Fund Black Scientists: How inequitable NIH funding perpetuates the disparities divide.

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Dr. Omolola (Lola) Eniola-Adefeso and Dr. Kelly Stevens are part of a nationwide network of BME women faculty who are collectively arguing that the racial funding disparity by NIH is the most "insidious barrier to success of Black faculty in our profession". A commentary paper co-authored by 18 members of the collective was published earlier this year which calls for NIH to recognize the systemic racism at play, and to take action to bring about an equitable distribution of grant funding. Together with podcast host Dr. Mary O'Connor, the panel discuss the wider implications of funding disparities, and how diverse teams having fewer blind spots leads to better solutions. Commentary paper: https://www.cell.com/cell/pdf/S0092-8674(21)00011-8.pdf

Dr. O'Connor: Welcome to the Health Disparities Podcast, a program of the Movement Is Life caucus. I'm Dr. Mary O'Connor, Chair of Movement Is Life and an orthopedic surgeon and the chief medical officer with Voya Health, a healthcare startup that is on a mission to empower humanity to lead their healthiest life. Prior to co-founding Voya Health, I spent my career in academic medicine, first at Mayo Clinic and then at Yale School of Medicine, and was a full professor at both institutions. My guest today are part of a nationwide network of BME faculty who are collectively arguing that the racial funding disparity by the National Institutes of Health the (NIH) is the most insidious barrier to success of black faculty in our profession. A commentary paper published earlier this year, called on the (NIH) to recognize the systemic racism in research funding, to stop making excuses and to take action to bring about an equitable distribution

of grants funding. Dr. Lola Eniola-Adefeso is currently a professor of chemical engineering and biomedical engineering at the University of Michigan, Ann Arbor. She did her undergraduate work at the University of Maryland, and then went on to complete her master's and doctoral degrees in chemical and biomedical engineering at the University of Pennsylvania. After a postdoc fellowship at Baylor College of Medicine in Houston, she went on the faculty at the University of Michigan, where her high tech research focuses on designing biocompatible particles for targeted drug delivery. Welcome, Dr. Eniola. A real pleasure to see you today.

Dr. Eniola-Adefeso: I'm delighted to be here. And thank you so much for this platform and what you are doing to give voice to the folks working to eliminate health disparities.

Dr. O'Connor: Thank you so much. My second guest is Dr. Kelly Stevens. Dr. Stevens did her undergraduate work at the University of Wisconsin-Madison and received her PhD from the University of Washington. She completed postdoctoral training at MIT, before joining the faculty at the University of Washington. Her work bridges several facets of regenerative medicine, including stem cell biology and tissue engineering. More very high tech exciting research. Welcome, Dr. Stevens.

Dr. Stevens: Thank you very much, Dr. O'Connor, it's lovely to be here.

Dr. O'Connor: I just do need to state that all the views and opinions expressed today on the podcast are their participants own and do not reflect our respective organizations or Movement Is Life. Dr. Eniola and Dr. Stephens, your commentary published January 26, of this year, along with your 17 coauthors in a very prominent and respected scientific journal, "*Cell*," as a very, simple call to action. You simply say fund black scientists. Tell us about the nationwide network of BME women faculty who are collectively arguing that racial funding disparities by NIH is the most insidious barrier to success of black faculty in our profession. How did you get organized and how did you develop your position statements?

Dr. Stevens: Right. Thanks for asking that question. It's a really essential component of this work. You know, this group really developed out of a social media platform, a social media group that had been put together some time ago by several senior faculty in our profession. And at the time it was a sort of social, I have a problem, what's your solution? Let's share syllabus for different classes and things like this, sort of a chit chat group between women faculty in our profession. And after the time of the George Floyd's murder, there was just a collective change and realization within this group and broadly across our profession, across science and the US, right, that it was time for action. And so, because of that several of us got together,

myself, Dr. Eniola-Adefeso, Dr. Naomi Kessler, Dr. Princess Maggoty, they got together and formed this group and just went on the social network and said, “Hey, who wants to come and join us to make action? It's time for action.” And so, from there, we started a Slack channel action group, so to speak. We had a few hundred BME women faculty sign up and just start talking over Slack with the time all of the different electronic virtual communication platforms are taking off. Whether it was Slack or Zoom or whatever it was, and so all it made it very, easy for us to interact seamlessly across the nation. And in doing so we just kept coming back time and time again to this notion of funding black scientists.

Dr. O’Connor: Dr. Eniola comments?

Dr. Eniola-Adefeso: No. I think the piece that missing there was that the fire that motivated us was the grief we were all feeling, regardless of white, black, brown, in that moment with the murder of George Floyd. For us women where the instinct is to protect and the helplessness of that moment, it really is the glue that brought us together and this was an obvious pause for us to coalesce around.

Dr. O’Connor: So powerful, the helplessness of that moment and then channeling that energy, right, that anger, frustration into, okay, let's do something to try and make a difference and address this issue. So, how bad is the

problem? I mean, I think most of our listeners are probably unaware of this issue. What are the funding disparities across race, and I'm confident gender as well when it comes to NIH grants?

Dr. Eniola-Adefeso: So, that's a great point to highlight to the listeners here. This problem runs deep. It has existed, we would argue since the beginning of time, but really was brought forth to light in a scientific paper that was published in 2011, where data was requested from NIH, as the grants that they were funding and, in that data, it was very clear that the amount of funding going to investigators that were black, were significantly less compared to investigators that were white. In fact, at that time, it was about 55% less in funding rate for black PI's. And PI is what we say when we refer to principal investigator meaning the lead researcher on an idea. And of course, when you correct for what we call the quality metrics, meaning the institution of education, the accolades that the investigators have, all of those things do not explain the disparity, the gap between funding the black investigators compared to funding the white investigators. What was profound about this was that this came out in 2011 and you fast forward to 2020, nothing had been done and the gap is still there.

Dr. O'Connor: So your focus in your commentary was on black scientists and underfunding of black scientists. Can you comment about whether this

underfunding also extends to other groups, other populations of scientists?

Dr. Stevens: In most cases, that is correct. For example, Hispanic and indigenous faculty are underrepresented in our faculty nationwide, similar to as black faculty are okay. But in this particular instance, for funding disparity, interestingly, that original study in 2011, by Ginther Atal, did not find the difference between, for example, white and Hispanic investigators. And so, we sort of glossed over that in the paper, because the sample sizes were small and so I mean, it's possible that there was something there. The indigenous population studied in that paper was actually only .05% of the overall pool. And so, they actually didn't even run those numbers and so, the guess would be that likely, there's a disparity there. And, of course, indigenous persons face just extreme, this history, that's just indescribable. And so, we intentionally focused on the black scientists, because that's where the data was for this particular issue. Now, are we hoping that our work extends broadly to push forward and support other populations that are underrepresented and face racism and science and everything, such as Hispanic and indigenous folks have? Absolutely.

Dr. O'Connor: I'd like our listeners to understand just how important these basic science grants are for the development of new medications and I'm going to share some data to show that. every single new drug or medication

introduced between 2010 and 2016, received NIH funding of some kind, that total amount invested by NIH was 100 billion, with a B, billion. That's 210 drugs introduced during that time. So, right now, it's NIH funding in mRNA research that actually laid the foundation for the Pfizer and Moderna vaccines that we're using to fight the COVID-19 pandemic. So, in reality, this process of NIH funding is vital for our scientists. But it seems that that process has also allowed structural racism to come into that conversation and decision-making process and widen racial inequities, basically, allowing white scientists to have more privilege than black scientists.

Dr. Eniola-Adefeso: You are absolutely correct in that statement. In fact, one can think of the NIH funding as the conception through birthing of a baby. And that's where NIH comes in with many of our medical innovations; they are there at the conception. And in many cases, industrial partners, like Madonna don't come in until the baby or the technology was born. So, then, you might argue that by NIH funding, going only to one group of Americans, in this case white Americans, you are essentially fixing the DNA of our technology and as you say, cementing that systemic racism. And once the baby's born and you can't correct it, you're now going to edit out racist technology because again, not all voices are on the table in the conception stage.

Dr. O'Connor: Dr. Stevens, would you like to comment?

Dr. Stevens: That was brilliant. That was fantastic.

Dr. O'Connor: I like that comment that was grand. Okay, that's good.

Dr. Stevens: Sorry, Lola, that I was like, I was actually just sitting over here sort of mind blown. That was like the best metaphor I've ever heard.

Dr. O'Connor: Exactly. That was a great metaphor, actually. I want to switch gears a little bit from NIH funding, and talk about STEM and women and individuals of color participating in STEM pipelines. We recently featured two advocates for stronger STEM and for our listeners, STEM means science, technology, engineering and math, that these people were very focused on advocating for stronger STEM education in the Hispanic community on our podcast. And it's striking to me that both black and Hispanic groups are underrepresented across dentistry, medicine, nursing, pharmacy, advanced practitioners, along with the life sciences. So, all STEM occupations. But what I'm hearing from you is that you're saying, we're basically adding insult to injury; because black BME research have a much harder time getting grant funding, particularly as we mentioned, with NIH, RO1 grants and the RO1 grants for listeners are like those early grants that you really need to get your career and research

project started. Those are the grants that build resumes and those are the resumes that are assessed for tenure. So, could you expand on the problem as it relates to career progression and career security for black scientists?

Dr. Eniola-Adefeso: Yes, and I do want to start by saying that we only know the NIH data, because we have it. It's likely that these kinds of disparity exist in other US research funding agencies. We just need them to open their books. So, really, to answer your question research, tenure track, faculty members across universities are hired and they have multiple jobs that they're essentially juggling, teaching, research and service. The research means requires this funding. We all have to raise research funding for our ideas. So, when a group of faculty members, in this case, black faculty members are not able to raise those funding, in ways that are not linked to the quality of their research work or the quality of their intellect, you end up in situations where they are disadvantaged in terms of being able to publish, right. Because you need money, research dollars, to get results that then form the basis of scientific publication. This, of course, is one of the currencies that academia and our universities use for promotion. And so, when you're not getting those funding, you're less likely to be promoted or tenured at this institution. So, then, of course, you end up in situations where these faculty members are in some ways weeded out of the academic pipeline. How is that linked to the lack of diversity in our

STEM student body? Well, we know, and we've known for a while that individuals persist in fields that they see people that look like. So, when these faculty members who are blind, and in some cases who are Native American, in some cases was Hispanic American are not present in the classroom teaching and not present in our research lab, leading cutting edge innovative sciences, then you have situations where young people that look like them, are not seeing those professions as for them, because those individuals are not there for that visit.

Dr. O'Connor: Dr. Stevens?

Dr. Stevens: I think it's important to just remind ourselves of the numbers of professors in our profession or faculty in our profession, only about 35 are black. And just think it's helpful to keep that in mind, if these numbers were representative of the population, we would have more like 250 faculty who are black. And so, it's just grossly disproportionate and just, we posit that this is, in fact, what can lead to the health disparities lack of these scientists, studying problems that affect diverse populations is just a sure bet way to not see the problems for what they are.

Dr. O'Connor: So, I want to go to that as a very concrete example in a moment, but I'll share that in orthopedic surgery, which is my profession, we all face the same challenges. We are a predominantly male and white male

profession. Six percent of board-certified orthopedic surgeons are women, that percentage for individuals of color is even dramatically lower. And so, we know that when students are thinking about future careers, they need role models, and they want to see people that look like them to say, yes, I can do that, I can succeed. And we've seen positive correlation with medical students being interested in orthopedics, if they're at university where there actually is greater diversity on that faculty. So, of course, all this ties into giving our young people the opportunity to consider careers in STEM and encouraging them to live up to their potential. But I want to take our audience to a very concrete example about why having more diversity in research and in biomedical engineering in particular matters. So, Professor Eniola, I'd like you to add to the conversation here with a very specific example. You have studied pulse oximeters, and that they have a higher error rate in black patients. Something that perhaps could have been avoided if black scientists had been working on the design and development of that product. So, I'd like you to comment on that and you could start by explaining to our audience what a pulse oximeter is.

Dr. Eniola-Adefeso: Yes, certainly. So, the pulse oximeter is an equipment that clinicians and nurses use to measure the oxygen level in a patient's blood. So, this equipment became quite important with the COVID-19 pandemic, because one of the critical pieces of data that we need in determining whether somebody is going to be needing admission or not, is their

oxygen level. And so, what I wrote was an op-ed describing a recent revelation, this was published in a New York Times article, which highlighted that that equipment was more likely to be inaccurate when used on black patients, compared to white patients. And what this means is, essentially, it's not able to pick up the accurate data. And so, then some of his patients were being read as having an adequate oxygen level and were sent home and that's critical because if your oxygen level is low, you need to be admitted, and you need to be supplemented. And so, the point I made in discussing this issue is that as a black person, it's not a far leap for me to say, “Oh, when we're making this technology, and we're calibrating it, and it's based on light through the skin, you better make sure that it can go through skins of all shades. And so, then the question is how did we get a technology that made it all the way to the clinic before somebody noticed that it did not work well, with black skin?

Dr. O’Connor: That is the important question, isn't it? It's actually mind boggling to think that this technology that is used so commonly, I mean, people have pulse oximeters at home? Okay. I mean, they're used everywhere, in healthcare, that it wouldn't be a device that you could trust, to give you the right information because that information may be skewed based on how much pigment is in someone's skin. And I think that goes back to, how can patients of color trust our healthcare system, when we produce equipment like this? This feeds into this trust of the system, which then feeds into, I

don't feel comfortable being vaccinated when we know that that's so important for communities at high risk, which are communities of color. And from a standpoint of the medical profession, we just hurt ourselves, we hurt the profession, we're hurting patients, because we're not paying attention to these issues.

Dr. Eniola-Adefeso: That is absolutely correct. And the other piece here is for many of this technology, you need to do clinical trials, right, before you put it out for clinical use? If people running that research are not diverse, you are not going to convince diverse people to line up for the technology to be tested on them, especially when you put that next to the history of medical testing, unauthorized medical testing on the black population. Right. So, there is already this built-in lack of trust and this NIH funding disparity simply reinforces that by not putting or not allowing black researchers to be at the table to be leading some of this innovation, to be leading the discovery of some of this technology. Then, you're biasing, again, the testing of it to just one fraction of the American population.

Dr. O'Connor: Alright, I want to turn to a little bit of a different topics that I think is kind of fun and I want to ask you about Twitter, and how you have built support because your paper and commentary in sell was tweeted out by MC Hammer to his 3.2 million followers. I mean, you've got an amazing

platform for this issue for your call to action to fund black scientists. I mean, do either of you personally know MC Hammer?

Dr. Stevens: Twitter has definitely been a fun game for us, it absolutely helped our cause. And I think that the key thing to keep in mind is that one of the reasons that we were so successful on Twitter, at least to start with, when the paper was first published was because we had already built the community and the movement and we were tightly knit, and we were online together, chatting back and forth and we had developed a plan that was tight. So, we knew when the paper was going to publish, and our entire faculty community was there ready, when it did so, and we were able to amplify it. And the other advantage of having that huge network is it just so happened, that one of the faculty in our network, a junior white woman, I should say, happened to have had MC Hammer follow her previously on Twitter. And so, she was able to direct message him and ask him to amplify us and he did. And I should say, now he follows several members of our community, I want to say, not me yet, and then, it's been able to keep going because some of us are good with the platform. Dr. Eniola-Adefeso has a good Twitter game. And so, I think that it's been just an absolutely critical way for us to get our message out to the community. And it's been fun, too. It's helped us build our community.

Dr. Eniola-Adefeso: And I should highlight that the connection to MC Hammer is not by accident. MC Hammer has been a supporter of science, and bringing science to all Americans, so he already had a platform going. And we knew that this was going to be something that spoke to his heart and so we reached out and we were deeply, deeply grateful that he amplified us in this way, again, on the problem that we are deeply committed to bringing attention to and so we were just grateful to him.

Dr. O'Connor: Well, I want to comment on your success to both of you and to your entire team, and everyone that has supported this including MC Hammer, because this week, actually, March 1st, NIH issued a statement and I'm going to quote this, "NIH stands against racism in biomedical research." They announced a new initiative called UNITE, and a raft of measures intended to create a more equitable environment. And I think it's notable that NIH has acknowledged now in no uncertain terms that there is a problem, which, of course, is the first step to creating solutions. So, I'd ask you to summarize for our listeners, some of the solutions that they're proposing and comment on whether those solutions are going to go far enough to address the issues that we're facing.

Dr. Stevens: Thank you for noticing this and we would just completely agree with you that this is a really a revolutionary moment for NIH to make this statement and to make it so publicly and to make it so big. NIH, the National

Institutes of Health has said openly that structural racism permeates its biomedical research enterprise. This is an absolutely revolutionary moment. To move forward from this, the NIH has apologized and established a working group, quite broad and large working group, to do something. We're now at, what is that something? And so far, we're not sure yet. And that's because the NIH has been very vague. And so we'll see. Currently, the NIH has opened up requests for information to say we're listening. And so, our community will share our opinions, again. NIH has also launched one small funding announcement targeted at racial health disparity. We would argue that it's not nearly enough money, put up that issue, but the short is we've had a revolutionary moment where NIH has acknowledged the problem. But now it's time for action and the tangible action that they will take is completely unclear still and so what we want to say is action must be taken. We must have racial funding equity. We must have solutions to this, and we must have them, now. And so, we'll see if they can take that step, So far, we haven't seen it.

Dr. Eniola-Adefeso: And I think it's important to highlight that there are two parallel issues here. There is the issue of healthcare funding disparity, right, meaning we're not funding black scientists equally. Right. And we talked early on about the negative impact of that. And then there's the healthcare disparity and putting money to research disparity in healthcare. Those are not the same thing and people and maybe even sometimes NIH tends to

conflate the two. We can find people to do healthcare disparity risk research to understand differences between race and how they respond to different diseases, such as COVID-19, but we also need diverse researchers in all aspects of biomedical research, so that we don't end up with technologies like the oximeter that is discriminating against one group of Americans versus the other. So, that distinction is important, NIH is committed to putting money towards understanding healthcare disparity. We also need them to commit money to closing the gap, so that block PI's and other underrepresented PI's can be at the table leading innovation in all kinds of technology, not just looking at healthcare disparity, if that makes sense.

Dr. O'Connor: Dr. Eniola, it makes so much sense and I will speak, be a visiting professor talk about health equity, diversity inclusion and sometimes one of the examples that I'll use about to highlight the issue of unconscious bias is first generation airbags. And the reason why I like to talk about this is because I actually bought one of those cars. So, when I was just a young mom, I was going to buy a new car, and I was driven solely by wanting a passenger side airbag, because I felt that that was going to protect my children. It was a safety feature. So, I went out and bought one of the two cars on the market at the time that had a passenger side airbag. Little did I know that that first generation airbag actually put my children at risk. And this was before we understood that kids should be in the car seat

in the backseat of the car. Then, when you look at, well, how could that happen? You know, did Detroit invest millions and millions of dollars to create a safety device that was going to kill children, women and small men? Of course not. Were the engineers who designed that device and competent? No, they were smart people. They were well intentioned. So, what went wrong? Well, there were not very many women on those teams. And if somebody had asked the question, what happens if my baby's in the front seat, then somebody would hopefully have done the test before the product was released, and lives would have been saved. So, if there had been black scientists on the design for the pulse oximeter, right, somebody would have said, what about if it's used on me, or someone in my family? Does the pigment in my skin affect the accuracy of this device? And so, we can only see the world through our own lens, through our own life experiences and that's why, this is my take home message, of one of my talks. That’s why diversity on your team is so important, because each of us can only bring our own lens and each of us will have blind spots. You know, I call it the “airbag tragedy”. You need diversity on your team, so you never are in the situation where you are creating a first-generation airbag.

Dr. Eniola-Adefeso: I could not agree more. And in some ways, you just rewrote our paper. And that's exactly the point we have been making.

Dr. O'Connor: But that is the point and that's why we do better and we're stronger when we are more diverse. It's not because non-diverse groups are ill-intentioned. I mean, nobody is trying to create an inferior product that hurts people, it's that they simply don't always see these issues. So, alright, because I could, you know, talk about that forever. So, we've covered a lot of ground and it's certainly notable that the problems that you're highlighting for scientists are to a great extent, as I mentioned, across all medical disciplines, in some ways. Perhaps only nursing has representation that is not less than the population demographics would suggest. And I certainly hope that we can be allies in this effort to remove barriers, to be fully inclusive in science and medicine occupations and patients, in fact, I mean, look at the boardrooms across America. We certainly still need more diversity at all levels of leadership in our society. So I'd like to ask each of you if there's something you'd like to add in closing.

Dr. Eniola-Adefeso: I think it's important, the point that you made just now that it's not that non-diverse teams are ill-intentioned. I think when we talk about fund black scientist, people get defensive because they hear that we're saying that non-diverse things are not good. No, we're saying that we could make better technology. We're saying that the greatest nation in the world can be even greater, if we leverage the life and lived experiences of all Americans. And right now, in biomedical research, we're not doing that,

simply because we did not pay attention to how we're funding research grants. And how is that linked to diversity? The bulk of the investigators that review NIH proposals are also non-diverse. Okay, so that's a team, right? The NIH reviewer panel is a team and it's a team that's not diverse. So, this idea of having a diverse team, you've given a perfect example, where the automotive industry. We give the perfect example with a medical technology. The NIH study section panels is also a team and that team has to be diverse, if that team is going to make the best decision in terms of innovative work that we could be pushing and be funding with the American tax dollars. So that's the point that I want to highlight. We're not saying that people are doing this on purpose or people are intentionally leaving out a group. We're saying because we're not diverse, we're leaving out ideas, and creativity that we could be leveraging to enhance our nation and that in fact, to be quite honest, our competitiveness in the global stage.

Dr. O'Connor: Absolutely. Dr. Stevens?

Dr. Stevens: Three words, fund black scientists.

Dr. O'Connor: That is a very powerful closing statement. So, I want to thank you both for joining us. I'm so appreciative of all the work that you're doing and all of us are doing because you know, we are all connected. I hope the

pandemic has highlighted, for all of America, we are all connected. No person is an island, to paraphrase that famous quote, and any progress that we make towards equity, you know, pushing that boulder up the hill just a little bit is progress for all, we are all linked. And so I just applaud all of the work that you've done. It's very exciting, and we stand together with you. So, I want to thank our listeners for tuning into the conversation today. Please remember to subscribe. You can find us on Twitter and we are also now following MC Hammer. Be safe, be well and stand with us for equity. Goodbye for now.

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