

### 3・3 誌上発表論文抄録

馬肉中に含まれる住肉胞子虫の危害性消失条件の検討による生食用馬肉を共通食とする食中毒事例の発生防止対策に関する研究

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熊本県（熊本市を除く）では、県の特産ブランドである馬刺しを共通食とする原因不明の一過性嘔吐下痢症事例が毎年 20 件以上発生していた。平成 22 年度厚労省特別研究において原因究明を開始し、馬の筋肉内に寄生する住肉胞子虫のブラディゾイドが病因物質であることが明らかになった。本研究では一定時間の冷凍処理で住肉胞子虫はペプシンにより消化され、その毒性を失うことを見いだした。この性質を利用して、住肉胞子虫の死滅する適切な条件を検討し、馬刺し関連食中毒発生防止のための馬肉の冷凍処理条件を確立した。

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Phylogenetic Analysis of the Nonstructural and Structural Protein Encoding Region Sequences, Indicating Successive Appearance of Genomically Diverse Sapovirus Strains from Gastroenteritis Patients

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We previously identified 139 human sapovirus (SaVs) from 1,367 stool samples of outpatients with acute gastroenteritis in Kumamoto Prefecture, Japan, using RT-PCR targeting the SaV RdRp-VP1 junction region. The 139 SaVs were then successfully classified into 4 genogroups and 11 genotypes: GI.1, GI.2, GI.3, GI.5, GII.1, GII.2, GII.3, GII.4, GII.7, GIV.1 and GV.1.

In this study, We could amplify the partial RdRp sequences of 119 of the 139 SaV strains (85.6%). By the phylogenetic analysis, partial RdRp regions of the 119 SaVs corresponding to the 4 genogroups and 11 genotypes were basically segregated into distinct clusters or branches along with their VP1-based genogroup and genotype except GII.2 and GII.3 strains.

In conclusion, our data demonstrated that genetically diverse SaV strains with both nonstructural and structural protein encoding region sequences.

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Genetic analysis of human rhinovirus species A to C detected in patients with acute respiratory infection in Kumamoto prefecture, Japan 2011–2012

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We performed detailed genetic analysis of the VP4/VP2 coding region in human rhinovirus species A to C (HRV-ABC) strains detected in patients with a variety of acute respiratory infections in Kumamoto, Japan in the period 2011–12. The phylogenetic tree and evolutionary timescale were obtained by the Bayesian Markov chain Monte Carlo method. Phylogenetic analyses showed that the present HRV-A, -B, and -C strains belonged to 25, 4, and 18 genotypes, respectively. Some new genotypes were confirmed as prevalent strains of HRV-C. An ancestor of the present HRV-ABCs could be dated back to about 20,000 years ago. The present HRV-A and -C strains have wide genetic divergence (pairwise distance >0.2) with rapid evolutionary rates (around  $7 \times 10^{-4}$  to  $4 \times 10^{-3}$  substitutions/site/year). Over 100 sites were found to be under negative selection, while no positively selected sites were found in the analyzed region. No evidence of recombination events was found in this region of the present strains. Our results indicate that the present HRV strains have rapidly evolved and subsequently diverged over a long period into multiple genotypes.

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Characteristics of Human Metapneumovirus Infection Prevailing in Hospital Wards Housing Patients with Severe Disabilities

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Epidemics of infectious diseases often occur at long-term inpatient facilities for patients with severe motor and intellectual disabilities. However, the pathogens causing these infections remain unknown in approximately half of such epidemics. Two epidemics of respiratory tract infection occurred in 2 wards in the National Hospital Organization Ehime Hospital (prevalence 1, 34 infected out of 59 inpatients in the A ward in September 2011; prevalence 2, 8 infected out of 58 inpatients in the B ward in June 2012). Human metapneumovirus (HMPV) was detected from the nasal (and some pharyngeal) swabs from 17 patients. Based on phylogenetic analysis of viral genomes, the virus was grouped in subgroup A2 (prevalence 1) and B2 (prevalence 2). We considered that the viruses had spread through the 2 wards. The average duration of high fever in the 42 patients was 6.8 days, with the majority

of fevers exceeding 38°C (79%) and being accompanied by a productive cough. Ten out of 17 patients (59%) in whom HMPV was detected had decreased lymphocyte and increased monocyte counts in the blood. Eleven cases (65%) had elevated-C reactive protein levels and fever protraction as well as images of bronchitis or pneumonia on chest radiographs approximately 1 week after onset. Anti-HMPV antibody in the blood was positive in 95% of patients (151 of 159 inpatients), indicating no relation between HMPV infection and antibody titer but revealing recurrent infections. In view of the fever protraction and frequent co-occurrence of bronchitis and pneumonia at long-term inpatient facilities for immunocompromised patients such as the ones in this study, the prevalence of HMPV must be carefully monitored, and preventive measures and early-stage treatments are required.

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#### Determination of Isotianil in Brown Rice and Soil Using Supercritical Fluid Extraction and Gas Chromatography/Mass Spectrometry

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Isotianil (3,4-dichloro-2'-cyano-1,2-thiazole-5-carboxanilide) is a new plant-activating pesticide. Usage of the pesticide was approved for rice fields in 2010 and its production increased 400 times ( $2 \times 10^4$  kg) in the next year. In this work, a method for determining isotianil in brown rice and rice field soil was investigated for the first time. Isotianil was extracted by supercritical fluid extraction and measured by gas chromatography/mass spectrometry. Isotianil was successfully analyzed with good recoveries (95.1 – 99.3 %) even from soil samples with strong adsorption of pesticides.

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#### 九州・山口地域における有害大気汚染物質濃度の経年変化への越境大気汚染の影響

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九州・山口地域における有害大気汚染物質について、越境移流の影響を把握することを目的に解析を行った。その結果、越境移流の影響を受けた高濃度日事例は出現するものの、Ox, 酸性雨の様に越境移流の影響が経年的に増加し、懸念される状況となっているわけでは無いものと結論づけられた。ただし、1,2-ジクロロエタンについては、経年的に増加傾向にある可能性も見られたが、全国的な経年変化の挙動でも同様の傾向が見られることから現時点で越境移流の影響と結論づけることはできなかった。現状では指針値を大幅に下回っており健康的影響のあるレベルではないが、高濃度日事例解析から、越境移流の頻

度が他の物質よりも高いと考えられることから、今後のモニタリングにおいて、その挙動には注意すべきである。

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九州・山口地方における有害大気汚染物質 1,2-ジクロロエタン濃度の経年変化への長距離越境大気汚染の影響

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大気汚染防止法に基づく有害大気汚染物質の九州・山口地方でのモニタリング調査において、経年的な濃度増加傾向の可能性が見られた 1,2-ジクロロエタンについて、その経年変化に対する大陸越境移流の影響に関する解析を行った。九州・山口地方の低濃度地点の経年変化は、2004 年度頃から明らかな上昇傾向を示し、また他地域の経年変化よりも増加傾向が大きかった。また、後方流跡線より、各地点の調査日を気塊の大陸経由の有無で区別することで、大陸越境移流の影響を検証した。その結果、大陸経由時の方が、濃度レベルが明らかに高く、さらに、大陸経由時の濃度レベルが最近上昇傾向にあることが分かった。これらの解析結果から、この地域での 1,2-ジクロロエタン濃度の経年的な上昇傾向は、大陸経由の気塊の濃度レベルの経年的増加の影響を受けたものと判断された。その一方で、南方海域方面のバックグラウンドを気塊が経由する場合においても、大陸経由時ほどではないものの、経年的に増加する傾向が認められ、対流圏内での大気循環により、1,2-ジクロロエタンの対流圏濃度レベルが上昇していることが示唆された。従って、1,2-ジクロロエタン濃度の経年変化は、この対流圏濃度レベルの上昇をベースに、大陸越境移流の影響が上乗せされた状況にあるものと考えられた。

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