2-2022

Childhood Allergy and the NeOnatal Environment (CANOE) Research Protocol and Recruitment Redesign during the COVID-19 Pandemic

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Recommended Citation

Afshan T, Kulkarni A, Blackshere T, Smith J, Tesson E, Hartert T, Rivera-Spoljaric K, Zoratti E, Joseph C, Gern J, and Singh AM. Childhood Allergy and the NeOnatal Environment (CANOE) Research Protocol and Recruitment Redesign during the COVID-19 Pandemic. J Allergy Clin Immunol 2022; 149(2):AB7.

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019 Effects of Type 1, 2, and 3 Immunity on the Viral Susceptibility of Human Keratinocytes

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RATIONALE: Atopic dermatitis (AD) is a chronic inflammatory skin condition characterized by increased susceptibility to cutaneous viral infections. Type 2 (T2) immunity predominates in AD skin lesions, but expression profiling has demonstrated involvement of Type 1 (T1) and/or Type 3 (T3) cytokines. We investigated whether these cell-mediated immune pathways effect cutaneous viral infection.

METHODS: Human differentiating keratinocytes were treated with cytokine(s) representative of these immune pathways T1 (IFN-γ), T2 (IL-4+IL-13), and T3 (IL-17A) at doses 3,12.5,50,200ng/ml for 48 hours. Keratinocytes were infected with vaccinia virus (50-100pfu/ml) and infectivity was quantified via plaque assay and viral titering. Transepithelial electrical resistance (TEER) was measured over 4 days to assess cytokine (50ng/ml) effects on barrier function.

RESULTS: T1 (50ng/ml) significantly reduced plaque number ($P=0.04$; $n=5$-7) and reduced virion production by 44-2170 fold compared to media ($n=3$). T2 treatment increased plaque count 1-222 fold at all doses ($P<0.02$; $n=8$) and increased virion production 15-96 fold ($n=3$). T3 treatment did not significantly effect viral assays. T1 (50ng/ml) significantly increased TEER at day 2 post differentiation, but became statistically decreased by day 4. Neither T2 nor T3 significantly changed TEER.

CONCLUSIONS: IL-4+IL-13 increased viral plaque numbers and virion production, demonstrating that T2 cytokines make keratinocytes more permissive to viral infection and dissemination. In contrast, IFN-γ reduced viral infectivity and dissemination, possibly by enhancing barrier function earlier. IL-17A had no statistically significant effect on viral assays or TEER. The imbalance of T1 and T2 cytokines in skin lesions may be a key driver of cutaneous viral infections in AD subjects.

020 Exploring Dietary Patterns And The Distribution Of Atopic Dermatitis In A Birth Cohort Of A Metropolitan Area In Germany

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RATIONALE: Early life exposures likely affect the development of atopic diseases. Diet has been considered to be a modifiable factor to intervene preventively. The aim of the study was to identify dietary patterns based on the use of supplements during pregnancy.

METHODS: This cross-sectional study was derived from the birth cohort of the Munich Atopy Prediction Study (MAPS). Data was collected using a study-specific food frequency questionnaire (FFQ) and follow-up questionnaires of MAPS. By submitting the FFQ 168 mother-child pairs were included. For analysis hierarchical clustering method and simple matching coefficient were applied.

RESULTS: Four clusters C1 ($n=43$), C2 ($n=71$), C3 ($n=46$), C4 ($n=8$) were identified, characterized by folate, iron, iodine, calcium, and omega-3 use. In C1, almost every woman used all supplements with lower omega-3 intake (62.8%). In C1–C3, every woman took folate, against none in C4. All women in C1 and C2 used iodine, whereas none in C3. Fewest supplements were used in C3 and C4. Altogether, 34 children were diagnosed with AD (20.2%), while within C3 the lowest proportion appeared (15.2%). In C1–C3 most children were predisposed. In C1 and C2, most infants were exclusively breastfed for more than 4 months; those in C3 were exclusively breastfed for less than 4 months (47.8%).

CONCLUSIONS: According to our findings, in C3, where relatively few supplements were used and the proportion of infants breastfed exclusively for less than four months was relatively high, the rate of AD cases was lowest. Further studies are needed to clarify these results.

021 Childhood Allergy and the NeOnatal Environment (CANOE) Research Protocol and Recruitment Redesign during the COVID-19 Pandemic

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RATIONALE: Recruitment for research studies is a challenging endeavor that has been further complicated by the COVID-19 pandemic. While clinical research was temporarily halted due to the pandemic, it was hypothesized that study and recruitment restructuring would enable brisk enrollment when research resumed.

METHODS: A new NIH/ECHO-supported multi-center birth cohort, "Childhood Allergy and the NeOnatal Environment" (CANOE) was launched in January 2019 across four sites to determine how pre-, peri-, and post-natal factors influence development of recurrent wheezing and atopic dermatitis. Study recruitment was halted for nine months due to the COVID-19 pandemic, during which recruitment and study procedures were redesigned.

RESULTS: Recruitment strategies were modified to limit in-person contact, shifting toward alternative HIPAA-compliant methods like clinician referrals, institutional social media, and telemedicine consenting. Protocol changes included reducing frequency of in-person visits, leveraging clinical care visits to collect bio-samples, expanded self-collection of samples at home, and posting study materials online. Recruitment rates range from 3-12 families per month per site. In-clinic recruitment with modifications for social distancing has been successful across all sites. Other successful strategies have included targeted social media posts, mailed letters, and email. Rates of consent have been similar across recruitment strategies and the implementation of multiple recruitment strategies has yielded the highest rates of ongoing consent and enrollment of mother-infant dyads.

CONCLUSIONS: Study procedures that prioritize health and safety measures such as social distancing, study participant convenience, and diversification of recruitment strategies enable continued birth cohort recruitment and data collection while adhering to public health restrictions during the pandemic.