March of Dimes remains steadfast in our commitment to advancing research to improve maternal and infant health through the development of lifesaving diagnostic and therapeutic tools. In this newsletter, I’m pleased to introduce you to our new Chief Scientific Officer who will lead our research strategy: Dr. Emre Seli. In a Q&A with Dr. Seli we explore his background and goals for the future of March of Dimes research. In addition, you’ll read about our work through the following stories:

**Using bacteria to predict preterm birth:** Researchers at our Prematurity Research Center at Imperial College London discuss the development of a new rapid test that identifies specific bacteria and immune responses associated with preterm birth.

**Nutrition and the newborn brain:** One of our Agnes Higgins Award winners discusses his pioneering work in neonatal nutrition.

**Why we give:** We introduce you to one of our generous donor families and their personal story of preterm birth.

Thank you for making important research like this possible. We look forward to a healthy and prosperous year ahead.
INTRODUCING
DR. EMRE SELI

As the new Chief Scientific Officer at March of Dimes, Dr. Emre Seli will lead a dedicated team to maximize impact in maternal and infant health research. With an extensive—and impressive—background in treating complex cases of infertility, Dr. Seli’s excited to take on this new challenge and implement real progress in the field of prematurity.

Tell us a little about your background.

Dr. Seli: I was born and grew up in Istanbul, Turkey, where I developed a passion for science and medicine early on. Despite my parents having successful careers of their own in different disciplines—my father was in economic development and my mother was an artist and painter—I gravitated toward the science laboratory. In fact, I always loved research.

I attended medical school in Turkey and pursued an OB/GYN residency there but left halfway through to attend Yale University for a research fellowship. I was soon recruited to pursue OB/GYN residency there. I continued my training at Yale and graduated in 2004 from their Reproductive Endocrinology and Infertility (REI) fellowship program.

I was drawn to the REI subspecialty not only because it gave me great joy to help couples with infertility have a baby, but also because of the vast innovative potential in the field—there was still so much to discover! Soon after, I became a member of the Yale faculty and began teaching infertility and seeing patients there. That was nearly 20 years ago, and I remain there today.

Simultaneously to Yale, I served as the research director at IVIRMA, the world’s biggest and most research focused fertility company, from 2017-2021. As part of that role, I oversaw all the group’s research into ovarian rejuvenation, gene editing, laboratory science, genetic embryo testing, cryobiology, endometrial synchrony, aging and rejuvenation, stem cells, epigenetics, reproductive disorders, immunology, psychology, surgery and more.

Your prior work focused on the treatment of complex cases of infertility. Why did you decide to focus on maternal and child health at March of Dimes, and more specifically, preterm birth?

Dr. Seli: Three reasons: I’m passionate about March of Dimes’ work to improve outcomes for all moms and babies, regardless of race and class, particularly in terms of lowering prematurity and maternal and fetal death rates for minority communities, really appeals to me. I believe, like March of Dimes, that all babies deserve the same start in life, no matter into which family they are born. And that means a mother having access to comprehensive prenatal care, having a to-term gestation with a birth attended by a respectful, attentive provider and having a supportive post-partum experience.

Of course, there are many more facets to improving outcomes for minority moms and babies and closing the gap with White moms and babies, but the four aspects I mentioned above are big picture goals.

Our researchers at March of Dimes will prioritize the second aspect I mentioned—having a to-term gestation and conducting research into exactly why African and Native American women have such high prematurity rates and how to overturn those statistics. Everything from DNA, to microbiome, to societal maternal stress will be analyzed, with the goal of finding predictive tests and treatment solutions that result in fewer moms experiencing preterm birth. Importantly, we want to achieve these goals within the foreseeable future, preferably within our lifetime.
I mentioned earlier that the field of infertility was ripe for investigation and discovery, meaning there was a lot we didn’t know as doctors. You can absolutely say the same thing with prematurity; however, unlike the field of infertility, little progress has been made in the field of prematurity in the last few decades, and it’s my deep desire to change that.

**What are the biggest issues facing maternal and child health today?**

**Dr. Seli:** There are many, but I will speak to the scientific challenges around the two main issues: the first is that preterm birth rates in the U.S. are higher than they should be in a developed, wealthy nation like ours, and the second is that minority moms and babies experience far worse outcomes than their White counterparts. These two issues are very much related.

March of Dimes researchers around the world want to know what’s driving these high prematurity rates among minority moms. Is it differences in vaginal bacteria, called microbiome, differences in the expression of DNA, called mRNA, societal stress or nutrition? And we also want to know why minority women have such poor outcomes compared to White women—we believe structural racism plays a big role, but what other measurable factors are involved? This is the work of March of Dimes’ research centers in a nutshell.

**What are your first priorities for March of Dimes maternal and child health research?**

**Dr. Seli:** The main priority for research right now is shifting the direction of our research teams toward translational research, or research that directly impacts patients in the foreseeable future. I always say that put simply, our goal here is to help at least one woman avoid preterm birth. One woman. It doesn’t sound like a lot, but it’s a start. And from there, there will be another woman, and another, and hopefully a generation of new moms who will not bear the burden of prematurity that today’s minority families face.

The shift in our research will happen by changing the questions we ask in the laboratory—instead of asking whether a pregnant mouse will give birth later if we change her diet, we want to ask the same question about a pregnant woman. Of course, translational, or direct impact, research is not easy to conduct on pregnant women, but there are ways to do it ethically and efficiently. It all starts with a shift in mindset. The reason for the shift is simple—the sooner we start asking questions that are more relevant to patients, the sooner we conduct research that can positively impact them several years down the road in a doctor or midwife’s office and the sooner we can see birth equity in this country.

**If you could change one thing in maternal and child health today, what would that be?**

**Dr. Seli:** Probably structural racism and how hard that is to change. Specifically, I’m referring to structural racism here that affects minority moms. This idea is now widely accepted as fact—that women of color are treated, for a myriad different reasons, differently than their White counterparts, leading to poor outcomes for them and their babies. And it’s really hard stuff to change. For example, a Black mom may have an unhealthy pregnancy not because someone is outwardly racist to her, but because she lives in an area without access to a grocery store and eats mostly fast food. Those types of urban design issues are often part of the conversations about structural racism, and altering those issues will take a multi-disciplinary, sustained approach. And March of Dimes is up to the challenge.

**What do you hope to accomplish in this new role?**

**Dr. Seli:** If we move March of Dimes into the translational research realm, help develop tests that predict prematurity and preeclampsia, test new treatment strategies, help train more Black and Native American scientists and continue to invest in health equity research, I’ll be very happy.

**What do you see in the future of research at March of Dimes?**

**Dr. Seli:** We’re moving toward a more health equity focused approach, so I know there will be a big push to do more research about exactly why women of different races and classes have different outcomes. Other than that, the direction of the research will drastically depend on what we uncover next, and what needs to be built upon. Clinical research is like unspooling a long, long thread—the more you pull, the more you have to work with. It’s a long but extremely rewarding process, and I’m very grateful to be a part of it here at March of Dimes.
DR. EMRE SELI
March of Dimes Chief Scientific Officer
Yale University Professor of Obstetrics, Gynecology & Reproductive Sciences
Preterm birth complications remain the leading cause of death for children under age five, accounting for about one million deaths worldwide each year. In some pregnant women, imbalances in bacteria can cause inflammation in their reproductive tract, which can lead to preterm birth. There are current gold standard tests to identify risk of preterm birth, but they’re time consuming, costly and difficult to adapt for routine bedside testing.

That’s why the March of Dimes Prematurity Research Center at Imperial College London developed a new rapid test that’s just as effective as these gold standard tests, yet far more economical and produces results in about two minutes. The ability to monitor the vaginal microbiome and inflammation throughout pregnancy with this new test could help identify women at risk of preterm birth sooner, potentially allowing obstetricians to monitor these women more closely and start preventative treatments earlier and in a more targeted way.

Specifically, this new test can rapidly and accurately predict both the type of bacteria colonizing the woman’s reproductive tract and whether the woman has raised an immune or inflammatory response to those bacteria. These two pieces of information are essential in ensuring a successful pregnancy.

In the study of the test’s efficacy, researchers found that women who went on to experience preterm birth were more likely to have changes in the types and amounts of certain vaginal bacteria during their pregnancy. Further, certain medical interventions that women received during pregnancy could cause inflammation that’s associated with preterm birth. Unlike current tests which can take days to obtain equivalent results, this new test, which is called direct-on-swab metabolic profiling by Desorption Electrospray Ionization Mass Spectrometry, or DESI-MS, can predict the type of bacteria and a woman’s inflammatory response to it in just a couple of minutes using a simple swab sample.

“We’ve known for some time that the vaginal microbiome can contribute to the risk of preterm birth, but now we have developed a device which in just a few minutes can report both the microbiome composition and inflammatory status of a sample collected during pregnancy,” said Dr. David MacIntyre, a Reader in Reproductive Systems Medicine at Imperial College London. “This is the first rapid testing device of its kind and could be readily transferred to use in a clinical setting. The information gleaned by doctors could help monitor the risk of preterm birth and help optimize treatments, such as more selective use of antibiotics.”

The device also has wider applicability to other areas of women’s health, including identifying BV-type vaginal bacterial profiles linked to HPV infection, cervical pre-cancer and IVF failure, as well as miscarriage and preterm birth.

“Our study did not set out to specifically predict preterm birth,” said Dr. MacIntyre. “However, we were able to robustly predict the microbiome and inflammatory states typically associated with it. And the ability to rapidly diagnose the vaginal microbiome and the inflammatory status of a woman in pregnancy opens new opportunities for identifying preterm birth risk factors and monitoring patient response to treatments received during pregnancy.”

Researchers now plan to register the technology and seek regulatory approval for its use in the U.K. and Europe and, eventually, in North America. They also are planning development of a miniature version of the test that can be used more widely in clinics and would allow for bedside testing. Their study, which detailed the test’s operation and results, was recently published in Nature Communications.
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NUTRITION AND THE NEWBORN BRAIN

New research is showing how good nutrition, particularly early on, can have far-reaching positive effects on brain development.

Not long ago, conventional wisdom held that newborn babies came into this world as a blank slate, a tabula rasa, as the Latin saying goes, but that idea has since been decisively proven wrong. Babies aren’t blank at all—quite the opposite. They’re imprinted practically from the time they’re conceived, and the condition they’re born in is materially affected by their mom’s environment and behavior during pregnancy and even pre-pregnancy, epigenetic factors that turn genes on and off and birth timing. Now a new study finds that a baby’s nutritional state both pre- and post-delivery is another important factor that affects their health.

That study is being conducted by Dr. Michael Georgieff, a pediatric neonatologist and winner of the 2020 March of Dimes Agnes Higgins Award for his pioneering work in neonatal nutrition. Dr. Georgieff’s work established that the first 1,000 days of a baby’s life are critical for healthy brain formation and cognitive function, and that iron, the most commonly deficient nutrient, may be a causal factor in determining whether a baby is capable of achieving its full mental and emotional potential.

“If a person is iron deficient as an adult, they won’t feel good—they’ll be tired and their memory won’t be as sharp. They may also have some emotional problems, but they can be treated, and their symptoms will disappear. That’s not the case with children, newborns and especially fetuses,” said Dr. Georgieff. “Being iron deficient early in life confers long-term risks in development. And you can’t correct them the way you can with an adult. You can’t just give the iron back because the residual deficits remain. And there’s a tremendous personal and even societal cost to that. That’s why we’re looking into what causes these long-term effects.”

We know that iron regulates how genes specifically relating to cognition in the brain are expressed, which determines how flexible a brain is. This determines the total capacity of a brain’s functions, including emotional status, stability and speed of processing—things which, if compromised in a third grader, set a child behind in school and life in general. If giving the iron back doesn’t work, what does? Dr. Georgieff seeks to understand whether iron is the real culprit, and if so, how iron deficiency dysregulates those genes, and also whether another nutrient called choline might restore brain function in children. Preclinical studies have been positive and indicate the work should move forward. Clinical trials are next and won’t start a moment too soon.
DR. MICHAEL GEORGIEFF
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PHILANTHROPY IS PERSONAL

Lauren and Brandon Bettencourt weren’t supposed to have a preterm baby. They had two. For them, and so many other parents, prematurity matters.

Were you familiar with March of Dimes before you had your two babies?

Lauren: Until I delivered at 26 weeks with my first, we knew nothing about March of Dimes, the NICU or preterm birth. We just assumed that you get pregnant and you have a full-term baby.

Brandon: This was our first child, so it was our first experience of having a baby and having it not go according to plan. It was eye-opening and scary, and we had to learn a lot very quickly.

Did you have any history of preterm birth in your family?

Lauren: None. They really can’t pinpoint a reason why I went into preterm labor. I’m healthy and active, I eat well—everything that’s supposed to lead to a perfect pregnancy, but it didn’t. And they said if I did have another baby, I’d have an 85 percent chance I’d go full-term, nothing to worry about, but it happened again.

How many weeks was your second child?

Lauren: Just 31. But he was a giant by comparison.

Brandon: During that second pregnancy, just as a precaution, they were closely monitoring Lauren and giving her progesterone. But we didn’t know if that was going to be impactful, or if the first time was just a fluke. So even though the doctors were treating Lauren’s pregnancy as if it might go to full term, the way it ended up happening the second time was very much like the first.

So, there were some similarities between the two births?

Brandon: In both cases, Lauren’s delivery was very rapid. We would enter the hospital in what seemed like a stable state, and then she would deliver in half an hour. The first time it caught everyone by surprise. And the second time as well because everyone assumed it wasn’t going to happen again—yet it did.

Were you any more prepared the second time around?

Lauren: Surprisingly, yes. I mean, you’re never really prepared for a preterm birth, but I knew the process. I knew the questions to ask, I knew he’d be whisked away to the NICU, and I knew the nurses down there. It was less scary because I had done it before and because August was born five weeks later, which in my eyes was a huge difference. The day after he was born, I was just so happy that I had gotten to 31 weeks.

When did your work with March of Dimes begin?

Lauren: A NICU nurse put me in touch with a previous patient of hers who had a preterm baby, and she told me that March of Dimes did great things and that I should get involved with them. I was drawn to the idea of being able to help someone in the same difficult and helpless-feeling situation I was in. And that’s when I got involved with the NICU Family Support® program.

Brandon: Our first experience was after Griffin turned one-and-a-half. There was the annual Black Tie for Babies Gala where Lauren gave a great speech and we brought Griffin out in a little tuxedo. Lauren had experience making videos for her fitness business and she created a couple of different videos about our journey which March of Dimes ended up using. That started the relationship four years ago.

Is there a specific area of research that you two are particularly interested in?

Lauren: It’s important to me to make preterm birth known. I have a social media presence on YouTube and Instagram and that allows me to be an outreach person to educate people about it and what they can do to help. One of the things I’ve done is to create a huge fitness class that gets people together to raise money for March of Dimes and for preterm birth. I’m also constantly posting about our experience and how the kids are doing now. I get messages and emails multiple times a week from people all over the world asking me questions about preterm birth, about Griffin. They ask for advice
about eating, growth and development because they know what I went through, and I know what they’re going through, and we can relate to each other. Helping someone else is what got me through this. And since our babies were in the NICU, we focus on how we can support families whose babies have to be there. How can we help advance the science to give babies who were born too early a better chance of surviving?

**Brandon:** And not just surviving but thriving. That’s what we look back on and feel lucky. Part of the success we think our children has is the result of March of Dimes’ research. If you think about the baby born five, ten, years from now, what can we learn in that time to give them an even better chance? We want to help March of Dimes keep babies from being born too early but also give the ones who are the chance to be healthy. There are certain things you can donate to that feel intangible and it’s hard to pinpoint exactly where your money’s going or what it’s doing, but you can go to a NICU and see the babies like Griffin and August and know, if not for donations for this research, they may not even be here. That’s how you know this work matters. It saves lives.
Congratulations to March of Dimes current grantees who include experts working on everything from development of antibodies to prevent NEC (necrotizing enterocolitis) and an aspirin regimen for preeclampsia to addressing racial and health disparities in birth outcomes and so much more.

- Ripla Arora, Ph.D., Michigan State University
- Phillip Bennett, M.D., Ph.D. FMEDSci, Imperial College London
- Rupsa Boelig, M.D., Thomas Jefferson University
- Eliezer Calo, M.D., Massachusetts Institute of Technology
- Jennifer Condon, Ph.D., Wayne State
- Andrea Edlow, M.D., MsC, Massachusetts General Hospital
- Sarah England, Ph.D., Washington University
- Timothy Hand, Ph.D, University of Pittsburgh
- Ethan Goldberg, M.D., Children’s Hospital of Philadelphia
- Russ Lehrman, Ph.D., BioSuperior
- Corina Lessuer, M.D., Icahn School of Medicine
- Brian Kalish, M.D., Hospital for Sick Children
- Deborah Karasek, Ph.D., UCSF
- Kok Lim Kua, M.D., Indiana University
- Louise Laurent, M.D., Ph.D., UCSD
- Jamie Lo, M.D., Oregon Health and Sciences University
- Marina Sirota, Ph.D., University of California, San Francisco
- Carole Ober, Ph.D., University of Chicago
- Samuel Parry, M.D., University of Pennsylvania
- Rebecca Simmons, M.D., University of Pennsylvania
- David K. Stevenson, M.D., Stanford University
- Sing Sing Way, M.D., Ph.D., Cincinnati Children’s Hospital

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