The PCR assay is comprised of two reagents: one containing a reaction buffer and enzyme and one with the primers and the probes for the multiplex assay. In the second study, we used the simple buffer DNA extraction material and swapped the reaction buffer with Perfecta ToughMix® which is commonly used for SCID testing.

The results of these tests suggest that the in-situ assay is compatible with the PCR chemistry developed to identify the homozygous deletion of exon 7 in the SMN1 gene and simultaneously evaluate the copy number of TREC and KREC using a simple elution solution or Extracta DBS solution. The results also confirm that the PCR System developed is optimized fully to detect the four targets in the qPCR assay as compared to Perfecta ToughMix®.

P111. Newborn Screening Facilitates Early Diagnosis of Spinal Muscular AtrophyNewborn Screening Facilitates Early Diagnosis of Spinal Muscular Atrophy

Mei-Ying Liu, Hsiao-Jan Chen, Li-Yun Wang, Yun-Hui Chou, Szu-Hui Chiang, Shu-Min Kao, Hui-Chen Ho, Kwang-Jen Hsiao and Yuh-Jyh Jong

The Chinese Foundation of Health, Newborn Screening Center, Taipei, Taiwan

Background: Spinal muscular atrophy (SMA) is an autosomal recessive disease characterized by defect in the survival of motor neuron 1 (*SMN1*) gene. Type 1 SMA patients typically develop symptoms within the first six months after birth and most patients die before age 2 years. Therefore, early detection by SMA newborn screening (NBS) provides neonates the opportunity for early SMA diagnosis and standard care. We report our results of 18-month period of SMA NBS.

Methods: Two NBS centers, Taipei Institute of Pathology (TIP) and The Chinese Foundation of Health (CFOH), screened for SMA using dried blood spots between September 2017 to February 2019. TIP detected the homozygous SMN1 deletion by genotyping 4 polymorphisms between the SMN1 and SMN2, including the c.840C/T alleles, using Sequenom MassArray. CFOH performed a real-time polymerase chain reaction (RT-PCR) assay to detect the presence of the c.888+100A in the SMN1 intron 7. Molecular diagnosis of neonates with SMN1-deleted status was confirmed by multiplex ligation-dependent probe amplification (MLPA) using genomic DNA samples.

Results: of the 164,352 screened newborns, 10 and 12 newborns were screened positive by RT-PCR and Mass spectrometry, respectively. Thirteen cases with the absence of SMN1 were confirmed by MLPA and then all remained asymptomatic. During 6-month follow-up, five of them with 2 copies of SMN2 became symptomatic and diagnosed as type I SMA, 2 of then died of necrotizing enterocolitis and acute respiratory failure, respectively. While six cases with 3 or 4 copies of SMN2 remained asymptomatic, another 2 lost follow up. The other 9 cases revealed 1 copy of SMN1 by MLPA and eight of the nine false-positive cases were resulted from gene conversions between SMN1 and SMN2.

Conclusion: SMA NBS by RT-PCR and Mass spectrometry is feasible and can provide early diagnosis of SMA. Our results revealed an incidence of newborns with homozygous SMN1 deletion in Taiwan is about 1 in 12,642.

P112. Newborn Screening of Congenital Toxoplasmosis Infection in northern Taiwan

Hsiao-Jan Chen, Ying-Hsuan Chung, Kai-Ting Wen, Hsuan-Chieh Liao, Mei-Ying Liu, Shu-Min Kao, Kwang-Jen Hsiao and Pei-Chen Tsao

The Chinese Foundation of Health, Newborn Screening Center, Taipei, Taiwan

Background Congenital Toxoplasmosis is a cause leading to development of central nervous system anomalies and neurological sequelae in neonates if their mother acquired infection during pregnancy. Early detection and accurate management can reduce the burden from these long-term neurological sequelae. This study aimed to investigate the seropositive rate of Toxoplasma infection in pregnant women and for early diagnosis and treatment of congenital Toxoplasmosis in newborns.

Methods Dried blood spots (DBS) were collected for detection of Toxoplasma-specific IgG and IgM using the ELISA and FEIA, respectively. Newborns with any of positive results were referred for second test within one month. Newborns with seroconversion to positive IgM in the second test or with two positive results of IgM in the first and second tests were identified as congenital Toxoplasmosis. The confirmed newborns were suggested for follow-up of auditory function and neurodevelopment for 3 years.

Results of the 723 neonates in northern Taiwan using DBS screened for Toxoplasma from March to December 2018, the seropositive rate of Toxoplasma IgG was 4.98%. In total, none of these seropositive infants had increased the titer of IgG and changed to positive titer of IgM during regular follow-up. Among the seropositive cases, one of these participants' mother was seropositive for both IgG and IgM and a subsequent IgG avidity test showed high avidity index for IgG antibodies which indicated that the mother got new infection during early pregnancy.

Conclusion Congenital toxoplasmosis has negative impact on not only neurological outcome of the infected newborns but also on public health system. Newborn screening of Toxoplasma and regular follow-up will improve the neurodevelopmental outcomes due to early detection and treatment.

P113. Newborn Screening of Congenital Cytomegalovirus Infection in Northern Taiwan

Hsiao-Jan Chen, Ying-Hsuan Chung, Kai-Ting Wen, Hsuan-Chieh Liao, Mei-Ying Liu, Shu-Min Kao, Kwang-Jen Hsiao and Pei-Chen Tsao

The Chinese Foundation of Health, Newborn Screening Center, Taipei, Taiwan

Background Cytomegalovirus (CMV) is the most common congenital infection in human. The incidences of congenital CMV infection–related progressive hearing loss and neurodevelopmental impairment are underestimated due to unrecognition of most infected newborns lacking of clinical manifestations at birth. This study aimed to early detection of congenital CMV infection and set up a follow-up protocol to investigate the incidences of neurological sequelae.

Methods Dried blood spots (DBS) were screened for human CMV-specific IgM. The presence of DNA fragments of CMV in dried saliva swabs was detected using qPCR. Swabs were collected at least 1 hour after breast milk feeding. Newborns with any of positive results were referred to confirm using urine CMV PCR or cultures. The confirmed newborns were suggested for follow-up of auditory function and neurodevelopment evaluation for 3 years.

Results of the 723 newborns in northern Taiwan from March to December 2018, six has positive results. There were 83 cases born prematurely and three of them had positive results. of positive cases, five newborns was reconfirmed congenital CMV infection. The incidence of congenital CMV infection is 0.7%. All these cases passed their hearing screening exams. Until Dec. 2018, four confirmed cases had complete their follow-up exams at the age of 6 months old. Two infants still had positive results of urine CMV culture and no case had the diagnosis of hearing defect or neurodevelopment impairment.

Conclusion Saliva qPCR is a feasible approach for screening of congenital CMV infection. We expect that a follow-up protocol could provide the epidemiology data of late-onset neurological sequelae in children with asymptomatic CMV infection. Furthermore, early detection and intervention may improve the outcomes of these children.

P114. Screening of Inborn Genetic Disorders X-ALD, ADA-SCID, ASA-LD and OTCD with Specific New Analytes Included in the NeoBase™ 2 Non-Derivatized MSMS Kit

Heidi Appelblom, Tero Lehtonen, Jenny-Maria Brozinski, Dorley Christine, Margo McKinlay, Tuukka Pölönen, Aki Koivu and Katja Vaahtera

PerkinElmer, Diagnostics, Turku, Finland