

salted. In Japan, people have the habit of eating raw fish such as 'sushi' or 'sashimi', so they have more chance of infection with larvae of anisakid nematodes. Since the symptoms result from larval invasion of the gastrointestinal mucosa of patients, larval penetrability play an important role in the pathogenicity. Recently, using molecular biological methods, *Anisakis simplex* larvae can be separated three sibling species, namely, *A. simplex* sensu stricto, *A. pegreffii* and *A. simplex* C.

Objectives: The aim of this study was to investigate *Anisakis* larvae's penetrability in order to clarify tendency of the ability among the each sibling species.

Methods: We isolated *Anisakis* larvae from *Scomber japonicus* fish caught in the sea around Goto Islands (Nagasaki Prefecture, Japan) and the sea around Jeju Island (Korea). *Anisakis simplex* larvae identified by morphological features were used in the study. For identification of the sibling species, PCR-RFLP for ribosomal DNA internal transcribed spacer (rDNA ITS) regions was performed. The penetrability of the larvae were evaluated with the agar method which was previously reported (Kojima et al. Clinical Parasitology 2012, Vol. 23, pp. 63–65).

Results: One hundred *Anisakis simplex* larvae (third stage) were examined in the study. By the molecular biological method, it was demonstrated that all of the larvae were *A. pegreffii*. The mean penetration rates of the larvae were 69% in 2 hours and 78% in 24 hours. The larvae kept the penetrability even on the state of imperfect body or after the long term storage over 3 weeks in saline at 4 degrees centigrade.

Conclusion: These results demonstrate that *A. pegreffii* larvae have the high ability to penetrate and the penetrability is kept under cold storage conditions.

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Prevalence of immunity against tetanus and the efficacy of booster vaccination among Japanese travelers

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Introduction: Tetanus is caused by *Clostridium tetani*. It can be prevented by vaccination, which is especially important for overseas travelers. However, although a booster vaccination every 10 years is recommended, most Japanese adults do not receive it unless they have a physical injury or have to travel overseas.

Objectives: The aim of this study was to investigate the level of protective immunity against tetanus among Japanese travelers, which may provide valuable information for formulating recommendations for booster vaccinations.

Methods: In total, 113 Japanese travelers who received the tetanus toxoid at a travelers' clinic were recruited. Travelers who did not visit again and those whose samples could not be collected during the second visit were excluded. Finally, 96 participants were included. Informed consent was obtained from each participant, and 96 blood samples were collected twice, before vaccination and 3–5 weeks after vaccination. History of immunization against tetanus, including the DPT and DT vaccines, was determined from information obtained during the interview or from the immunization records.

Results: The pre-vaccination genomic mean titer for 96 participants was 1.07 IU/mL; further, 76% had a protective antitoxin level (>0.1 IU/mL), and 50% had a long-term protective antitoxin level (>1.0 IU/mL). Majority of the participants aged <40 years had protective immunity without receiving the booster vaccination, whereas only 30.8% of those aged >50 years (excluding participants who had received a tetanus booster in the past 10 years) had protective immunity. Among the 23 participants who did not have protective antitoxin levels (<0.1 IU/mL), the booster vaccination was efficient in 100% of the participants aged <40 years and in only 28.6% of the participants aged >50 years.

Conclusion: Although the tetanus antitoxin level decreases depending on the age, a booster vaccination clearly helps in increasing the protective antitoxin levels among Japanese travelers. Further, booster

vaccinations are highly recommended in individuals who have never been vaccinated against tetanus, especially elderly individuals aged >50 years, in order to prevent tetanus in travelers and residents in Japan.

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A report on 2 cases of *Paragonimus westermani* infection

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Introduction: We here report two cases of *Paragonimus westermani* infection caused by eating raw boar meat

Results: Case 1: A 69-year-old man was referred to our hospital with left pleural effusion. Eosinophilia in peripheral blood and pleural effusion were identified. The effusion was exudative with low pH, low glucose and high lactate dehydrogenase (LDH) levels. Case 2: A 69-year-old man was admitted to our hospital with abdominal pain. Chest CT showed a mass shadow in the right upper lobe and right pleural effusion. He had eosinophilia, but the eosinophil fraction of his pleural effusion was 7%. The effusion was exudative with low pH, low glucose and high LDH levels. Analysis of a transbronchial lung biopsy specimen of the mass lesion revealed prominent eosinophilic infiltration.

In both the cases, they had histories of eating raw boar meat, and *Paragonimus westermani*-specific IgG antibody titers were extremely high in their serum. Thus, *P. westermani* infection was diagnosed. After oral administration of praziquantel, their chest CT and eosinophilia were improved.

Conclusion: *P. westermani* is a parasite of freshwater crabs, and consumption of inadequately cooked crabs causes infection with this parasite. Wild boars are paratenic hosts of *P. westermani* and the infection in humans is also caused by eating raw or improperly cooked boar meat. Pulmonary infiltration with eosinophilia in the peripheral blood and pleural effusion, abdominal pain, and history of eating raw boar meat suggest *P. westermani* infection.

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Pre-travel health advice and area of residence among tourists who visited Cuzco, Peru in season January–February 2012

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Introduction: In trips to developing countries, millions of tourists are exposed to acquire infections, such as the traveler's diarrhea and return with them all over the World. This is the reason why pre-travel health advice offers preventive ways and recommendations to reduce risks and protect the health of the tourists and the population that is visited.

Objectives: Evaluate the association between pre-travel health advice as a prevention way and the traveler's diarrhea risk zone where the tourist resides.

Methods: We defined pre-travel health advice as the affirmative answer to did the tourist go to a consultation with a healthcare worker in travel medicine before travelling to Peru?; and to live in a low risk zone (LRZ) or non-low risk zone (NLRZ) to acquire traveler's diarrhea. We found 732 (37.9±16.3) tourists who had pre-travel health advice, and 1035 (37.9±14.8) that had not. Information was obtained from a database generated by a survey of tourists that visited Cusco in January-February 2012.

Results: We found that 92.5% (640) of residents from LRZs and 72.5% (700) from a NLRZs had a PMABT ($p < 0.001$, χ^2 test). Through regression analysis of General Linear Models we found: live in a LRZ

increased the possibility of having a pre-travel health advice in 194% (95% CI 120–293%), men had 17% pre-travel health advice less than women (95% CI 7–26%), and to know that they would visit more than one city in Peru before Cuzco increased the possibility of having a pre-travel health advice in 25% (95% CI 4–49%), adjusted to age, residence time, trips in the last six months, antecedents of travelling to risky zones and gastric illness.

Conclusion: The possibility of having a pre-travel health advice is increased if the tourist came from a LRZ, the female sex of the tourist and to know that they would visit more than one city in Peru before going to Cuzco.

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Alimentary hygienic risk behaviors in tourists who visit a country inside a high-risk area for traveler's diarrhea

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Introduction: Peru is considered a high risk area for traveler's diarrhea (TD), with incidence rates around 40%. Sometimes, tourists have alimentary hygienic risks behaviors (AHRB), that increase the risk of gastro-intestinal illness during their stay. The factors that are associated are destination, accommodations, traveler's age and the exposure to food/water contaminated. However, few studies have approached AHRB in people who travel to South America.

Objectives: To evaluate the AHRB in tourists that visited a country cataloged as a high-risk area for TD.

Methods: Secondary data from an auto applied survey to 1914 tourists (age range 18–88 years old) who visited Cuzco in January-February 2012 were used. Eight AHRB variables were considered quantitatively: eating at markets, unpeeled fruit, raw vegetables, eat in buffets, with cold sauces, iced drinks, tap water and not washing hands before eating.

Results: On average, tourists committed 2.6 risk behaviors (SD = 1.6, range 0–7), there were no differences by residence in a risk area for TD ($p = 0.239$). In the analysis with generalized linear models adjusted for all variables, we found that there is an increased risk of TD on those who incurred AHRB by 9% (95% CI 2–17%). Furthermore, it was found that men had a higher probability, 9% (95% CI 2–16%), of incurring AHRB compared with women. Also, it was found that the increase in one year of age, in tourists, decrease their AHRB by 1%.

Conclusion: It was found that the TD, age and gender are related to the probability of incurring AHRB. Tourists who live in developed countries have similar amounts of AHRB that those from developing countries.

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Travelers' diarrhea: a comparison between foreign tourists and travelers visiting friends and family in Cusco, Peru

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Introduction: Travelers' diarrhea (TD) is the most common illness affecting the 80 million travelers visiting high risk areas every

year. Well known risk factors include country of destination, eating behaviors and type of travel. Little is known about the differences in incidence and risk factors for TD between foreign tourists and Peruvian travelers visiting family and friends (PVFR).

Objectives: To compare the incidence and risk factors for TD between foreign tourists and PVFR.

Methods: Adult tourists from the United States and Canada and PVFR residing in the United States or Canada for a minimum of 6 months were included. A self-administered survey was distributed to participants while waiting at the departures lounge of Cusco's International Airport. Information on personal and travel demographics, risky eating habits and TD symptoms was collected.

Results: Forty six PVFR (mean age 37.8±13.3 years, male gender 32%, mean stay in Peru 3.1±3.6 days) and 383 foreign tourists (mean age 41.2±17.7 years, male gender 53%, mean stay in Peru 2.7±3 days) were included. While PVFR were more likely to stay at family homes or hostels ($p = 0.03$) and to eat at family homes or street vendors ($p < 0.01$) than foreign tourists, the later were more likely to seek for physicians' pre-travel advice ($p < 0.01$). One quarter of foreign tourists had TD compared to 43% of PVFR ($p < 0.01$, χ^2 test). Being a PVFR increased the risk for TD 82% (95%CI: 21–172%) and every extra day of stay in Peru increased the risk for TD 5% (95%CI 1–10%).

Conclusion: PVFR are more likely to adopt risky behaviors and had TD more often than foreign tourists. Being a PVFR and staying longer in Peru increased the likelihood of TD.

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Trends in morbidity due to snakebites in Risaralda, Colombia, 2007–2009

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Introduction: Snakebites still continue to be a significant cause of morbidity in many developing countries in Africa, Asia and Latin America. In this region, excepting Brazil, few countries are undertaking surveillance studies to assess the trends in the occurrence of snakebites and its burden in the population.

Objectives: To assess the number and rates of incidence of snakebite in an ecoregion of Colombia (Risaralda department) where no previous studies on this have been made. In this study we evaluate trends in morbidity between 2007 and 2009. Incidence rates were calculated based on official population estimates for each municipality of the department. Risaralda has 14 municipalities totaling a population of 919,656 people for 2009 (ranging from 6,344 in Balboa municipality up to 454,495 in Pereira, the capital municipality).

Methods: Epidemiological data for this study were retrieved from the records of the Secretary of Health of Risaralda after the collection from each of the municipalities through the epidemiological surveillance system (SIVIGILA). Using these data, we analyzed the epidemiological impact of snakebites in each municipality during the study period.

Results: During the study period, there were 126 reports of snakebites (median per year of 43, ranging from 29 to 54). Cumulated incidence rate of snakebites for the period was 13.78 cases/100,000pop; ranging from 2.7 to 243.95 cases/100,000pop. As expected the most rural and undeveloped municipality (Pueblo Rico) registered the high number of cases (30) and incidence rate (243.95/100,000pop). Pereira, the capital municipality, having the high proportion of urban population, registered 26 cases for an incidence rate of 5.75 cases/100,000pop. During the study period only one death was registered (for a mortality rate of 1.09/1,000,000pop for the department). Snake species involved in Risaralda are: *Micrurus dumerilii*, *M. mipartitus*, *Bothrops asper*, and *Lachesis muta*.

Conclusion: Snake envenomations are an important cause of injury in endemic areas of Colombia as in many American countries. Surveillance of envenomations is essential for establishing guidelines, planning therapeutic supplies, and training medical staff on snakebite treatment, as well as assessing risk zones for travelers.