we will be giving away gift certificates for the drawing. To try to help defray the cost of the meeting, our National AMT organization will be providing a check for $350 to members who preregister for the meeting. They will be providing more information on this soon.

Taffy K. Durfee

District Councilor’s Message

Randy Swopes

As we conclude the Spring BOD/Council meeting, the information in this message is the most up to date available. We are rapidly approaching our National Convention being held in Hawaii. If you are planning on going and have not registered yet, I urge you to go to the AMT website and do so. All members who register for the full package will receive a check for $350.00 upon checking in at the convention, compliments of AMT. You should immediately make your reservations at the resort, this can be done also on the AMT website. The rates are posted there also. Shuttle service from the airport is available for a fee. The dates for the meeting are Jun. 22nd thru 25th. Attire for the convention is completely casual. This includes all banquets and parties and meetings, but swim wear is prohibited at these events. The welcome party will be a poolside party, but again no swim wear. If you have any questions, just e-mail me or call me, my contact information is located on the AMT website.

AMT has partnered with the American Kidney (AKF). There will be more information regarding this venture coming soon. Watch your e-mail and the AMT web site.

We will be celebrating Laboratory Professionals week from Apr 19th thru the 25th. Make your self known that week and remind your employers what a valuable tool they have in your services.

This will be the last year for paper/pencil exams. Beginning in 2016 they will be completely computerized.

2015 is going to be an exciting year for AMT. Don’t forget your State meetings, each state has a dedicated team of leaders that strive to make the best speakers available to help all with their CCEUs. I plan on attending the State meeting in C/Plains, Missouri, Arkansas, and Louisiana. All of Central District states are to be congratulated for the level of excellence you maintain. Thanks for all your efforts.

Randy Swopes MT
Central District Councillor

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Ronin

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Spring/Summer 2015 / TxSSAMT
 Kimberley’s Corner 
Editor's Message
Hello Texans:

How do you like this crazy weather we are having? It literally goes from being in the high 60s to the low 40s in one day. No wonder everyone is sick. We have some very exciting things that are happening, Hawaii being one of them. The National meeting will be held in Kona, Hawaii June 22-25, 2015. How awesome is that? Now, the flight is another thing that I am not looking forward to if I get to go. We have major changes at work planned to take place so I may not get to go this year. If I do not get to go, I need several of y’all to take lots of pictures for the journal for me.

We do have the spring meeting in April at Huntsville April 17-18 that Taffy and Katrina are hosting. Lots of great speakers will be there so try to join us for that meeting.

I wanted to take the time to apologize for the last journal. It did get sent to the members late, beyond the voting deadline, and I am deeply sorry about that. I take full responsibility because I am the editor. I love being the editor and I make mistakes so, again, I apologize.

I do hope everyone will try to attend the spring meeting. I miss seeing a lot of y’all that have not been to a meeting in a while. I know lives get busy with work, kids, school, etc... but try to come if you can. Delegates to the national meeting will be approved, so it is especially important for you to attend if you plan to go. Additional meeting information is in this journal.

Email me if you have any suggestions for the journal or would like to submit an article. I always need articles.

Happy Spring to you!

Kimberly

CORRECTION: I would also like to apologize for leaving Katrina's last name off of the ballots in the last journal. Her name is Katrina Fryar and I am deeply sorry for mistakes I made in the last journal.
The Dr. Jeckyll Mr. Hyde Protein

There is a protein floating around in our 60,000 miles of blood vessels that has been given the power to save life or destroy it. This protein, known as fibrinogen, helps red blood cells and platelets stick together to form a clot. If the clot forms at the site of a broken or cut blood vessel, it is an advantage to the body and can save "a life." If the clot forms inside a blood vessel in the absence of a wound or trauma, it can be life threatening since it may plug up a heart or brain artery. An elevated fibrinogen level is a predictor of cardiovascular disease. Research on this protein suggests it may also be an active participant in Multiple Sclerosis and in prohibiting regeneration of the spinal cord after injury. (Kaslow, 2002)

As previously stated, fibrinogen is a protein and proteins are large organic compounds made of amino acids arranged in a linear chain and joined together by peptide bonds between the carboxyl and amino groups of adjacent amino acid residues. The sequence of amino acids in a protein is defined by a gene and encoded in the genetic code. Proteins work together to achieve particular functions and participate in every process within cells. The chief characteristic of proteins that allows their diverse set of functions is their ability to bind other molecules specifically and tightly. Fibrinogen, also called factor I, is synthesized in the liver hepatocytes and megakaryocytes which normally has a concentration between 150-400 mg/dl in blood plasma. In natural form, fibrinogen forms bridges between platelets by binding to their GpIIb/IIIa surface membrane proteins though its major use is as a precursor to fibrin. Fibrinogen is a hexamer containing two sets of three different chains (x, B, and y) linked together by disulfide bonds. The N-terminal sections of these three chains are evolutionary related and contain the cysteines that participate in the cross-linking of the chains.

Fibrinogen is a coagulation factor, a protein that is essential for blood clot formation. It is released into the circulation system as needed along with other clotting factors. When a body tissue or blood vessel wall is injured, a process called the coagulation cascade activates these clotting factors one after the other. As the cascade nears completion, soluble fibrinogen is changed into insoluble fibrin threads. These threads cross-link together to form a fibrin net that stabilizes at the injury site. Platelets also stick to this net to form a blood clot. This barrier prevents additional blood loss and remains in place until the injury heals. Normal fibrinogen levels reflect normal blood clotting ability. Unfortunately, high levels reflect inflammation and disease somewhere within the body.

One person dies every 33 seconds in America from cardiovascular-related disease. People with diabetes, those who are overweight, sedentary, and smokers have higher levels of fibrinogen. Their risk of developing heart disease is compounded. Even in healthy people fibrinogen levels rise by 25 mg/dl per decade. One study of 2,116 men found that those who had high LDL("bad") cholesterol; but low fibrinogen levels had only one-sixth the heart attack risk of men with high LDL and high fibrinogen levels (Meletis, 2005). Fibrinogen promotes thromboses, or clots, by causing platelets to clump inside blood vessels. This is one of the main factors underlying ischemia and heart attack. Protecting the heart now means more than worrying about total cholesterol, weight control, and exercise. Measuring fibrinogen levels should become part of this intervention.

Imagine the body becoming allergic to itself. A genetically damaged immune system is unable to distinguish between virus proteins and the body's own myelin and so it produces antibodies that attack. Multiple Sclerosis is an inflammatory disease that affects the central nervous system. Destruction of the myelin sheath is associated with accumulation of fibrinogen deposits in the brain. Fibrinogen activates macrophage cells called microglia, causing inflammation which damages myelin. Studying a mouse model, researchers identified a specific receptor called Mac-1 that is formed by microglial cells and binds to fibrinogen. The mice having a mutant form of fibrinogen or peptide that failed to bind Mac-1 had fewer inflammatory lesions and less severe MS symptoms. The peptide served as a decoy tying up the receptor and keeping microglia from responding to the real protein. "Importantly, this approach blocks fibrin's interaction with microglia, but not with platelets, so clotting wouldn't be impacted," said Akassoglou, Ph.D. assistant professor in University California San Diego's Department of Pharmacology (Akassoglou, 2007).
A gymnast cartwheels from one side of the balance beam to the other. As she flips underneath the ripple of protective bones, nerve cells are passing brain messages through the spinal cord (Ogundipe, 2007). Suddenly a slight slip of the foot and off the beam she tumbles head first. In the blink of an eye her neck snaps and the communication line directing the movement of her muscles shuts down just below the point of impact. Over 250,000 Americans have spinal cord injuries. Research on fibrinogen may explain one reason why the human body is unable to repair itself after a spinal cord injury.

A research team, led by Dr. Katerina Akassoglou, Assistant Professor in UCSD’s Department of Pharmacology, studied three types of spinal cord injuries in mice and rats. The injuries resulted in cellular and vascular damage and leakage of fibrinogen from the blood vessels. Massive deposits of fibrinogen were found at the sites of injury which surprised the researchers. This led them to investigate the protein’s effect on neuronal cells’ ability to regenerate. Fibrinogen inhibits axonal growth by binding to the beta three integrin receptor. This binding induces the activation of another receptor called the epidermal growth factor receptor, which also stops axonal growth.

This discovery will lead to a possible strategy to improving recovery after spinal cord injury by discovering a way to block activation of neuronal receptors by fibrinogen. "A similar mechanism could be at work in other neurological diseases that result in paralysis, such as multiple sclerosis or hemorrhagic stroke, where blood vessels break and bleed into the brain", said Dr. Akassoglou (Akassoglou, 2007).

In mainstream culture the very phrase "Jekyll and Hyde" has come to mean a person who may show a distinctly different character, or profoundly different behavior from one situation to the next, as if almost another person. Research has revealed the hidden dark side of fibrinogen. You might say this protein has a split personality; transforming spontaneously from savior to assassin.

References


Retrieved February 25, 2008 From www.vanguarddngr.com

**Dr. Jeckyll Mr. Hyde Protein - CE #31-301-15**

1. In which area of the body is fibrinogen synthesized?
   a. Bone marrow
   b. Liver
   c. Parathyroid
   d. Thyroid

2. Fibrinogen is also called what factor?
   A. I
   B. B
   C. x
   D. y

3. Fibrinogen is a precursor to what other protein?
   a. Thromboplastin
   b. Fibrin
   c. Prefibrin
   d. Plastin

4. What can an elevated level of fibrinogen predict?
   a. A deficiency of vitamin B12
   b. Thyroid hormone imbalance
   c. Cardiovascular disease
   d. A deficiency of vitamin A

5. In healthy people, for every decade of age, how much does the levels of fibrinogen usually rise?
   a. About fifteen mg/dl
   b. About twenty-five mg/dl
   c. About fifty mg/dl
   d. About seventy-five mg/dl

6. Accumulation of fibrinogen in the brain is associated with what disease?

7. When fibrinogen binds to the beta three integrin receptor, it inhibits what growth?
   a. Axonal
   b. Microglia
   c. Dendrite cells
   d. Myelin fibers

8. One of the main factors that causes platelets to clump inside blood vessels is because fibrinogen promotes what?
   a. Plastin
   b. Hemolysis
   c. Thrombosis
   d. Fluidification

9. Approximately how many Americans currently suffer from spinal cord injuries?
   a. Over 250,000
   b. Over 500,000
   c. Over 750,000
   d. Less than 100,000

10. High levels of fibrinogen indicate ___________________________ and ___________________________ within the body.

Please do not send money, these are free CEUs.

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**T.J. Weatherly**

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Rett syndrome is a childhood neurodevelopment disorder that affects females almost exclusively. The child generally appears to grow and develop normally before symptoms begin. Loss of muscle tone is usually the first symptom. Other early symptoms may include a slowing of development, problems crawling or walking, and diminished eye contact. As the syndrome progresses, a child will lose purposeful use of her hands and the ability to speak. Compulsive hand movements such as wringing and washing follows the loss of functional use of the hands. The inability to perform motor functions is perhaps the most severely disabling feature of Rett syndrome, interfering with every body movement, including eye gaze and speech.³

Rett syndrome results from a mutation on the X chromosome that is transmitted as an X-linked trait. However, most cases are thought to represent new mutations that appear to occur spontaneously for unknown reasons. In some affected females, the disorder may result from mutations of a gene known as MECP2 and is thought to play an essential role in brain development.⁴

Rett syndrome is most often misdiagnosed as autism, cerebral palsy, or non-specific developmental delay. In the past, making the correct diagnosis called not only for a long list of diagnostic tests and procedures to rule out other disorders, but is also took from months to years waiting to confirm the diagnosis as new symptoms appeared over time. Today, there is a simple blood test to confirm the diagnosis. However, since it is known that the MECP2 mutation is also seen in other disorders, the presence of the MECP2 mutation in itself is not enough for the diagnosis of Rett syndrome. Diagnosis requires either the presence of the mutation or fulfillment of the diagnostic criteria (a clinical diagnosis, based on signs and symptoms that you can observe) or both. Below is a list of diagnostic criteria.⁵

**Necessary criteria** (must be present for the diagnosis)
1. Apparently normal prenatal and perinatal history
2. Psychomotor development largely normal through the first six months or may be delayed from birth
3. Normal head circumference at birth
4. Postnatal deceleration of head growth in the majority of patients.
5. Loss of achieved purposeful hand skill between ages six months and 2.5 years
6. Stereotypic hand movements such as hand wringing/squeezing, clapping/tapping, mouthing and washing/rubbing automatisms
7. Emerging social withdrawal, communication dysfunction, loss of learned words, and cognitive impairment
8. Impaired or falling locomotion

**Supportive criteria** (not necessary for the diagnosis, but may also be seen)
1. Awake disturbances of breathing (hyperventilation, breath-holding, forced expulsion of air or saliva, air swallowing)
2. Teeth grinding
3. Impaired sleep pattern from early infancy
4. Abnormal muscle tone successively associated with muscle wasting and dystonia
5. Peripheral vasomotor disturbances (cold, blue hands and feet)
6. Scoliosis/kyphosis progressing through childhood
7. Growth retardation
8. Hypotrophic (small) feet; small, thin hands

To date, there is no cure for Rett syndrome. Research shows that early diagnosis of developmental disorders such as Rett syndrome, is important for improving outcomes. Interventions delivered early in life are more likely to result in positive effects on later skills and symptoms. The sooner
treatment begins, the greater the opportunity for learning. Most people with Rett syndrome benefit from well-designed interventions, no matter what their age.

There are a variety of ways to help minimize the effects of Rett syndrome. Rather than addressing the syndrome as a whole, most treatments try to reduce specific symptoms of Rett syndrome. These treatments generally aim to slow the loss of abilities, improve or preserve movement, and encourage communication and social contact. People with Rett syndrome often benefit from a team approach to care in which many different kinds of health care providers play a role along with family members. Members of this care team may include:

- Physical therapists, who can help patients improve or maintain mobility and balance and reduce misshapen back and limbs
- Occupational therapist, who can help patients improve or maintain use of their hands and reduce stereotypic hand movements
- Speech-language therapists, who can help patients use non-verbal ways of communication and improve social interaction

Other members of the team may also include developmental specialists, developmental pediatricians, orthopedic surgeons, gastroenterologists, pulmonologists, cardiologists, neurologists, special education providers, and nurses. The involvement of family members is also critical to ensuring the well-being of those with Rett syndrome.

On February 8, 2007 the journal *Science* announced astonishing and unexpected results with the publication of a paper entitled *Reversal of neurological Defects in a Mouse Model of Rett Syndrome*, by Adrian Bird, Ph.D. of the University of Edinburgh.

Until this point, research was focused on diagnosis and prevention, or at best, a therapy that could be initiated during the small window of opportunity before symptoms in a baby begin to manifest. Professor Bird’s work has now made the reversal of full-blown symptoms a tangible possibility.6

While Rett syndrome occurs in roughly one in every 10,000 females, it is extremely rare in males. Because they have only one X chromosome, males with Rett-causing mutations have only the abnormal copy of the MECP2 gene and usually die before birth or in early infancy.

Although Rett syndrome in humans occurs primarily in females, the researchers used male mice to generate their mouse model of the syndrome, tampering with the MECP2 genes of the male mouse in a way that was mild enough to allow the animals to survive. They did this in order to eliminate the effects of X chromosome inactivation.

“‘These mice are expected to be a more useful model for Rett syndrome than are previous models using female mice,’” said James Hanson, M.D., Chief of NICHD’s Mental Retardation & Developmental Disabilities Branch. “‘Because they do not have a ‘backup’ normal copy of the MECP2 gene, male mice have consistently more severe symptoms than female mice and have more uniform symptoms. This fact will allow researchers to better assess the effects of new medications and therapies in treating or preventing the symptoms of Rett syndrome.’”

Other options, such as medication or surgery are also effective. For instance, surgery can correct scoliosis for some persons with Rett syndrome. Similarly, anti-seizure medications can effectively control seizures for many affected by Rett syndrome. Other medications can reduce breathing problems and can eliminate problems with heart beat rhythm. Over-the-counter aids for indigestion and constipation can also help to reduce these problems. Calcium and mineral supplements may also help to strengthen bones, which slow the progress of the scoliosis.1

References

Questions

1. Rett syndrome results from the __________________________ chromosome that is transmitted by __________________________ trait.

2. Females that have the disorder may result from the mutation of what gene? __________________________

3. T/F Rett syndrome affects roughly over __________________________ females.

4. T/F Teeth grinding, hyperventilation and scoliosis is part of the criteria on being diagnosed.

5. __________________________ and __________________________ help patients to improve on maintaining their mobility and balance.

6. __________________________ and may help to strengthen bones, which slows the progress of __________________________.


8. Males that have Rett syndrome have __________________________ chromosome.

9. T/F Males usually die before birth or early infancy due to the abnormal genes.

10. T/F When doing research, male mice are used more than female mice and have more symptoms.

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Alternative Medicine

By Wendy Day
Instructor: Kim Meshell, Angelina College

Since my mother suffered breast cancer and has just entered into remission this last year, I felt that I’d like to write about the different treatment available for cancer patients in alternative medicine. My mother underwent radiation therapy. Had she known that there were alternate choices available, and their statistics, I wonder if she would have given them a second thought. I would like to discuss these four alternative routes. Complementary and Alternative Medicine (CAM) – CAM is any medical system, practice, or product that is not thought of as standard care. Standard medical care is care that is based on scientific evidence. For cancer, it includes chemotherapy, radiation, biological therapy, and surgery. Complementary Medicine – Complementary medicine is used along with standard medical treatments. One example is using acupuncture to help with side effects of cancer treatment. Alternative Medicine – Alternative medicine is used in place of standard medical treatments. One example is using a special diet to treat cancer instead of a method that a cancer specialist (an oncologist) suggests. Integrative Medicine – Integrative medicine is a total approach to care that involves the patient’s mind, body, and spirit. It combines standard medicine with the CAM practices that have shown the most promise. For example, some people learn to use relaxation as a way to reduce stress during chemotherapy.

In 2002, the Medical Subject Headings (MeSH) Section staff of the National Library Medicine classifies alternative medicine under the term complementary therapies. This is defined as therapeutic practices which are not currently considered an integral part of conventional medical practice. They may lack biomedical explanation but as they become better researched some, such as physical therapy, diet and acupuncture, become widely accepted whereas others, such as humors or radium therapy, quietly fade away. Therapies are termed as Complementary when used in addition to conventional treatments and as Alternative when used instead of conventional treatment. To give you an idea, alternative therapies include, but are not limited to the following: Folk Medicine, Herbal Medicine, Diet Fads, Homeopathy, Faith Healing, New Age Healing, Chiropractic, Acupuncture, Bee Sting Therapy, Naturopathy, Massage, Music Therapy and even Scientology.

The National Cancer Institute cites this information in regard to alternative care.
Types of Complementary and Alternative Medicine (CAM)

We are learning about CAM therapies every day, but there is still more to learn. Cons the terms "natural", "holistic", "home remedy", or "Eastern medicine" to refer to CAM. However, experts use five categories to describe it. These are listed below with a few examples for each.

Mind-Body Medicines

These are based on the belief that your mind is able to affect your body. Some examples are:
- **Meditation**: Focused breathing or repetition of words or phrases to quiet the mind.
- **Biofeedback**: Using simple machines, the patient learns how to affect certain body functions that are normally out of one’s awareness (such as heart rate).
- **Hypnosis**: A state of relaxed and focused attention in which the patient concentrates on a certain feeling, idea, or suggestion to aid in healing.
- **Yoga**: Systems of stretches and poses, with special attention given to breathing.
- **Imagery**: Imaging scenes, pictures, or experiences to help the body heal.

Biologically Based Practices

This type of CAM uses things found in nature. This includes dietary supplements and herbal products. Some examples are:
- Vitamins
- Herbs
- Foods
- Special diets

A note about nutrition: It's common for people with cancer to have questions about different foods to eat during treatment. Yet it's important to know that there is no one food or special diet that has been proven to control cancer. Too much of any one food is not helpful, and may even be harmful. Because of nutrition needs you may have, it’s best to talk with the doctor in charge of your treatment about the foods you should be eating.

Manipulative and Body-Based Practices

These are based on working with one or more parts of the body. Some examples are:
- **Massage**: Manipulation of tissue with hands or special tools.
- **Chiropractic care** (ky-ro-PRAK-tik): A type of manipulation of the joints and skeletal system.
- **Reflexology** (ree-flex-AH-lo-gee): Using pressure points in the hands or feet to affect other parts of the body.

Energy Medicine

Energy Medicine involves the belief that the body has energy fields that can be used for healing and wellness. Therapist use pressure or move the body by placing their hands in or through these fields. Some examples are:
- **Tai Chi** (ty-CHEE): Involves slow, gently movements with a focus on the breath and concentration.
- **Reiki** (RAY-kee): Balancing energy either from a distance or by placing hands on or near the patient.
- **Therapeutic touch** (thair-a-PYU-tik): Moving hands over energy fields of the body.

Whole Medical Systems

These are healing systems and beliefs that have evolved over time in different cultures and parts of the world. Some examples are:
- **Ayurvedic medicine** (eye-yer-VAY-dik): A system from India emphasizing balance among body, mind, and spirit.
- **Chinese medicine**: Based on the view that health is a balance in the body of two forces called yin and yang.
- **Acupuncture** (AK-yoo-PUNK-cher) is a common practice in Chinese medicine that involves stimulating specific points on the body to promote health, or to lessen disease symptoms and treatment side effects.
- **Homeopathy** (home-ee-AH-puh-thee): Uses very small doses of substances to trigger the body to heal itself.
- **Naturopathic medicine** (na-chur-o-PATH-ik): Uses different methods that help the body naturally heal itself.

The National Cancer Institute suggest that anyone thinking of any alternative care to speak with their medical doctor before starting alternative treatment. Many people are afraid to talk with their doctor about the alternatives available to them; but doctors know that people with cancer want to take an active part in their care. They want the best for their patients and are often willing to work with them.

If you, or someone that you know, is considering alternative therapy, then it is very important to be informed of what the scientific studies have shown and make a decision based on the facts, which is a better idea than simply using a therapy because of something you have seen on television, in an advertisement, a magazine, newspaper or on a Web site.

Standard treatments are based on scientific evidence. While claims are made that CAM treatment has many benefits and can sound promising, we do not know how safe many CAM treatments are or how well they work. Studies are under way to determine the safety and usefulness of many cancer-related CAM practices. Many patients have found CAM to help manage stress, nausea, and pain. While others did not notice any change.

References

National Cancer Institute - www.cancer.com
NCCAM - http://nccam.nih.gov/health
New Hope Medical Center - http://www.newhopemedicalcenter.com
Differentiating Reactive Lymphocytes from Monocytes in the Peripheral Blood Smear

By David A. Chattin, MT

INTRODUCTION

One part of performing a manual white blood cell differential that is often difficult for inexperienced laboratory workers is differentiating between reactive lymphocytes and monocytes. This is understandable for lab techs in training, as the two cells possess similar characteristics when stained with Wright-Giemsa or comparable stains. However, by knowing the differences between these two cell types, one can confidently identify them correctly.

What are Reactive Lymphocytes?

For the purpose of this article, all varieties of reactive lymphocytes (also called atypical, viral, transformed, or variant lymphocytes) will be described as one type of cell. When lymphocytes react to certain antigenic stimuli, they begin to produce the appropriate lymphokine response or antibody expression. This response causes morphological changes in the lymphocyte as it reacts to the targeted antigen. The size of the reactive lymphocyte most often grows and can vary by 10-25 µm in diameter. This increase in size is caused by an increase of RNA in the cytoplasm as well as an increase of DNA in the nucleus.

The nucleus varies in shape and size and may contain nucleoli. Cytoplasm is often royal blue showing varying shades of basophilia, and may or may not contain vacuoles or red/pink granules. The nucleus to cytoplasm ratio also varies greatly with ranges seen from 2:1 to 1:2. The most dramatic presentation of reactive lymphocytes is seen in infectious mononucleosis. However, reactive lymphocytes are also present in other conditions such as CMV, viral hepatitis, and post-transfusion reactions. Clinically normal patients may have up to 5% of their leukocytes classified as reactive lymphocytes.

Differences between Reactive Lymphocytes and Monocytes

The nucleus of a reactive lymphocyte often displays a wider variety of shapes than a monocyte’s. There is a greater tendency for the nuclear chromatin to be condensed at the periphery of the cell in the reactive lymphocyte, and “brain-like” convolutions present in monocytes are not observed in a reactive lymphocyte. The nucleus of a reactive lymphocyte will also tend to stretch along with the cytoplasm to reach out toward neighboring red blood cells. Monocytes have
finely granular grey/blue cytoplasm (sometimes described as having a “ground glass” appearance), whereas the cytoplasm of reactive lymphocytes commonly has a relatively clear, non-granular appearance. Reactive lymphocytes are often deeply indented by neighboring red blood cells and may show darkening around the red blood cells (also called skirting). Monocytes may extend pseudopods which push against neighboring red blood cells, causing them to be indented by the monocyte.

Distinguishing Characteristics

Reactive Lymphocyte

Monocyte

The nucleus of a reactive lymphocyte often displays a wider variety of shapes than a monocyte’s.
A) This cell may be identified as a reactive lymphocyte. Observe the way the cell reaches to neighboring red blood cells and displays darkening (skirting) where it makes contact. The cytoplasm is blue, non-granular, and although it contains vacuoles like a monocyte, the nucleus to cytoplasm ratio is greater than would be seen in a monocyte. One should be careful not to be fooled by the shape of the nucleus, as it displays a fold similar to the classic fold a monocyte’s nucleus presents. This is a distractor.

B) At first glance, the most striking features of this cell include a large, folded nucleus and finely granular cytoplasm that includes vacuoles consistent with the characteristics of a monocyte. Continue to observe the cell’s other features. The nucleus to cytoplasm ratio is small like a monocyte, and the cell appears to push against the surrounding red blood cells rather than wrap around them. Skirting is also absent. All of these clues identify the cell as a monocyte.

C) This cell presents a strange morphology as it stretches between several red blood cells. Observe the interaction with those cells. Skirting is present, and the leukocyte appears to wrap around them. The cytoplasm is royal blue and lacks granules. At this point, most characteristics of the cell point to it being a reactive lymphocyte. The final criterion that cinches that identification is the nucleus to cytoplasm ratio. This cell has a high nucleus to cytoplasm ratio inconsistent with a monocyte.

D) A classic monocyte. The nucleus has brain-like convolutions and the characteristic fold. The cytoplasm is finely granular, grey/blue, and contains many vacuoles. Pseudopods are pressing against the surrounding red blood cells, making indents. Do not be distracted by what may appear as slight skirting where the monocyte touches the red blood cells. While this is a characteristic of reactive lymphocytes, all morphologic clues must be taken into consideration when identifying a cell, and this leukocyte displays all the features of a mature monocyte.

CONCLUSION
It is important to be thorough in your observation of leukocytes when deciding on the identification of the cell because some cells share or have similar characteristics. Being familiar with multiple defining features of leukocytes will help the hematologist make a confident decision when differentiating between two similar cells. As a learning technician, the most important thing to be able to do is know when you are unsure as to what you are looking at. Manual differentials take practice, and it is always wise to seek the opinion of a more experienced staff member when unsure about the identity of a cell.

References

A special thank you to Dr. Michael J. Russell, MD for generously sharing his knowledge about this topic.

Health tidbit
How many of us have the hot flashes, night sweats, mood swings, weight gain all because our hormones have changed.

Well according to a recent research study, they found that yams can help balance your hormones. Yams contain a phytoestrogen that works as natural hormone replacement therapy. Postmenopausal women who added yams to their diet saw levels of protective hormones rise more than 25% in a month, while levels of harmful hormone disrupters-linked to everything from obesity and osteoporosis to cancer dropped almost 40%. I think I will add Yams to my daily diet!
1. What triggers the change from a common lymphocyte to a reactive lymphocyte?
   a. antibodies
   b. antigen
   c. bacteria
   d. DNA

2. The growth of a reactive lymphocyte is caused by an increase of ______ in the ____________.

3. Which of the conditions listed below does NOT cause reactive lymphocytes to appear?
   a. mononucleosis
   b. CMV
   c. viral hepatitis
   d. Alzheimer’s

4. What term has been adapted to describe the appearance of the cytoplasm of the monocyte?
   a. “ink smear”
   b. “muddy waters”
   c. “brain-like”
   d. “ground glass”

5. Reactive lymphocytes are often indented by what type of cell?
   a. WBC
   b. RBC
   c. Platelet
   d. Monocyte

6. A normal patient may have up to what percent of their lymphocytes classified as reactive lymphocytes?
   a. 5%
   b. 10%
   c. 15%
   d. 25%

7. What disease causes the most dramatic increase in reactive lymphocytes?
   a. viral hepatitis
   b. cytomegalovirus
   c. infectious mononucleosis
   d. lupus

8. Which cell has a high nucleus to cytoplasm ratio?
   a. normal lymphocyte
   b. reactive lymphocyte
   c. normal monocyte
   d. reactive monocyte

9. T/F Monocytes are often deeply indented by neighboring red blood cells and may show darkening around the red blood cells (also called skirting).

10. Match cell type with distinguishing characteristics:

    | Cell type         | Characteristic                                      |
    |-------------------|-----------------------------------------------------|
    | a. Reactive Lymphocyte | Nucleus has characteristic fold                     |
    | b. Monocyte        | Irregular shaped nucleus                            |
    |                   | 10-25 µm in diameter                                |
    |                   | Lack nucleolus                                      |
    |                   | Royal blue cytoplasm                                |
    |                   | May have nucleoli                                   |
    |                   | Presence of vacuoles                                |
    |                   | May show red/pink granules                          |
    |                   | Cytoplasm has clear, non-granular appearance        |
    |                   | Brain-like convolutions in the nucleus              |

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Linda Raven and Ms. Sibyl- two beautiful ladies!
Members looking happy to be there
Tom, Pat and Vickie- Pat holding her Hall of Fame award- so proud of you
Vernell with Tom, Pat and Vickie as Pat got her Hall of Fame award
Taffy giving away two scholarship awards
Immanuel- listening to a lecture
Petronila- smiling beautifully
Taffy and Vernell- having fun at the auction
Taffy with G.R. McGee and his lovely wife
Members enjoying a meal at the auction
David and Taffy
Two members enjoying a session
Taffy with Georgetown students- we love our students
First time attendees
15 Pat with her brother Tom and sister in law Vickie
16 David and Joe- handsome fellows!
17 Joe
18 Vickie holding a white teddy bear that she bought at the auction
19 Kim’s MA students- Carissa, Audra, Vania
20 Vernell with the newly elected officers - Taffy-president, Jean-Treasurer, Katrina-secretary, Kim-vice president
21 Taffy with Felicia Lankford and Allie Meshell- scholarship award winners
22 Students from Georgetown
23 Vernell and Pat- just stunning
24 Bobbie- another beautiful member
2014 may end up being a very bad year for the flu. The primary reason is that just over half the strains tested were not covered by the current vaccine. Also, there is currently a mutated strain that was not active at the time the vaccine was being developed. Still, it is always good to get vaccinated because it will lessen the chances of getting the flu and passing it to others as well as possibly making your illness milder if you do get it.

While flu outbreaks are high in nearly half the country, there is nothing to indicate that the outbreak this year will be worse than in previous years and right now we are in the middle of the peak times between December and February.

In 2011 to 2012 season, thirty-seven children died, in 2012-2013, there were 171. In the 2013 to 2014 season, the figure was 109. During the 2009 to 2010 season, 348 deaths were reported, mainly due to the H1N1 virus. Totals are known for children but not adults because child deaths must be reported to the CDC; there’s no similar requirement for adult deaths.

Older people are generally those worst-affected and their hospitalization rate of almost 39 per 100,000 people is the highest in the country.

But fear not, there are steps you can take to help prevent getting and spreading the flu.

• Wash your hands often with soap and water or an alcohol-based hand rub.
• Avoid touching your eyes, nose, or mouth, as germs are spread this way.
• Try to avoid close contact with sick people.
• Practice good health habits. Get plenty of sleep and exercise, manage your stress, drink plenty of fluids, and eat healthy food.

Most of the time if you get the flu it is mild and does not require medical care or antiviral drugs. If you get sick with flu symptoms, you should stay home and avoid contact with other people except to get medical care. If you have the flu and are in a high risk group, contact your health care provider. Those in the high risk groups include children, people 65 and older, pregnant women and people with certain medical conditions. When you call or leave a message, be sure to remind your medical practitioner that you are in one of the high risk groups.

Go to the emergency room as a last resort or if you are very sick. If you are at high risk of flu complications or you are concerned about your illness, call your health care provider for advice. If you go to the emergency room and you are not sick with the flu, you may catch it from people who do have it.

The emergency warning signs of the flu:

In children
• Fast breathing
• Bluish skin color
• Not drinking enough fluids
• Not waking up or not interacting
• Being so irritable that the child does not want to be held
• Flu-like symptoms improve but then return with fever and worsened cough
• Fever with a rash
• Being unable to eat
• Has trouble breathing
• Has no tears when crying
• Significantly fewer wet diapers than normal

In adults
• Difficulty breathing or shortness of breath
• Pain or pressure in the chest or abdomen
• Sudden dizziness
• Confusion
• Severe or persistent vomiting
• Flu-like symptoms that improve but then return with fever and worsened cough

Continued on page 20
Macular Degeneration: a Vision Vandal

By Misti Patterson

Many people go through their lives with good vision; maybe they need glasses or contacts or maybe they have Lasik surgery. But for an unfortunate group of the population, their vision deteriorates beyond the point of corrective lenses or surgery. A visit to their optometrist or ophthalmologist leads to an upsetting discovery. A vision vandal, macular degeneration, is on the move.

Macular degeneration is "the slow deterioration of the cells in the macula, a tiny yellowish area near the center of the retina where vision is the most precise. This deterioration affects your central vision, jeopardizing your ability to read, write, drive, and recognize faces." It is "the leading cause of blindness for those aged 55 and older in the United States, affecting more than 10 million Americans. A former director of the National Eye Institute, National Institutes of Health, Dr. Carl Kupfer, has stated that macular degeneration will soon take on aspects of an epidemic."

Macular degeneration is a vision vandal in that it takes away one's ability to clearly see. It may cause straight lines or faces to appear wavy, making it difficult to read or recognize faces. It may cause one to require bright lights and/or magnifying glasses for reading or doing up-close work. It may also cause a general haziness of overall vision.

There are two types of age-related macular degeneration (AMD): wet and dry. Dry macular degeneration is much more common and progresses slower than wet macular degeneration. Dry macular degeneration is caused by yellow deposits of "acellular, amorphous debris, known as drusen. These deposits lead to a thinning and drying out of the macula, causing the macula to lose its function." This causes a slow progression of vision loss. In wet macular degeneration, "abnormal blood vessels are present that might begin to bleed or leak fluid, causing the macula to bulge or lift up. Vision loss may be rapid and severe."

There are several tests used to diagnose macular degeneration, beginning with a routine eye exam that looks for abnormalities in the macula. The doctor may then perform one or more of the following tests: the Amsler grid test, fluorescein angiography, Indocyanine green angiography (ICGA), optical coherence tomography (OCT), or genetic testing. In the Amsler grid test, the doctor uses a grid to determine if macular degeneration is present. If the lines seem faded, broken or distorted, the disease may be present. In the fluorescein angiography, fluorescein dye is injected into a vein in the patient's arm, circulating through the blood stream to the eye. A camera takes flash photographs every few seconds. The doctor can then use these photographs to look for abnormal blood vessels. ICGA is another type of angiography in which ICG dye is used, which lights up under infrared light, to show abnormalities in the blood vessels. OCT uses ultrasound to check retinal thickness and thinness. In genetic testing, doctors are looking for a "gene mutation that is responsible for protein associated with immune system function called Complement Factor H. This is one of the most important discoveries in macular degeneration to date."

There are many risk factors that increase the risk of developing macular degeneration. Increasing age, heredity, ethnicity (occurs predominantly in Caucasians), gender (females are at a higher risk), smoking, obesity, high blood pressure, high cholesterol, and certain drug side effects are all contributors to the development of this disease.

There are a variety of treatments for macular degeneration that prolong vision loss; however, there are none available to reverse or cure macular degeneration. Angiogenesis inhibitors are given by intraocular injections. Vitamin and mineral supplement, surgery to implant a miniature telescope, laser photocoagulation, and photodynamic therapy are also available treatments.

The following is the study of one patient's attempt to chase away this vision vandal. In 2006, a 70 year old male went to his optometrist for a routine eye exam. After the exam, the optometrist informed him he was developing cataracts and suggested surgery to remove them. This patient is a firm believer in "if is doesn't bother you, don't fit it". Therefore, he chose not to have the surgery. Upon renewing his driver's license, he failed the eye exam. He returned to his optometrist and had another, more thorough, eye exam. This time he discovered he was almost totally blind in his left eye. He was complaining of losing his depth perception and a
little dark spot in the center of his vision. He then decided to go ahead with the surgery to remove his cataracts. He had to have another, even further in-depth exam prior to surgery, by yet another doctor. This doctor performed the Amsler grid test first. Some of the lines were distorted and blurry. He then went through the fluorescein angiography. The doctor then informed him cataracts were not his problem. Unfortunately, his vision was being vandalized by wet macular degeneration.

This patient then went through his treatment options with his doctor. In the past, this particular doctor had always treated macular degeneration with laser therapy. However, he had been hearing of a cancer drug, Avastin, which was being used in Germany for treatment of macular degeneration. This particular drug had not been approved by the FDA in the United States yet. The doctor informed the patient this was one of his options. This particular patient weighed his options and decided to go ahead with Avastin as his treatment.

During his first appointment, the doctor applied an anesthetic to a cotton all and placed the cotton ball under the eyelid of the eye to be treated. He then placed a retractor on the eye and told the patient to look down and to the side. The injection of Avastin would be administered by approaching from the top and side. After the injection, an antibiotic ointment was applied to the eye and antibiotic eye drops were administered for several days after. The patient was then put on a scheduled rotation of eight weeks, coming back for another injection in each eye. Within twenty-four weeks, the black spot was gone, but the distortion was still there.

The patient has continued these treatments now for five years. In 2006 he started receiving two shots in each eye on a six week rotation. In 2010, the patient had to go to a three week rotation. Today his right eye seldom has fluid in it. His left eye is dry, but the distortion is still there. His main problem is his lack of depth perception. He is turning 75 this year, and when asked what he thinks about all of his treatments he has had (over 200 injections to date), he says, “that compared to the alternative [blindness], it is well worth it”.

Works Cited

2014 Flu Outbreak – continued from page 18

Your doctor may prescribe antiviral drugs that can treat the flu. These drugs work better the sooner they are started.

According to CDC guidelines you should stay home for at least 24 hours after your fever is gone. To be more specific, that is a reduction in fever without the use of fever reducing medication. You should stay home from work, school, travel, shopping, social events, and public gatherings. If you must leave home, for example to get medical care, wear a facemask if you have one, or cover coughs and sneezes with a tissue and throw the tissue away into a receptacle. And the easiest way to prevent the spread is to wash your hands often.

References
http://www.cdc.gov
## SCHEDULE

### Friday, April 17, 2015

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<tr>
<th>Time</th>
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<tr>
<td>7:00-4:00</td>
<td>Meeting Registration/Sign-in</td>
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<tr>
<td>7:50-8:00</td>
<td>Welcome/Announcements – Taffy Durfee, MT, President</td>
</tr>
</tbody>
</table>
| 8:00-9:00 | “Pathology at a Glance - Breast Cancer”  
31-101-15 Katrina Fryar, MT, Pathologist’s Assistant, Brazos Valley Pathology, St. Joseph RHC |
| 9:00-10:00 | “You Are What You Eat, a Look at Processed Food”  
31-102-15 Michelle Hege, MT, Scott and White Health Care |
| 10:00-11:00 | “Bone Marrow Donations”  
31-103-15 Benita Davis, Gulf Coast Blood Center |
| 11:00-12:00 | “College Health Programming”  
31-104-15 Lisa Clarkson, MPH, RD, Health and Wellness Programming Coordinator for the Student Health Center |
| 12:00-1:30 | Lunch on your own/TxSSAMT Board Meeting                               |
| 1:30-2:30 | “Cosmetic Solutions”  
31-105-15 Sue Hill, RN, Cosmetic Solutions Clinic, Huntsville, Tx |
| 2:30-3:00 | Refreshment Break                                                    |
| 3:00-4:00 | “Soft Skills, Who Needs Them”  
31-106-15 LaTonya Brown, RMA, CMA, CCA, Medical Assistant Clinical Coordinator, Sanford Brown College |
| 4:00-5:00 | “An Overview of Campus Health Care”  
31-107-15 Lewis Devore, PA, Sam Houston University Student Health Center |
| 6:30-9:00 | Wine and Cheese Social and TxSSAMT World Famous Auction (Included with paid registration) |

### Saturday, April 18, 2015

<table>
<thead>
<tr>
<th>Time</th>
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<td>7:00-4:00</td>
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<tr>
<td>7:50-8:00</td>
<td>Welcome/Announcements – Kim Meshall, CAHI, COLT, RMA, RPT, Vice-President</td>
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</table>
| 8:00-9:00 | “Graves Disease”  
31-108-15 Ebony Lovingood, Instructor of Student Affairs, NRCMA, Kaplan University |
| 9:00-10:00 | “Innovation and Automation at a New Hospital”  
31-109-15 Alonso Mendici, BSMS, MSL, (ASCP)BB, SBB, QLC, Blood Bank Technical Specialist, Resolute Health |
| 10:00-11:00 | “Physician - Medical Assistant Relations and HIPPA”  
31-110-15 Ginell Agnew, RMA, Instructor, Sanford Brown College |
| 11:00-12:00 | “Communicating with Medical Staff to Improve Patient Outcomes”  
31-111-15 Metrissa Wagner, CHES, Physician Liaison, Huntsville Memorial Hospital |
| 12:00-1:30 | Business Meeting with lunch provided                                 |
| 1:30-2:30 | “RBCs in 3D”  
31-112-15 T. J. Weatherly, MT, Grimes St. Joseph Hospital |
| 2:30-3:00 | Refreshment Break                                                    |
| 3:00-5:00 | “Name that Organism” 2 hour Game Show  
31-113-15 TxSSAMT BOD |

Thanks for your attendance!  
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Note: Schedule is subject to change

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(b) Circulation to all members of the Texas State Society of American Medical Technologists.  
(c) Single column width. 3½”; double column width. 7½”.  
(d) Depth of column - 10”.  
(e) Columns per page - 2.  
(f) Column inches per page - 20.

**Material requirements:** Camera ready positive material.

**Deadlines:**  

No cancellations within 5 days of the closing date.

**Agency Commission:** Above rates net; any agency fees used, final fees should be adjusted so that final payment agrees with above stated rates.

**Terms:** No cash discount, rated due 30 days following invoice.

If I can be of assistance to you or your organization, please contact me.  
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HUNTSVILLE, TEXAS

67 foot statue of Sam Houston located on I-45

Steamboat House where Sam Houston died in 1863

HEARTS Veterans Museum

Texas Prison Museum located just off I-45