Dialogue

Dr. Miller (session leader): Hello everyone, and thank you for coming to this special question-and-answer session. I want to take the time to introduce you to Dr. Jamison. She has over 22 years of hematology oncology experience. As you know, we've been studying different leukemias and lymphomas in class and I thought it would be a good opportunity for you to apply the information you learned in class by asking her questions. I will now hand over the floor to Dr. Jamison.

Dr. Jamison: Thank you everyone for being here today and thank you again to Dr. Miller for inviting me to be here today. To give you a little background about me, I've been working at Smithville Hospital for about 15 years now. Through the use of different diagnostic techniques and collaborating with other departments, we have been able to provide the best treatment possible for our patients with lymphoma.

I understand that you've been learning a lot about different lymphomas in class. One of the things that I hope I can do for you is to provide you with a better resource for putting all that information into perspective. As you can imagine, it's one thing to learn about something from a book, but quite another to learn something from someone else's personal experience or from a real-world opportunity such as the hospital environment. I'll answer all of your questions to the best degree possible, and please, if there's something that's not clear in my response to you, please feel free to clarify the question or ask another until you receive the information that you need. If anyone has a question, the floor is open.

Questioner: Hi, Dr. Jamison. What treatment options do you consider after a follicular lymphoma patient has relapsed on BR for the second time?

Dr. Jamison: That's a great question. Determining what type of treatment is not always a cut-and-dried decision. There are a number of different factors that need to be considered when thinking about a type of therapy. I'm sure many of you are familiar with the NCCN guidelines, but deciding on what treatment to use stems from more than those guidelines. One thing to consider is the type of lymphoma being dealt with along with the different characteristics about them, such as cytogenetics, translocations, mutations, stage of disease, and the different therapeutic options available, such as whether to use a chemotherapy agent or whether to use radiation or even to use monoclonal antibodies or something else.

I want to turn this back to the patient because a lot of it also has to do with the patient's health status, age, and any comorbidities they might be dealing with. It is important to consider whether patients are able to take treatment, and if so to what degree. The NCCN guidelines provide recommendations for different types of patients suffering from different types of lymphomas with varying degrees of characteristics. Another consideration is personal experience. Many of the recommendations based in the NCCN guidelines are based on data from clinical trials and other studies in addition to

physician experience with patients. These factors and the results from some of the clinical diagnostic tests can give the physician a better handle as to how to proceed with treatment. The treatment that is chosen, such as a chemotherapeutic agent, radiation, stem cell transplantation, or small molecule-targeted therapy, can also be based on the mechanism of action, the ability of the drug to be used in combination with something else, and most certainly its main indication.

Questioner: I have a question. Will you describe how flow cytometry is used to differentiate among the different types of leukemias and lymphomas?

Dr. Jamison: Sure, that's a great question. To first understand flow cytometry, you have to recognize that different cells have different surface antigens that they express, and lymphocytes are no different. Since the focus of this discussion is leukemias and lymphomas, more specifically lymphomas, we focus primarily on the cell-surface antigens that are being expressed on lymphocytes. You are probably familiar with the term CD with a number, as in CD20 or CD30. CD stands for cluster of differentiation and it is specific to the cell surface marker on the lymphocyte. When it comes to lymphomas, many different lymphomas have characteristic CDs on their cell surface, or cellular expression if you will. For example, for CLL, the immunophenotype, or in other words the cellular expression on the lymphocyte cells, can be characterized as CD5 positive, CD10 negative, CD19 positive, CD20 dim, and CD23 positive, and CD43 can be either positive or negative. In addition, cyclin D1 expression is usually present. However, the CD expression for follicular lymphoma is very different. That phenotype is characterized as CD20 positive, CD10 positive, BCL2 positive, CD23 positive or negative, CD43 negative, CD5 negative, CCND1 negative, and BCL6 positive.

It is these types of CD or cluster differentiation that we're looking for when we use flow cytometry. Flow cytometry allows for the detection of one or more of the cellular markers that are being expressed on the cell surface. Having an understanding of the characteristics of cell surface expression of both normal and cancerous cells gives us an idea of what type of lymphoma may be presenting, and also helps us to differentiate and possibly treat specifically to that disease. Traditionally, cancer cells often overexpress specific markers, whereas normal cells do not, and this same ideology follows through to normal and cancerous tissue.

While the question was specific to flow cytometry, it does call into question some of the other diagnostic techniques that are also essential for proper diagnosis. Naturally, a tissue biopsy is important and is often required for a correct diagnosis. By using a biopsy technique, we are able to view the cells under a microscope, after specific histologic stains that help us to identify the type of cells present, the amount of cells present, and any specific characteristics of either the cell or its expression, which may be dependent on the stain used.

Other types of testing that we may often use are molecular genetics and cytogenetics. The most common cytogenetics test is fluorescence in situ hybridization, also known as