

Innovations in Neonatology



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focused solely on children.*



PEOPLE

New members, new roles and recognition

Four physicians have joined the Division of Neonatology at Rady Children's Hospital-San Diego and UC San Diego, and many current team members have been recognized for their achievements and skills with new roles or recognition.

New Physicians



Jeanne Carroll, M.D., a physician-scientist from Boston Children's Hospital, investigates the molecular mechanisms of stem cell differentiation.



Laurel Moyer, M.D., from Cincinnati Children's Hospital, is an expert in clinical innovation and quality improvement research in neonatal care.



Patricio Fernandez, M.D., from the University of North Dakota, is also a practicing cardiologist, specializing in the care of critically ill newborns and infants with congenital heart disease.



Audra Wise, M.D., from the UC San Diego/Rady Children's program in neonatal and perinatal medicine, researches innovative approaches for treating respiratory failure in critically ill newborns, particularly those with congenital diaphragmatic hernia.

New Roles



[Crystal Le, M.D.](#), has been named medical director of the Rady Children's NICU at Scripps Mercy Hospital Chula Vista.



[Charles Sauer, D.O.](#), [Krishelle Marc-Aurele, M.D.](#), and [Carlos Ramos, M.D.](#), have been promoted to associate clinical professors of pediatrics.

Recognition



[Jane O'Donnell, M.D.](#), received the Rady Children's Hospital Physician of Excellence Award.



[Dr. Marc-Aurele](#) received the 2016 Whitehill Prize for excellence in the teaching of clinical medicine, awarded by the Academy of Clinician Scholars at UC San Diego.



[Erika Fernandez, M.D.](#), was recently elected president of the Western Society for Pediatric Research.



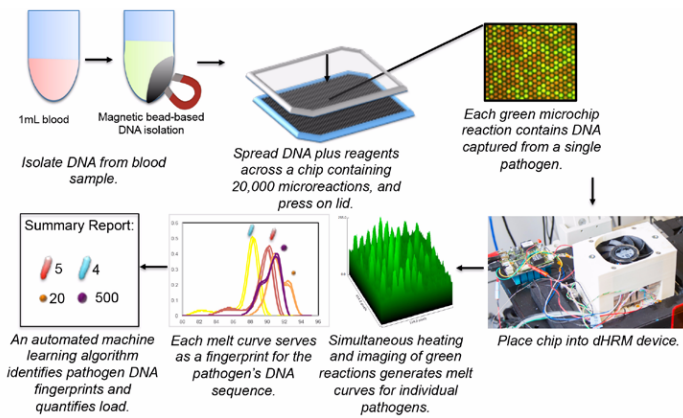
RESEARCH

Massively parallel digital high-resolution melt for rapid and absolutely quantitative sequence profiling

[Shelley Lawrence, M.D.](#), a neonatologist at Rady Children's Hospital and an assistant clinical professor of pediatrics at UC San Diego School of Medicine, in collaboration with Stephanie Fraley, Ph.D., of the UC San Diego Department of Bioengineering, among others, has developed advanced technology that quickly identifies bloodborne pathogens.

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Using an integrated platform, the researchers detected bacterial pathogen DNA sequences in complex samples in less than four hours. The system incorporates a microfluidic chip and instrumentation to accomplish universal PCR amplification, high-resolution melting (HRM) and machine learning within 20,000 picoliter scale reactions, simultaneously. Clinically relevant concentrations of bacterial DNA molecules are separated by digitization across 20,000 reactions and amplified with universal primers targeting the bacterial 16S gene. Amplification is followed by HRM sequence fingerprinting in all reactions, simultaneously.

The resulting bacteria-specific melt curves are identified by Support Vector Machine learning, and individual pathogen loads are quantified. The platform reduces reaction volumes by almost 100 percent and achieves a greater than 200-fold increase in dynamic range of detection compared to traditional PCR HRM approaches. Type I and II error rates are reduced by 99 and 100 percent respectively, compared to intercalating dye-based digital PCR (dPCR) methods.

This technology holds the promise of impacting a number of quantitative profiling applications, particularly infectious disease diagnostics.

The research was recently published in [Scientific Reports](#).



INNOVATIONS

NICU quality improvement project reduces laboratory tests

[Crystal Le, M.D.](#), [Richard Song, M.D.](#), and [Charles Sauer, D.O.](#), all neonatologists at Rady Children's Hospital, spearheaded efforts to decrease the number of laboratory tests in asymptomatic neonatal intensive care unit (NICU) patients admitted for evaluation for early onset sepsis (EOS) due to maternal chorioamnionitis. The project was implemented at Rady Children's community NICUs and is part of a hospital-wide quality improvement initiative at Rady Children's.



innovation
belongs in every moment



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Reducing lab testing not only benefits patients by decreasing needlesticks, but also lessens the likelihood of false positives in EOS evaluation, which lead to a diagnosis of culture negative sepsis and may prolong the hospital stay.



To reduce the testing, changes were made in the order set; instead of ordering initial complete blood counts (CBCs) at admission, these were ordered at 12 to 24 hours of life, resulting in a significant decrease in CBCs without any increase in readmission for sepsis. Specifically, the average number of CBCs per patient were reduced 34 percent in the intervention period (November 2015 to June 2016) compared to the baseline period (June 2015 to October 2015).

Additionally, the number of patients having at least two serial CBCs was markedly reduced, from 93 percent to 44 percent. A trend was also observed in reducing the average hospital length of stay, but a larger patient population will be needed to determine if this reduction is statistically significant.

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