Editorial

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What Makes a Community?

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Editorial

The opinions expressed in this editorial article are solely my own, and are not representative of ARUP Laboratories or the Journal of Clinical and Molecular Pathology. If I say the word community, what does this conjure in your mind? A place where everyone is working together and everybody has a role to play? A place where everybody is accepted for who they are? Does the word actually convey a feeling? The definition of community I align with is "a feeling of fellowship with others, as a result of sharing common attitudes, interests, and goals". If this feeling could be achieved at a global scale the world as we know it would be very different to what it is now. I always thought that ants were a perfect community, all working towards the good of the colony. However, it has been observed that there are "lazy" ants that are immobile while other ants are working around them. It is not known what their role is, but they are not driven out of the colony. Therefore they either have a yet to be discovered role, or ant colonies are very accepting of all their ants.

A sense of community is important in a pathology department. As it takes a whole village to raise one child, it takes an entire institution to get a pathology test validated. From the conception of an important diagnostic test based off the study of a disease many groups within a department are required to be able to use that test in the field of medicine. Research and development laboratories are responsible for the validating the test, however numerous other groups are a vital part of the process. Information technology is necessary for being able to store the test results and provide a means of getting the results to the ordering client. Client services are necessary for assistance with questions about the test. Business and finance are important for finding the appropriate market for a test and pricing. Quality and compliance are necessary for ensuring that the tests are thoroughly validated and are accurate to ensure patient safety. This is a good example of a community working together to accomplish a goal to solve a problem.

When pushing for greater efficiency, there is a possibility of quality loss when trying to increase the quantity produced. There has to be a balance between the two. How does this notion affect pathology? In my previous editorial I was calling for more efficiency in pathology testing, which is important. If the number of tests required to be run by a laboratorial exceeds a reasonable number the quality will certainly diminish. This would be because increasing the amount of work that needs to be performed means that there is less time for ensuring that the assay is being carried out mistake free. In addition to this, if this efficiency comes at a cost of the human capital we are doing a disservice to our laboratories. For example, trying to gain too much work from our laboratories can lead to burn out and reduce their efficiency. In addition, that particular individual could be affected by the stress for the remainder of their working life if not caught soon enough.

At the institution where I am employed, the research and development staff does have fields they specialize in. From time to time, they do redeploy personnel when projects need more personnel in order to complete it in a timely manner. This is an example of efficiency, being able to move assets around to be able to complete a project within a given time. Not all personnel are comfortable moving. In my case, I consider myself a "jack of all trades, master of none" and feel comfortable moving from one field to another. Therefore, my own field of technical study has changed from digital FISH pathology to flow cytometry [1]. Digital FISH pathology is still an interesting and growing field. It is more challenging then bright field digital pathology, due to having to work with fluorochromes that are far more labile then other histochemical stains.

When I was working through my PhD in the late 90's, flow cytometry was able to detect a maximum of 5 antigens simultaneously on commercially available instruments [2]. Today, commercially available flow cytometry instruments can easily measure 10 different antigens simultaneously. With a well-designed flow cytometry panel, the number can go up to a maximum detection of 15 antigens. Cytometry is also not limited to fluorochrome conjugated antibodies, but has been expanded to mass spectrometry instrumentation. This technique is referred to as Mass Cytometry but is more commonly referred to by the name of the instrument, Cytometry by Time of Flight (CyTOF). In this approach isotopically pure elements are conjugated to the antibodies. Theoretically, the number of different antigens that can be detected is 100, but in reality approximately 30 different antigen targets can be simultaneously detected. CyTOF does have the edge in the number of antigens detected simultaneously, but it is far more expensive to own and has a much slower data acquisition rate.

In flow cytometry, smaller panels of antibodies means that multiple tubes are required to fully analyse a sample [3]. This is because markers would have to be repeated across those tubes to identify the appropriate cell population, and then include the specific marker that needs to be analysed on that population. For this reason, having the ability to detect more antigens or cell specific markers simultaneously has its advantages. The larger panel of markers provides a more precise characterization of various cell populations in the single tube. The larger panel of markers then translates into fewer antibodies being used because the antibody redundancy is eliminated. This also translates into using fewer samples, which conserves precious specimen for other downstream testing as needed. Finally, the larger panel also improves the detection of low frequency abnormalities. This is because the larger number of markers can be used to better distinguish the rare abnormal cells from the high background of normal cells. In particular, this has been a benefit for minimal residual disease (MRD) testing in leukaemia and lymphoma cases.

I enjoy being a part of the molecular diagnostics community where we are all working towards the same goal of improving patient's lives through the new scientific assays we develop and the improvements we continually make to our existing technology. Molecular diagnostics is interesting due to the advances in technology and different challenges that are constantly arising, and rewarding because the work that we do does affect the lives of other people. Thank you for taking the time to read this article, and I hope that you feel you are a part of a community, whether it is your local community or the larger pathology community. These days, with so much information to find and digest I appreciate the fact that you have taken the time, which is important to all of us, to read the Journal of Clinical and Molecular Pathology. It is thanks to you, and other readers like you, that the Journal of Clinical and Molecular Pathology continues to publish manuscripts. Please choose us the next time you have a manuscript to publish, and recommend us to your colleagues when they are also ready to publish. I hope your individual research is progressing well, and that you have many successes both personally and professionally.

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