Pediatric RESEARCH

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EDITOR'S FOCUS

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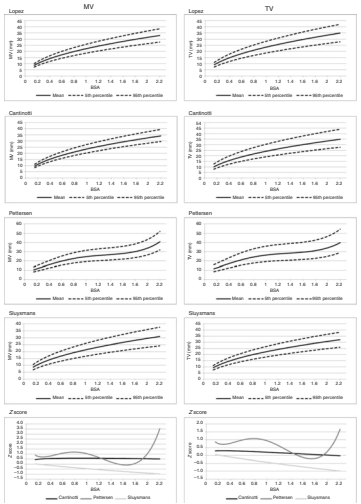
Early Career Investigator

Congratulations to Lyndsay Harshman, the Early Career Investigator for October. Dr. Harshman grew up in small-town Iowa and was introduced to research as an undergraduate at the University of Iowa. She was a recipient of the Doris Duke Clinical Research Fellowship at the University of Iowa Carver School of Medicine and discovered a passion for pediatric nephrology—and specifically transplant medicine—under the mentorship of Patrick Brophy. As reported in this issue, Dr. Harshman and her multidisciplinary team used structural magnetic resonance imaging of the brain to identify gray matter volumetric differences between children with early chronic kidney disease and peers without chronic disease. Dr. Harshman reminds her children that "you can do hard things" and points to good mentorship as necessary for success in pediatric research. See pages 402 and 526

A closer look at nomograms for 2D echocardiography

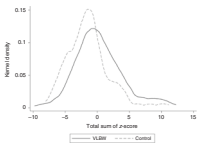


Nomograms for 2D echocardiography have been introduced into clinical decision making, but recent studies suggest that discordant *Z*-score values are reported between nomograms. A comparison of *Z*-scores between ranges of normality showed limited agreement between nomograms for important diagnoses, including aortic arch anomalies. Cantinotti and colleagues plotted *Z*-scores from four widely used nomograms across a broad range of body surface area (BSA) values and found high agreement between two recently proposed nomograms with divergent *Z*-scores, particularly at higher BSA, with two older nomograms. See page 579

3D printing application in pediatrics

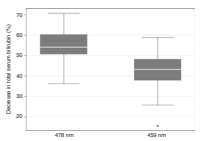
"Personalized medicine" is a nuanced label that may be applied to understanding disease pathogenesis, interventions, and outcomes for individuals within a population. A clear example of personalized medicine can be identified in the new paradigm of 3D printing. While many applications of 3D printers support mass production of materials, an important use is the ability to create patient-specific models for education, interventions, or procedures. In their systematic review, Francoisse and colleagues propose the acronym TDPM to assist pediatric healthcare providers and research teams with language to classify 3D printing applications. (Photo: Scharfsinn86/Getty.) See page 415

A composite score to estimate ageing in VLBW infants



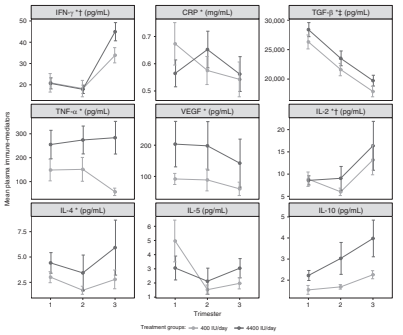
Prematurity and low birth weight are increasingly recognized as important risk factors for adult-onset diseases, with recent studies suggesting that individuals born premature and/or with low birth weight are physiologically advanced for chronologic age. Longitudinal cohorts, which are critical for identifying these relationships, help frame new ideas and hypotheses. Darlow and colleagues' data on 26- to 30-year-old participants from the New Zealand 1986 VLBW Follow-Up Study show that very low birth weight (VLBW) adults have a composite 10-biomarker score that reflects a moderate shift in physiological functioning compared with adults born at term. In an accompanying Comment, Vasu and Gale point to other markers of ageing, including telomere length, and remind us that perception of perceived age is the best biomarker of biological ageing. Also in this issue, a mother recounts her experience of delivering preterm and the effects on their family and on her child's life. See pages 533, 411, and 705

A comparison of short and long wavelength of blue light on bilirubin concentration



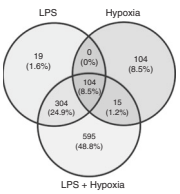
The widespread use of blue light for hyperbilirubinemia is based on the absorption spectrum of the bilirubin–albumin complex in vitro with peak absorption of 459 nm. Interestingly, the formation of configurational isomers differs by wavelength, and recent evidence suggests that wavelengths between 460 and 490 nm may be more readily absorbed by bilirubin modified by photochemical reactions. Ebbesen and colleagues demonstrate that blue light centered at 478 nm reduced bilirubin concentrations at 24 h after initiation by nearly 55%, whereas blue light centered at 459 nm reduced bilirubin concentration by 42%. These findings raise the question of whether we should be more specific with our blue light phototherapy. See page 598

Pre-pregnancy vitamin D status vs. supplementation during pregnancy



Vitamin D deficiency is common during pregnancy, and low vitamin D stores are associated with disordered skeletal homeostasis in offspring. Previously published studies suggest that high-dose vitamin D during pregnancy may be beneficial in lowering rates of gestational diabetes, preeclampsia, and preterm birth; however, supplementation beyond the 1000–2000 international units (IU) commonly found in prenatal vitamins is not currently recommended. Expanding on these previous studies, Khatiwada and colleagues provided either 400 or 4400 IU of vitamin D to 100 each of pregnant Hispanic, African-American, and Caucasian women and assessed immune-mediator concentrations in each trimester. While baseline vitamin D concentration was associated with interferon-γ and interleukin-2 in later trimesters, neither supplementation protocol was associated with second- or third-trimester immune mediator supplementation. The authors suggest that vitamin D supplementation prior to pregnancy may be necessary to induce immunomodulatory effects of vitamin D. See page 554

Distinguishing cytokine and miRNA signatures in neonatal encephalopathy



Recent attention to the term "neonatal encephalopathy" (NE), including in editorials and articles in this journal, highlight the different mechanisms involved in its diagnosis. Using a piglet model to simulate hypoxia ischemia with co-existing pathogen-mediated inflammation, Lingam and colleagues found evidence of unique cytokine and miRNA signatures in the peripheral blood associated with hypoxia and endotoxemia—independently and together. The authors observed that circulating interleukin-10 concentrations seemed to coincide with brain injury severity and differentiated all three conditions for NE. These data underscore the relationship between hypoxia, ischemia, and pathogen-mediated inflammation in NE and add evidence of the complexity of NE. In an accompanying Comment, Felderhoff-Müser discusses the overlapping insults involved in NE and the utility of animal models in understanding the diversity of mechanisms leading to the disorder. See pages 464 and 409

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