

## President's Message

Mariane Wolfe

## Happy (almost) Spring!

This past January, I had the opportunity to attend the Emerging Laboratory Managers Collaborative Conference (ELMC2). This conference is one of the areas of professional development designed for laboratory professionals to gain skills to take on leadership positions within and outside of the laboratory. With my role in an academic setting, sometimes I had questions from my former/current students related to "what next?" This conference has given me the ability to talk about roles and responsibilities that an MLS can move into. I had some main take away from the conference that I would like to share with you.

- First, each one of us has the ability to lead.
- As a laboratory professionals you have a lot of knowledge that you have that can help the doctor or the patient. If you see something that is unusual, have the courage to let the doctor or the supervisor know because ultimately the patient is benefiting from that information. Having the courage to tell someone can help you gain confidence and be able to lead someday.
- Focus on small moments instead of a single big impact because each small moment can ultimately change someone's life.

## Emerging Laboratory Managers Collaborative Conference

[Home](#)

[/ Emerging Laboratory Managers Collaborative Conference](#)



Recent studies indicate nearly 1/3 of managers in the core lab planned to retire in the next five years. For some areas like hematology and microbiology, that percentage is higher. As an entire generation of laboratory professionals leave the workforce, younger, less experienced laboratory professionals are being pressed into service in management positions they didn't train for. A need exists to prepare these professionals to take on new roles.

*President's Article continued on next page*

### Inside This Edition:

President's Message

Pages 1-2

Scientific Assembly: Chemistry

Pages 3-6

2022 ASCLS-Michigan Annual Meeting

Pages 6-7

Medical Laboratory Professionals Week

Pages 8-9

As we head into spring, we are excited to continue to work behind the scenes to prepare for our state annual conference that will occur on April 10-13 in Kalamazoo. Throughout our planning, ASCLS-Michigan has followed best practices recommended by the CDC and abided by the legal mandates and recommendations. For those traveling to be a part of the event, your health, well-being, and safety remain our top priorities. ASCLS-Michigan is committed to providing respect and care for all attendees. We are implementing a COVID safety practice for this meeting as noted in the registration website.



*As we move forward to spring,  
THANK YOU for all the continued  
work that you are doing to be a part  
of the laboratory profession  
contributing to patient care.*

[www.asclsmi-conference.org](http://www.asclsmi-conference.org)

*I hope to see you in the near future;  
in person or virtually!*



**American  
Society for  
Clinical  
Laboratory  
Science  
Michigan**

### ASCLS-Michigan *Newslinks*

A bi-monthly publication of the American Society for Clinical Laboratory Science - Michigan. Deadlines for articles are the 20th of Feb, Apr, Jun, Aug, Oct, & Dec. Articles must have name of author. Anonymous letters will not be published. The editor reserves the right to edit all materials submitted for publication. Articles appearing in *Newslinks* represent the opinion of the author and may not represent the opinion of the society.

**Membership:** Join ASCLS-Michigan by visiting the ASCLS web site:  
[www.ascls.org/membership/app.pdf](http://www.ascls.org/membership/app.pdf)

#### Non-Member Subscriptions

(\$10 annually) should be made payable to ASCLS-Michigan and sent to:  
ASCLS MI Executive Secretary  
145 Redwood Drive  
Troy, MI. 48083

**Advertising:** Reach hundreds of Clinical Laboratory Scientists and students! Advertising rates per issue:

Business Card (or 5 lines):	\$25
1/4 Page Ad:	\$50
1/2 Page Ad:	\$100
Full Page Ad:	\$200

ASCLS-MI Districts & Committees: no fee for announcements, ads or any other relevant and necessary forms of information. 10% discount for ASCLS members.

**ASCLS-MI Leadership:** Visit our web site at  
[www.ascls-michigan.org](http://www.ascls-michigan.org)

for a complete listing and contact information for all ASCLS-MI board members and a wealth of other information on the Society.

**Editor:** Paul Guthrie  
1506 Bacon Avenue  
Portage, MI 49002  
[pfgu3@aol.com](mailto:pfgu3@aol.com)

# Clinical Laboratory Science

A focus on what is happening in our profession

Featuring articles from Scientific Assembly Chairs or Board Members.

Materials from all members are also welcomed. Submit to editor. See page 2 for details.

## HbA1C and Hemoglobin Genotypes

Yukari Nishizawa-Brennen PhD, MLS(ASCP)<sup>cm</sup>, SC(ASCP)<sup>cm</sup>, MT(Japan),

Chemistry Scientific Assembly

I recently visited my primary care doctor's office for my annual checkup. She was very excited about their new HbA1c point-of-care analyzer. This experience led me to wonder how much HbA1c test methods have been improved to avoid interference from hemoglobin variants. This article reviews recent reports of hemoglobin genotype interference to HbA1c, basic knowledge of HbA1c and common methods of analysis.

### Glycation of Protein

Glycation of proteins, including globin chains, occurs at aldehyde of glucose and amino group of amino acids. This reaction initially forms a Schiff base, which is an imine. Since this imine is not stable, it will be either reversed back to the starting molecules or converted to a more stable molecule by Amadori rearrangement.<sup>1</sup> Figure-1 depicts the reaction mechanism of protein glycation (h) starting with activation of carbonyl group by protonation. The activated carbonyl group is then attacked by an amino group of the protein (b). Deprotonation of ammonium group by the hydroxy group leads to loss of a water forming an iminium ion (e). Further deprotonation from the iminium ion produces an imine (Schiff base, f). The rearrangement of this imine happens by migration of a hydrogen from an adjacent carbon followed by deprotonation of hydroxy group, and then formation of carbonyl group. The product of this arrangement, the ketoamine (glycated protein, h) is a stable product so that the reaction is irreversible.

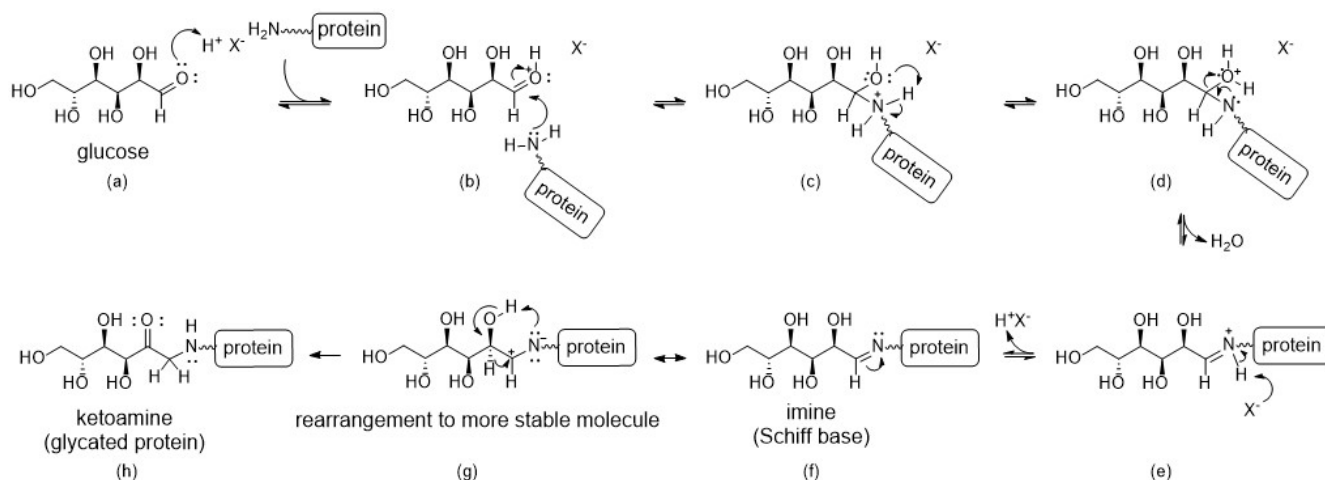


Figure-1: Reaction Mechanism of Protein Glycation

## HbA1C

The composition of normal adult hemoglobins are Hb A (95%), Hb A2 (<3.5%) and Hb F (1-2%).<sup>2</sup> The N-terminal amino acid of  $\beta$ -globin is valine (Figure-2).<sup>3</sup>

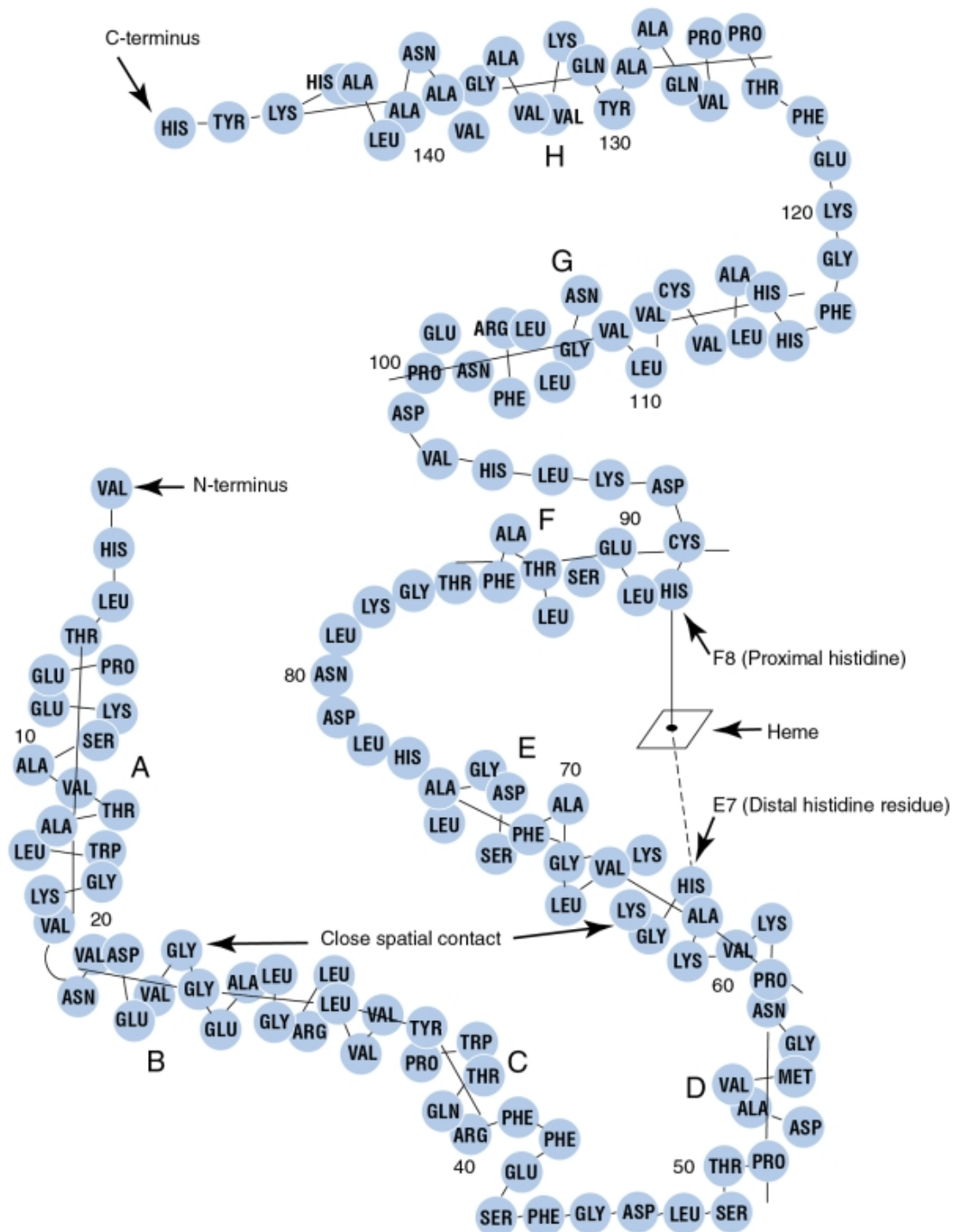


Figure-2: Amino acids chain of  $\beta$ -globin (Rodak's Hematology: Clinical Principles and Applications. 6th Edition)<sup>3</sup>



HbA1C measures percentage of hemoglobin glycosylated at N-terminal valine of  $\beta$ -globin. Glycation of hemoglobin can happen to both  $\alpha$ -globin and  $\beta$ -globin at amino groups of terminal amino acids or the middle of their chain. However, we cannot separate non-glycosylated hemoglobin from a glycosylated hemoglobin at a different location by methods separating based on charge. The methods that can separate other glycosylated hemoglobins from non-glycosylated hemoglobin are adjusted to detect only HbA1c. Even though, the precise meaning of HbA1C is glycosylated HbA at N-terminal valine of  $\beta$ -globin, we need to be able to use same method for hemoglobin variants. Compared to earlier methods of HbA1C, current common methods have been improved to reduce the interference of hemoglobin variants. However, we still see significantly increased or decreased results depending on the combination of method and type of hemoglobin variants.<sup>1</sup>

### Mechanism of Common HbA1C Analysis Methods

- **HPLC:** HbA1C has less attraction to cation exchange column since it is less positively charged than HbA. HbA1C arrives to the detector earlier than HbA.
- **Immunoassay:** It utilizes antibody against the N-terminal valine ketoamine with the next four to eight amino acids.
- **Enzymatic assay:** A protease cleaves the bond between leucine and histidine of glycosylated N-terminal releasing N-(deoxyfructosyl)-Val-His. Fructosyl peptide oxidase deglycosylates the N-(deoxyfructosyl)-Val-His producing hydrogen peroxide, which can proceed to common chromogenic reaction.
- **Boronate affinity chromatography:** The boronate of stationary phase binds to 1,2-diol of glycosylated hemoglobin. This method is known to be least interfered by hemoglobin variants.<sup>1</sup>

### Evaluation of Interference from Hemoglobin Variants.

Rohlfing et al. compared 15 current assay methods of HbA1C to boronate affinity HPLC method with hemoglobin variant specimens HbAA, HbAC, HbAD, HbAE and HbAS. They compared two enzymatic, four ion-exchange HPLC and nine immunoassay methods. Their experiment results exhibited statistically significant interference in all 15 methods by some hemoglobin variants. One ion-exchange HPLC method and two immunoassay showed clinically significant interference. There was no common pattern of interference among those three methods. Some hemoglobin variants falsely increased the value of HbA1c while the other falsely decreased the value. Rohlfing et al. concluded the importance of method selection for the patient population and education of the clinicians about possible interference from hemoglobin variants.<sup>4</sup>

### Hemoglobin Genotypes and Phenotype

Another thing we have to keep in our mind is hemoglobin genotypes and their phenotypes. The most structural hemoglobin variants are clinically silent that gives no warning of possible interference from the hemoglobin variants. Those clinically silent structural variants are often discovered by a discrepancy in HbA1C result. The structural hemoglobin variants with clinical disease and thalassemia syndromes cause shortening the life span of erythrocytes. This would lead to falsely decreased HbA1c.<sup>5</sup>

## Conclusion

When selecting Hb1Ac assay methods, the laboratory scientist must choose a method appropriate for the patient population, and recognize the possibility of interference from hemoglobin variants. Education of clinicians using point-of-care testing is also essential. Consider hemoglobin variant and life span of erythrocyte when there is a discrepancy in HbA1C result. This will help to avoid misinterpretation of results.

## Reference

1. Sacks D. Diabetes Mellitus. Rifai N, Horvath AR, Wittwer CT. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th Edition. St. Louis:Elsevier; 2018; 1160-1200.
2. Randolph TR. Hemoglobinopathies (Structural Defects in Hemoglobin). Keohane EM, Otto CN, Walenga JM. Rodak's Hematology: Clinical Principles and Applications. 6th Edition. St. Louis:Elsevier; 2020; 394-423.
3. Otto CN. Hemoglobin Metabolism. Keohane EM, Otto CN, Walenga JM. Rodak's Hematology: Clinical Principles and Applications. 6th Edition. St. Louis:Elsevier; 2020; 93.
4. Rohlfing C, Hanson S, Estey MP, Bordeleau P, Little RR. Evaluation of Interference from Hemoglobin C, D, E and S Traits on Measurements of Hemoglobin A1c by Fifteen Methods. Clinica Chimica Acta. 2021; 522: 31-35.
5. Klonoff DC. Hemoglobinopathies and Hemoglobin A1c in Diabetes Mellitus. J. Diabetes Sci. Technol. 2019; 14 (1): 3-7.



# ASCLS-Michigan Annual Conference

## Register Now!

**Registration for the ASCLS-Michigan Annual Conference is open! This event, held at the Radisson Plaza Hotel in Kalamazoo, MI April 10-13, 2022 features continuing education sessions, exhibitors, a career symposium, networking, governance, and more!**

**Check it out at:**

**[www.asclsmi-conference.org](http://www.asclsmi-conference.org)**



*Opening Keynote*

# RESILIENCE

TURNING CRISIS INTO OPPORTUNITY

APRIL 11, 2022

10:00 AM - 11:00 AM

[WWW.ASCLSMI-CONFERENCE.ORG](http://WWW.ASCLSMI-CONFERENCE.ORG)

SPONSORED BY



**HASSAN AZIZ**

President, ASCLS



## Opening Keynote: Resilience - Turning Crisis into Opportunity!

Join us April 11 at the Radisson Plaza Hotel in Kalamazoo as ASCLS President Hassan Aziz shares explorations on the importance of resilience and skills that help mitigate emotional injury and improve mental wellness.

More information on this and our other great upcoming conference sessions can be found at [www.asclsmi-conference.org](http://www.asclsmi-conference.org)

We can't wait to see you there!

# Get Ready for MLPW 2022

## April 24-30



Medical Laboratory Professionals Week (MLPW) provides the profession with a unique opportunity to increase public understanding of and appreciation for clinical laboratory personnel.

MLPW, which takes place the last full week in April each year, is coordinated by a collaborative committee with representatives from 17 national clinical laboratory organizations, including ASCLS. Now in its 47th year, it is important to reflect on the important history of MLPW.

Medical Laboratory Professionals Week originated in 1975 as National Medical Laboratory Week, or NMLW, under the auspices of the American Society for Medical Technology, now called the American Society for Clinical Laboratory Science (ASCLS). In subsequent years, other organizations have served as cosponsors and campaign supporters.

In the fall of 2005, NMLW was changed to National Medical Laboratory Professionals Week (NMLPW) to emphasize the person whose expertise is needed in the performance of laboratory testing. Beginning in 2010 the organizers decided to “brand” the event by using the same theme each year: Laboratory Professionals Get Results. In the summer of 2012 organizers deleted “National” from the title for brevity, and it became Medical Laboratory Professionals Week.

There are approximately 300,000 practitioners of clinical laboratory science in the United States. Since the development of this career group in the 1920s, the clinical laboratory science professional has played an increasingly vital role in the diagnosis and prevention of disease. Today, the clinical laboratorian is a key member of a health care team.

As team members of one of the largest industries in the United States, the dedicated efforts of laboratory professionals often go unnoticed by the general public, as well as by the very institutions employing their services. With the public now demanding the assurance of quality health care and professional accountability, organizations representing practitioners of this critical science have a responsibility to ensure that the public is well informed about clinical laboratory competency.

Beyond meeting this public need, the celebration of MLPW will help increase recognition for the profession as it improves the individual practitioner’s sense of self-worth. Further, as the various professional groups within laboratory practice work together on this project, the sense of unity and purpose necessary to further the goals of all laboratorians are reinforced.

Many members plan displays, open houses and various other activities in their institutions or local areas. Some have obtained proclamations by mayors or governors while others have been featured on



# #Lab4Life

local TV and radio stations. National MLPW has been successful in increasing the recognition of clinical laboratory science among the healthcare community and general public.

We encourage you to use our hashtag – #lab4life. For laboratory professionals, this hashtag is a statement of our dedication to the profession. To the general public, it illustrates how quality laboratory results can lead to a healthier life. Use this hashtag to show others your pride in being a laboratory professional. Find more resources at: <https://ascls.org/lab-week-mlpw/>

**Check out the Lab Week Run at :**

**[www.labweekrun.com](http://www.labweekrun.com)**



## APRIL 24-30, 2022

Take part in this virtual 5K during Medical Laboratory Professionals Week. Step out of the lab and into your communities to help spread the word about the Medical Laboratory Profession.

**Thank you to our generous Platinum Sponsors**



Register at  
**labweekrun.com**

### Registration Rates

- Early Bird Rate  
(by Feb 15): \$30

Early Bird Group Rate  
(five-pack): \$125

- Regular Rate  
(Feb 16 - April or  
when sold out): \$35

Regular Group Rate  
(five-pack): \$150

All proceeds support ASCLS new professionals and students. Race packets include a one-of-a-kind finisher medal and race bib.



American Society for  
Clinical Laboratory Science



Paul Guthrie  
ASCLS-MI *Newslinks* Editor  
1506 Bacon Avenue  
Portage, MI 49002-7166



Visit  
[www.ascls-  
michigan.org](http://www.ascls-michigan.org)