SCREENING TOOLS FOR PTSD

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Dr. Marti Jett was selected as the Chief Scientist for Systems Biology (ST, in the Senior Executive Service, Scientific Professional Members) in 2014. She is 1 of 5 STs in the overarching Medical Research and Development Command of the Army. Her lab has been funded for global molecular Systems Biology studies of Military-centered illness by DARPA, DTRA, DHA, NIH and the Army Medical and Development Command (USAMRDC). Her approach was that by using broad Systems Biology 'host' responses, one could find novel therapeutic targets for pathogenic intervention successes, and diagnostic potential related to stage or stratification of illness (>200 full publications and 6 patents. In 2011, she was selected as the Director for the Integrative Systems Biology Research Center for the Army at Fort Detrick and she was the molecular lead and co-leader of a team of scientist from 7 Universities, as the "Systems Biology Consortium for PTSD" to develop molecular approaches to objectively identify PTSD (diagnosed today by self-report. Those studies have identified a 'screening tool for PTSD' and 'biotype' subgroups of PTSD (improved sensitivity/specificity). Determining subgroups for personalized therapeutic approaches in PTSD is urgent due to the current therapy success rate of ~50%. Her passion involves outreach and she was the PI on multi-million dollar NIH grant awards by which she and Debra Yourick established the GEMS summer program for middle and high school students. Marti obtained a PhD from Georgetown University, School of Medicine, Department of Biochemistry, Molecular and Cell Biology and was a Post-Doctoral Fellow at the ARC Holland Laboratory, Bethesda, MD.

What is your current focus?

We are trying to develop a screening tool to use for early identification of PTSD symptoms. The aim is to identify these symptoms, prior to the patient going into the despair of PTSD. We're targeting active duty military members and looking at the difference between what the Military needs and what the Veterans Affairs (VA) needs. The military is trying to prevent PTSD and catch it early on. A lot of training goes into preparing these young people for military work – you don't want them slipping into something that could have been prevented. Of course, there is a perceived stigma to admitting you suffer from PTSD, which is wrong. Within an all-volunteer army, their promotions depend on how well they are performing – therefore, these young people are reluctant to admit to possible struggles with PTSD, or an anxiety syndrome, in the worry it will go on their record and prevent career growth.

Unfortunately, the Marines are under the belief that once a person has a PTSD diagnosis, they are "broken for life." They will welcome back those who have recovered from a serious physical injury, but they don't consider it for PTSD, and that it is all in the mind. However, our research has shown that PTSD is not all in the mind, there are some serious physiological issues. We believe, if one can begin to solve some of those, the Psychology issues can begin to be resolved, perhaps with the help of counselling.

These are young people, most under the age of 25, with little life experience, who come into the military with the intent of being independent. Some don't have the experience to recognise what is happening to them could be symptoms of PTSD. They may also be in denial of these symptoms.

I work with a group where we explain to service people that we will not report it to their authority. This allows them to be more honest with us, which is important because PTSD is self-report.

The army will give these people a PTSD checklist, to which they will deny any symptoms. However, when we have provided separate counselling with a psychologist or psychiatrist using a clinician-administered PTSD scale, as well as the checklist, these same people have admitted or acknowledged having PTSD. As a result, when we look at our statistics in terms of the area under the curve, sensitivity and specificity, I think we have reached as high as we can. We are approaching 90% and we will never get any better than that. That is the issue with self-reporting – some people think they are fine on three hours sleep, others will be exhausted. It is not that these people are being dishonest, they just have a different way of looking at the world. In these situations, there is not a lot we can do. Therefore, we recognise that is likely as successful as this can be.

Why is it so important to have a molecular screening tool for PTSD and to prevent the need for self-reporting?

Another priority is finding tools that indicate your circadian rhythm, so we can determine how disrupted it is. Your Synaptic plasticity is severely affected and long term potentiation is affected by things that can actually be fixed physiologically. The best-case scenario is to be able to fix some of these little things before they coalesce and become PTSD.

Why has it been so challenging to identify biomarkers for PTSD?

Using the Diagnostic Manual of Mental Disorders, for PTSD, some people have calculated that you can come up with 600,000 ways to be classified as having PTSD. We recognised early on that we had subgroups. How to tease them apart became an issue that we dealt with. The most recent manuscript we have submitted states that we have found a subgroup, in addition to a lot of other little subgroups.

How would you utilise your screening tools to develop future therapies?

It comes down to a couple of things. I think in terms of therapy, the only recognised one is the selective serotonin reuptake inhibitor (SSRIs). It is the only FDA approved treatment for PTSD.

Now that we been able to see the circadian rhythm and the synaptic plasticity so badly disrupted, among other things, we can now target some of these. We have done several studies with people who are carrying out clinical trials on treatment modalities. Mainly they aim toward cognitive therapy, however, the scientists we're working with, that I really have confidence in, begin to regulate what they're eating and drinking, giving them a schedule and a framework in which they can take care of themselves. They do this mostly in groups; however, some require isolation as they may suffer from uncontrolled anger where their personal relationships can fall apart or suffer. For one man, when he would come home, his kids had already run upstairs, and so did the dog. His wife simply said "you need to take care of this. You need counselling." He resisted. Finally, she got him to go and his life was saved.

With many of these young kids when they come back, after about three months post deployment, after the glamour wears off, they get the uncontrolled anger; sleep problems; their spouse doesn't understand them. They are young kids, both of them, and their relationships fall apart. This can become severe and can push them into isolation. They lose their support and are frequently deployed to other locations where they can lose their buddies. Their whole life becomes a mess. Therefore, we would like to do the screening, about three months after deployment.

Of the 1800 post deployment soldiers that we've looked at we see numbers like 8% being fully PTSD and another 9% being borderline. In the military it is though to be between 12% to 16%. Our groups include a good ethnic group distribution.

What are the top three takeaways from your presentation?

The FDA a few years ago concluded that civilian PTSD and altered PTSD were the same. We do have veterans and we have active duty military. We have now added another group from a civilian cohort in Atlanta. It is a little different from the military groups we have had; nevertheless, we have tried to pair that down to matchup and went back to the FDA with these data.

People such as emergency personnel, ERs, ambulance drivers, firefighters and nurses; they see the same thing too. However, these people can go home. In the military, your home is your work, you cannot escape. We are trying to make sure we include the emergency responders, too.

We see a fair amount of PTSD emerge during basic training, before these people are even deployed. This can be due to past trauma, such as sexual abuse as a child, one of the biggest predictors of PTSD.

In the educated group of people with PTSD, their PTSD seems less severe as opposed to those with less education. The more political kinds of people may say we just shouldn't let people likely to have PTSD into the military. However, there are people we have seen, with all backgrounds we would presume to lead to PTSD, who are doing just fine.

We are asked if we can find a definitive risk factor for PTSD. However, I hope we don't. I would not want to prohibit an entire group because there are people that can get over those hurdles. We don't find a risk signature and with over 600,000 ways to have PTSD, how can you? I say I don't think we should be assessing risk until we understand a lot more about PTSD.