FORMULATION AND DELIVERY OF PEPTIDES

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Dr. David Tellers has had the opportunity to lead groups focused on oligonucleotide delivery and small molecule neuroscience and infectious disease programs. He is currently focused on developing peptide therapeutics for challenging extra- and intracellular targets.

Why do you think there is so much push towards the interest in the delivery of peptides?

I think there's a recognition across the industry, there are many therapeutic opportunities that currently aren't met by biologics or small molecules. A lot of these opportunities exist inside of cells. Therefore, it would be great if you had a molecule that had the affinity and selectivity of a biologic like an antibody, but the permeability of a small molecule. Combining these two features is a way to get the permeability and the selectivity, and the peptide currently seems to be the best way to do this. I wouldn't have said that five years ago, but the peptide field has matured across multiple disciplines or functional areas, so that we can now begin to realise this goal. It's an untapped wealth of opportunities that can't be addressed right now. Peptides provide a great way to do that.

Why is this delivery method so advantageous in comparison to some other delivery methods?

It's the right problem, it's the right time, it's the right technology, and we get to work with a lot of different functional areas. From a peptide hit discovery perspective, these diverse libraries, like mRNA display, phage display, the SICLOPPS approach have generated a tremendous amount of diversity and starting points. What you're seeing is not just traditional peptide chemistry, but you're seeing people who have done small molecule medicinal chemistry apply their skill sets to peptide chemistry. The merging of these two synthetic disciplines has really advanced how we do chemistry. When we think about drug metabolism, pharmacodynamics, pharmacokinetics, how we analyse these in bio-matrices has improved tremendously with the software packages that are available with the advent of new mass spec technologies. Peptides are complicated to deconvolute, especially in bio-matrices, and a lot of that is becoming a reality now. When you look at serum plasma stability, intracellular stability, we can begin to understand these, and then the In Vivo models have gotten better as well. It's not one individual thing - you've seen all the different disciplines have made advances. All of the above seem to have come together at the right time.

What are your priorities and challenges at the moment?

Choosing the right molecules to start with is a challenge in how we prioritise them. The molecules that we get out of our screening hit many different epitopes on the protein. What that does is it causes different effects on the downstream signaling. As we're making advances and getting peptides inside of cells, we have to understand which peptides will have the right pharmacodynamic effects, i.e. affect the cell in a way that will have meaningful therapeutic consequences. This is still a challenge for us.

Are you also partnering with other companies in order to do this?

Absolutely. I won't go into detail as to the company specifically, but we are interested in collaborating with industry, government, and academic labs, on any step of that pathway from discovery, through In Vivo model, development. Anything that can help us elucidate mechanisms, help with the prioritisation I had just described, is a keen interest to us. Collaboration is essential. That's one of the reasons I come to the conference; because of who I get to meet and talk to, and I've already got a lot of great people that I've interacted with.

We talked about the delivery side of the FDA peptides – are you also working in the formulation side?

Yes, we have a great collaboration with our formulation colleagues. The formulation aspect has also improved dramatically as well. These peptides have properties that are different from small molecules, so we have to handle solubility and physical properties very differently. They are an essential part to how we interact in terms of bringing drug development for it.

Would it help for your work to have more formulation focus in the Peptides Congress?

We are beginning to understand the importance of physical properties as they relate to peptides. Introducing that to this group would probably be a value add; I don't know if they would necessarily see the connection immediately, but it's a key part to what they do. I think there would have to be a stream of key opinion leaders speaking about this topic.

In terms of the challenges that you have in your work and how this event seeks to solve some of the challenges, do you think it has been helpful to you?

I enjoyed the open session; the first two talks were fantastic. I think you're seeing continued attendance, that's the best way to answer that question; we're back again after last year, which means you're putting together a good product.

Within the peptides event, we are looking at the delivery, the formulation, analytical technologies, as well as the therapeutic areas. Is there any other area that you think is growing, or is expected to grow in the next few years and that we should put an emphasis on?

I don't feel like there is a lot of computational chemistry, computational sciences or predictive sciences included in the agenda. I know that field has also made improvements in terms of predictive designs, and how we analyse data. I can see that and I know we work with other biologics colleagues as well.