00:06 Sarah Crespi: Welcome to the Science Podcast for February 14, 2020. I'm Sarah Crespi. On this week's show, senior correspondent Jeffrey Mervis joins us to talk about a cluster hiring initiative. This is when you hire a group of faculty all at once that's sponsored by the NIH and has the aim of increasing diversity. And researcher Pierre Gagnepain is here to discuss the role of memory suppression in PTSD, in post-traumatic stress disorder. Could being good at suppressing memories actually protect people from PTSD?

00:44 SC: Now we have senior correspondent, Jeffrey Mervis. He's here to talk with us about a new cluster hiring initiative from the National Institutes of Health. Hi, Jeff.

00:54 Jeffrey Mervis: Hi, Sarah.

00:55 SC: I've heard of the cluster hiring before, but I've heard of it linked with hiring interdisciplinary faculty. But this is different; this is aiming for diverse faculty. So, in this context, what exactly does cluster hiring mean?

01:10 JM: Right. Well, the concept is the same. "Cluster," as the word implies is, rather than hiring one at a time, this would allow universities to hire several people.

01:23 SC: This is an initiative from the NIH, from the National Institute of Health. How is this something that they are doing?

01:30 JM: It goes back to a report in 2011 that NIH commissioned, in which it found, to its embarrassment, that African-American scientists who applied to NIH did significantly worse. In other words, they had much lower chance of getting an NIH grant. I mean, it showed a history of, in effect, discrimination. The question was, "Why?" Bias of the system could be one reason, the quality of the proposals, the areas in which African-American scientists propose to do research could be a reason. But, in any case, the result was many fewer PIs that were African-American and other minorities than NIH wanted. And so, over the years, they have launched a series of initiatives to try to improve the diversity of the pool of researchers that get NIH awards. So this is the latest attempt, and it has an acronym, "FIRST". But, basically, NIH is saying, "Let's apply the principle of cluster hiring to increase the diversity of the faculty."

02:41 SC: Another reason I've heard given for cluster hiring is that you're hiring backup. Is that part of the thinking here as well?

02:49 JM: You don't wanna just hire one person. Because if you do that, then that person comes to campus and realizes, "Uh-oh, I'm the only one." And they get overloaded with responsibilities to serve on committees, to mentor, to do all the things that universities are trying to do to increase diversity, and it can affect the scientist's ability to do research that would win them an NIH grant.
So NIH doesn't want to undermine their chances of getting an NIH grant by putting somebody in an institution where they're the only one. Hence, the idea of cluster hiring.

03:29 SC: Right. But this is hiring faculty at universities, not the researchers that work at NIH.

03:36 JM: Correct, yeah. So there's several assumptions built into this. The idea is that you have to start with the people that are hired by universities who end up being the people that submit proposals to NIH and that NIH funds. NIH doesn't have control over who applies for its grants. And so, this is sort of priming the pump with the goal of trying to increase the pool of minority scientists who are able to successfully win an NIH grant. So you have to start with young faculty. So this is focused on so-called "early career faculty", people getting their first tenure track position at a university.

04:20 SC: They're not gonna apply to NIH to work at a university. The universities now have to come in and say, "We're going to hire a cluster," and then work with NIH from there?

04:30 JM: Right. So this is a grant program. NIH hasn't put out the announcement, so the details aren't available. But the way it'll work, in general, is that NIH will put out a call, universities will submit a proposal that says, "We pledge to hire 10-12 new faculty members in a cluster hire, and we're going to put a premium on diversity. And we're gonna do that in two ways. The people we hire either can be from a group that's underrepresented in science, which is true for African-Americans, Hispanics, Native Americans, people with disabilities, and also women in many fields. Or the person can be a majority, from a majority group, but have shown a commitment to improving the diversity of the institution." So the goal is that the university itself will make diversity a priority.

05:31 SC: Ten or 12 hires at a university is a lot. Is NIH paying for the salaries of these people? Is it giving them start-up packages, grants?

05:46 JM: Right. So, in the sciences, a startup package, which is what it's called to equip a scientist with laboratory space, and equipment, and everything they need to do their research, could cost as much as $2-3 million. NIH is not gonna be paying for that. They're not gonna be paying for the salaries of the individuals either. They're not gonna be paying for the space. The institutions are gonna have to make that available. But what NIH is doing is they're going to give them some money to sort of help this process along. It'll be used by institutions to sort of sweeten the pot, and also to do campus-wide programs that focus on increasing the diversity of the faculty, giving the kind of mentoring and professional development, and giving the training to existing faculty to be more aware of the importance of a diverse workforce.

06:45 SC: Well, how much money is going to be paid out by NIH?

06:49 JM: So, over nine years, NIH is saying they will commit $241 million, which is a lot of money, but it's spread out over several years, and they estimate they will make about a dozen grants to institutions. So it's not clear how much money each institution will get. And institutions may use the money differently depending on what their plan is.
07:16 SC: This sounds expensive, particularly hiring 10 or 12 professors. And NIH isn't covering a lot of these costs. How accessible is this going to be to universities with less money?

07:29 JM: There is some concern that only the wealthier universities will be able to do this, and NIH is aware of that and says that they would be open to the idea of possibly allowing institutions to collaborate so that you would have hires across two or three institutions within a city, for example, or even to have fewer than 10 or 12, maybe as few as five or six.

07:55 SC: So who decided that this was something that NIH was going to do?

08:00 JM: The person that has really been behind it is a cardiology researcher named Hannah Valantine. She is the Chief Diversity Officer at NIH within the office of the director. She and senior leaders within NIH have been meeting and came up with this approach. It's modeled after a program that NIH began a few years ago for its intramural program. These are the people who do research on the NIH Campus. And it's called Distinguished Scholars Program, and they have used cluster hiring in two groups; the first two years, a total of 28 people. And they've had the same eligibility rules. And out of that first pool, they're very pleased with the quality of the people that they've attracted and also with the demographics. And they point to that as a model.

08:53 SC: I've seen some recent research that suggest that clusters actually tend to dissolve into their departments once hired, so they don't stay a cluster that works closely together. What is gonna be done in this to keep them cohesive, to keep it as a group? Or is that a goal of this program?

09:10 JM: Well, no, you raise a very interesting point. Because on the one hand, NIH says they want these clusters to have a sense of identity, and they feel that in numbers there is strength.

09:20 SC: Yeah.

09:24 JM: At the same time, they don't want the scientists to be stigmatized and marginalized by being seen as, "Oh, you're the minority cluster that our university hired two years ago." So it's a tight rope that the universities will have to walk. They want to make the people that are hired under the program feel that they are part of a special cohort, but at the same time they don't want to isolate them and keep them separate from their regular faculty. So universities are gonna have to figure out how to do that. That's what NIH is looking for, creative ideas.

10:05 SC: Typically, a department hires it's own. The faculty and the department, they perform the search, they pick the person. But this is reaching outside of that and changing the way faculty hiring happens. And this is cluster hiring in general, not just this particular initiative. Do you see that as the future of making sure that university faculty grow and reflect their fields and the people in them?

10:30 JM: This is another very sensitive issue. NIH is not trying to tell universities how to hire faculty. After all, that is the prerogative of the institution. So what is likely to happen is the departments will still play the primary role in the search, but the scope of the search will be defined.
much more broadly.

10:54 SC: So are you saying that a broader search helps with diversity?

10:58 JM: Researchers have found that, statistically speaking, if you advertise for a particular position, computational biologist in a tenure-track assistant professorship, you will get applicants from under-represented groups. You will even have some of them be on a short list. But for whatever reason, when the person is finally hired, more likely than not that person is not from a group under-represented in science. And NIH says, "Well, one of the reasons for that is that the institution hasn't made diversity a priority." So in the clusters that have been hired with diversity in mind, a lot of the institutions have asked the candidates to submit a diversity statement as the first step in the application process, which spells out what they have done to increase diversity at their institution. And that becomes a way to then winnow the field even before you take the second step.

12:01 SC: So put diversity statements as a filter or a top priority in the cluster hiring process.

12:08 JM: It's trying to increase the chances that institutions will be considering people for a variety of reasons and not just for their expertise in 18th century French literature. NIH emphasizes that the quality of the science is paramount and needs to remain paramount in any hire. But they say it doesn't have to be either/or, and that's where I think some institutions have lagged. Individuals who have said, "Well, I'm only interested in the quality of this person's research." And what NIH is saying, "Great, but you should also be interested in their ability to bring diversity to your faculty and to your institution because that will improve the quality of the research." The two are not mutually exclusive. In fact, they are synergistic.

13:04 SC: Well, thank you so much, Jeff.

13:05 JM: All right. Take care.

13:07 SC: Jeffrey Mervis is a senior correspondent in Science. You can find a link to his story at sciencemag.org/podcast. Stay tuned for an interview with Pierre Gagnepain about memory suppression and PTSD.

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13:27 SC: People who experience post-traumatic stress syndrome have immense difficulty recovering from a traumatic event, and many of those difficulties are tied to memory. They relive or remember unwanted memories, and they'll even avoid things that might bring on those memories. Pierre Gagnepain and colleagues published a paper this week that explores the role of memory in PTSD, especially suppressing memory in PTSD. They asked, "Are people that are better at suppressing memories protected in some way from PTSD?" Hi, Pierre.


14:06 SC: I wanna start first with the people in your study. They're part of a very large long-term
study on trauma. And all the people in the study experienced the November 2015 terrorist attacks in Paris. And they've agreed to participate in this larger project and also in your specific project on PTSD. Can we talk a little bit about this cohort?

14:30 PG: So, obviously, when the attacks happens, we were all very shocked in France. Everyone were shocked, and it was a big trauma for anyone in France. And just after that, the scientific community feel that they had to do something and try to respond to terror by using knowledge and science. We saw that we couldn't look the other way. We should tackle this issue and try to do a study that we could learn something from.

15:00 SC: Is it unusual to have a group of this type involved in research where they all have the same trauma exposure?

15:07 PG: That's, I think, one of the strengths of this study because most of the time other study will focus on the dysfunctioning or on the alteration that are related to PTSD. It's much harder to understand things that works well in people who did not develop PTSD. Because as you said, when you're exposed to a trauma, some people will go on to develop PTSD and some other will not. Most of the time, you don't have access to participants that have been all exposed to the same trauma at the exact same time with the exact same duration.

15:42 SC: Was there a lot of resilience to this particular trauma? What was the ratio like in this population?

15:50 PG: One thing that we were surprised is the proportion of PTSD in our sample, which was much higher, was more or less 50% a year after the attacks. In other type of trauma, it usually ran from 20-30%.

16:06 SC: You also brought in a non-exposed group. So you had your two experimental groups that were exposed to the same trauma, and then you had a control group of people that were not exposed to that trauma. And then you asked them to suppress a memory, to get into an FMRI machine and not think about something. You would think that suppressing a memory would be bad. It sounds bad.

16:29 PG: So this idea was actually that, first, it's not suppression that is bad. It's not the action of suppressing that is bad. The mechanisms, the system that allows you to do it that is actually compromised.

16:41 SC: Right. So if your... You've got really strong suppression muscles, you might very well do a little bit better after a traumatic event if you have the ability to suppress as needed.

16:53 PG: Yes, this is what we saw. And the reason why we think of that is because, if you ask x participant to suppress unwanted memories, you will observe some form of forgetting. So you will see a form of active forgetting.

17:08 SC: So you can do this experimentally. You can ask someone to forget something.
17:13 PG: We don't ask them to forget. That's the beauty of the thing; We just ask them to not think about it. That's very different. Not all people are equally good at this. And this is why we saw that maybe some people are more fragile, more vulnerable to trauma because they don't have the coping resources linked to this control and suppression skills.

17:36 SC: Yeah. So let's get into the actual experiment that you did. Do you wanna take us through kind of what a person involved in this study, what they had to do?

17:46 PG: Yes. So we use a task. We will create some memories in the lab. We sure hope that this memory will pop into the person's awareness like an intrusive memory will do. So the way we do that is simply by asking participants to overlearn pair stimuli, and it was words paired with picture of neutral object.

18:10 SC: Can you give an example of a pair?

18:13 PG: It could be, for instance, the word table paired with a picture of a balloon.

18:19 SC: They're not related in any way, memorizing pairs.

18:20 PG: No, no, no, not really. Not really related actually, no. No. We try to avoid obvious relationships. We want the learning to be really not automatic. A bit hard for that. When they remember, they truly remember. And we ask them to overlearn this type of pairs. And once we make sure they did that, then we explain them how to suppress memories. So what we tell them is, for instance, sometime, you will see a word in green. And when the word is green, I'm gonna ask you to visualize in your mind a picture of the image as complete and detailed as possible. But when the word is in a red color, we're gonna ask you to focus on the word and try everything to prevent the memories of the picture from entering your consciousness, your awareness.

19:10 SC: So they're actively trying to not think of something.

19:12 PG: Yeah. And we want to blank your mind and to not replace by any other pictures. If the picture comes to your mind, we want you to push it back, but we want to know about it. So we ask them, "Did you have an intrusive experience or not?"

19:29 SC: This is your metaphor for PTSD. So instead of a traumatic memory popping up, it's this paired memory popping up.

19:37 PG: Yes.

19:37 SC: Your brain is trying to suppress it.

19:40 PG: So people might say this is not a traumatic experience. It has nothing to do with traumatic experience, the way we implement this intrusive memory. And, of course, this is completely different. But that's our point because using this kind of neutral pictures, we can study
very general and basic mechanisms that we'll not be able to study if we use traumatic material. We want to make sure that the intrusive memory, the strength of the intrusive memory, is the same for every group.

20:08 SC: That makes sense. So you don't want people primed. You want them to all have the same feelings about them.


20:15 SC: And did you see a difference in people that had PTSD, didn't have PTSD, that always have been exposed to the same trauma?

20:25 PG: Expose individual results PTSD were much better at down regulating of the hippocampus using the frontal cortex during re-experiencing of this intrusive memory.

20:37 SC: So you were able to see this pattern in their brains, but you saw that less often in people who had the PTSD?

20:44 PG: Yes. The magnitude of this effect was much weaker in people with PTSD.

20:50 SC: If you're able to key in on this difference, does that mean that you could do something to help people with this disorder if you were able to say, "Oh, we see this difference in their brains. We can do something different with treatment."

21:04 PG: I think this is extremely important for the type of treatment than can be proposed. And I hope that it will pave the way for reconsidering this type of mechanisms in the treatment of PTSD. Most of the treatment, they are what we call trauma-focused treatment. So they try to correct the traumatic memories itself. They consider intrusive and traumatic memory as a dysfunction of the memory, not as a dysfunction of the control system that allows you to regulate your memory. This is perfectly correct and true, obviously. It has been demonstrated a lot. What we are saying is that, in addition to this, there is also another program regulating the memory. So instead of just doing a treatment that is focused on the trauma, they could also complement this type of treatment by boosting, if you like, the control skills and the control system that allows you to control over these memories.

22:02 SC: So you can imagine them doing this kind of pairing exercise that you did, working on neutral turf, and trying to strengthen this control?

22:11 PG: You could actually envision something where you could boost this control capacity without appealing to trauma at all.

22:20 SC: What about other conditions? Are any other conditions associated with this ability to suppress a memory or not suppress a memory?

22:27 PG: We believe actually that this process is central to many condition, and one of the
condition for which we believe as very important and we also carry a study on this particular condition is OCD.

22:38 SC: Obsessive-compulsive disorder?

22:40 PG: Yeah. Obsessive-compulsive disorder. We mostly know OCD from images of patients that are doing compulsive stuff most of the time. They are triggered by obsession. And what are obsession? They are intrusive images. So you can also imagine that this intrusive obsession or intrusive images in OCDS are triggered compulsive behavior. They actually due to the same type of dysfunctioning in control mechanisms as well.

23:08 SC: Thank you so much, Pierre.

23:10 PG: Thank you, Sarah, for your time and for your interest to our work. That's very kind of you.

23:15 SC: Pierre Gagnepain is a cognitive neuroscientist at Inserm. You can find a link to his science article at sciencemag.org/podcast.

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23:25 SC: And that concludes this edition of the Science Podcast. If you have any comments or suggestions for the show, write to us at sciencepodcast@aaas.org. You can listen to the show on the Science website. That's sciencemag.org/podcast. There you'll find links to the research and news discussed in the episode. You can subscribe, of course, on iTunes, Stitcher, Spotify, Pandora, and many other places. The show was edited and produced by Sarah Crespi, with production help from Podigy, Meagan Cantwell, and Joel Goldberg. Jeffrey Cook composed the music. On behalf of Science Magazine and its publisher, AAAS, thanks for joining us.