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NUCLEAR TECHNIQUES HELP DIAGNOSE CAMEL DISEASE IN THE MIDDLE EAST

核子科技幫助診斷中東地區的駱駝疾病

An emerging disease affecting camels and people is threatening the Middle East and its neighbours. Last month, the IAEA in partnership with the Food and Agriculture Organization of the United Nations (FAO) trained veterinary laboratory staff from this region on how to detect and diagnose the disease using nuclear and nuclear-derived techniques.

The Middle East respiratory syndrome caused by a coronavirus (MERS-CoV) is a serious and growing concern as it can be transmitted from

報告摘要(KEY INFORMATION)

1. 國際原子能總署與聯合國糧食及農業組織合作，對中東及其鄰國地區的獸醫實驗室人員進行培訓，探討如何利用核子技術檢測和診斷疾病。
2. 在第二屆國際放射腫瘤學大會中，國際原子能總署官員表示希望未來能利用最新的核技術幫助其成員國提高癌症護理的品質以及更有效和安全地治療更多的癌症患者。
3. 貧血是海地(Haiti)的一個公共衛生問題，當地政府請求國際原子能總署幫助他們選擇最具成本效益的鐵粉添加到麵粉中以對抗貧血。
4. 來自印度、斯里蘭卡、孟加拉國的大學和研究機構人員，舉行了為期兩天的研討會，討論了穩定同位素技術在營養方面的應用。
5. 為了能在冬季可以讓其他國家的消費者獲得新鮮的進口番茄，澳洲以輻射照射番茄作為農藥的替代品，以確保沒有害蟲並銷往其他國家。
6. 阿根廷和羅馬尼亞近期加入核能署及其所屬數據庫，此兩國都擁有豐富的核技術經驗以及基礎設施，核能署表示他們將能夠成為 NEA 使命的有力參與者。
7. 核能署副署長舉辦了「日本福島第一核電站事故後處置」的專題講座，旨在加強核能安全和改善 NEA 成員國安全能力，並討論了成員國的人力資源開發。

animals to humans, said Giovanni Cattoli, Head of the Animal Production and Health Laboratory at the Joint FAO/IAEA Division of Nuclear Techniques for Food and Agriculture, where the scientists were trained.

"A growing number of human cases is being reported almost on a daily basis and some are so severe that they can be fatal," Cattoli said. Around 35% of cases have resulted in death, according to reports from the World Health Organization (WHO).

A camel problem

Camels are the main hosts of the virus. In the Middle East, people use camels to travel; they eat their meat and drink their milk. Countries in this region are reporting the highest number of human cases — in particular Saudi Arabia, where the virus was first identified in 2012.

When infected, camels don't get visibly ill.

"The virus causes very mild clinical signs in camels, so it's not easy to notice," Cattoli said. "This is why it is so important to ensure that scientists and technicians in laboratories of the Middle East are aware of the risk, familiar with nuclear-derived technology, and ready to detect the virus."

Once scientists have detected the virus using these nuclear-derived techniques, authorities can alert the population in a particular area and advise on basic hygiene and other measures, such as washing hands after being in contact with camels or maintaining a certain distance from them. These measures can reduce the risk of exposure to the virus, which is important because the disease it causes is not yet treatable.

The course and the science

Veterinary diagnosticians from Bahrain, Iraq, Kuwait, Lebanon, Saudi Arabia, and the United Arab Emirates met last month at the FAO/IAEA laboratories in Austria. International experts trained them in modern molecular virus detection techniques (see Genetic sequencing) to detect and control the virus.

The techniques that these veterinary workers learned will help them accurately distinguish this virus in a matter of hours. By contrast, when using traditional techniques, the disease takes several days or even weeks to spot.

"As a new virus, there is still a lot we need to learn," said Mohamed Alhosani, from the Abu Dhabi Food Control Authority, who participated in the course. "The most important thing about these techniques is that they help us identify the virus fast. They're quick and they're accurate."

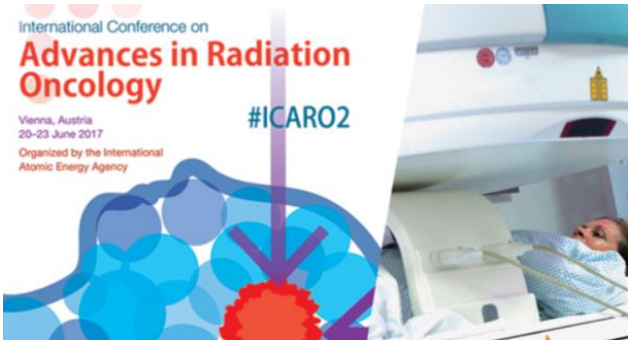
These techniques will not only help them detect and monitor MERS-CoV, but also contribute to increasing the basic information about the virus. Through genetic sequencing, for example, scientists can learn how the virus is spreading and evolving.

The course also helped foster collaboration, Alhosani said. "Meeting vets from other countries will open a lot of gates for us. We will now be exchanging information in shared

databases. We will work together to ensure the virus does not spread to other regions of the world."

IAEA CONFERENCE ADDRESSES KEY ISSUES AND RECENT ADVANCES IN RADIOTHERAPY

國際原子能總署會議發表了放射治療的關鍵議題和最新進展



Treating more cancer patients efficiently, effectively and safely — making use of the latest advances in technology — presents both an opportunity and a challenge, and the IAEA can help its Member States to improve quality and access to cancer care services. This was the message from IAEA officials at the opening of the second International Conference on Advances in Radiation Oncology (ICARO2) today.

The conference, which has attracted over 500 participants from 96 countries, is taking place at IAEA headquarters in Vienna from 20-23 June 2017.

"The role of the conference is to bring people together and spread the knowledge on the use of radiotherapy in cancer care," said Aldo Malavasi, Deputy Director General and Head of the Department of Nuclear Sciences and Application. "With the help of conferences like this the IAEA assists Member States in areas of quality assurance for radiation oncology, radiology and nuclear medicine, dosimetry audits, training and — very importantly — networking."

Continuous professional advancement is essential if medical personnel are to stay up to date with new developments and this conference provides an important forum not only to share the latest knowledge in the field, but also to review modern technologies, compare experiences, and assess their benefits from different perspectives, he said.

A quarter of the funds disbursed through the IAEA's technical cooperation programme are targeting projects in health care, particularly in radiotherapy, dosimetry and medical physics, highlighted Dazhu Yang, Deputy Director General and Head of the Department of Technical Cooperation. "Since the IAEA began its work in human health 60 years ago, the use of nuclear techniques in medicine has become one of the most widespread peaceful applications of nuclear technology," he said. The technical cooperation programme supported the participation of over 40 delegates from developing countries at the conference, he added.

Mr Yang referred to various milestones in cancer care achieved by Member States, such as Cambodia, in improving cancer diagnosis and treatment.

From ICARO to ICARO2

ICARO2 builds on the success of the first ICARO conference held in 2009, emphasized May Abdel-Wahab, Director of the IAEA's Division of Human Health. Since then, the field of radiation therapy has experienced rapid developments, and it is now possible to deliver radiation to the tumour target with ever greater precision, sparing normal tissues. Technological innovations coupled with advances in physics and radiobiology have been the main driving force behind this progress, she said. Many of these developments will be highlighted at the oral and poster sessions throughout the next four days.

"We have witnessed the implementation of new radiotherapy techniques, like intensity modulated radiation therapy (IMRT), image guided radiation therapy (IGRT), stereotactic body radiation therapy (SBRT), proton and heavy ion therapy," said Abdel-Wahab. "Developing these techniques has one main goal — treating more patients efficiently, effectively and safely."

HELPING TO COMBAT ANAEMIA IN HAITI

協助海地對抗貧血

Anaemia is a public health problem in Haiti. 61% of children younger than 5 years (72% of which are under 2 years old), 50% of pregnant women and 34% of lactating mothers are anaemic (figures from 2006).

Food fortification – that is, fortification of staple foodstuffs with iron and other necessary nutrients – offers an effective way to combat anaemia. In Haiti, wheat flour is consumed by the entire population in both urban and rural areas. In February 2017, the country issued a law making it obligatory to fortify wheat flour with iron, folic acid, B vitamins and zinc.

As part of this effort, the Haitian Government requested the IAEA to help inform their choice of the most cost-efficient iron fortificant to add to the flour. A study was conducted by the Human Nutrition Laboratory of ETH Zurich in collaboration with the nutrition team of the

Ministry of Health, supported by the IAEA's technical cooperation programme[1]. Twenty mothers and their children participated in the study, which measured their absorption of iron from flour fortified with ferrous fumarate[2], NaFeEDTA[3], or a combination of the two. The study outcomes demonstrated differences in the bioavailability of the two iron fortificants from wheat flour and identified NaFeEDTA as the more efficient fortificant compound in both groups. However, given its cost, a slightly higher fortification level of ferrous fumarate was found to be more cost-effective. The results have provided a basis for defining the level and type of iron fortificant(s) to add to wheat flour in the national fortification programme.

The study results were disseminated on 16 May 2017 at Haiti's National Laboratory of Public Health by principal investigator Isabelle Herter-Aeberli from the ETH Zurich team. IAEA technical officer Cornelia Loechl provided an introduction on the use of stable isotope techniques for nutritional evaluations and an overview of the IAEA's contributions to nutrition. In his opening statement to the workshop, the Director General of the Ministry of Health emphasized the importance of the long-standing collaboration between Haiti and the IAEA and highlighted the impact of the study results on national programming. The Director of Nutrition at the Ministry of Health moderated the discussions of the study results and guided the outline of the next steps. Representatives of the milling industry in Haiti, the UN family (UNICEF and WFP), Ministries (Ministry of Health, Ministry of Commerce), academia, and NGOs encouraged the reactivation of the multi-disciplinary and multi-sectorial fortification committee and the set-up of an effective quality control system. They also appreciated the IAEA initiative of sharing study results with national stakeholders.

The study has strengthened the collaboration between the National Laboratory of Public Health and nutrition at the Ministry of Health, which will serve as future platform for public health nutrition research and provide high quality data for policy makers and programme planning.

USING STABLE ISOTOPE TECHNIQUES TO INFORM PUBLIC HEALTH NUTRITION

使用穩定同位素技術應用於公眾健康營養問題

Researchers, professors and PhD students from universities and institutes all over India, Sri Lanka, Bangladesh and Indonesia gathered at a two-day workshop on 12-13 June to discuss the role of stable isotope techniques in nutrition in informing nutrition policies and programmes. Participants were given the opportunity to learn about the application of stable isotopes to assess body composition, breastfeeding patterns, energy expenditure, iron bioavailability, and vitamin A status.

Theoretical considerations on the principles and application of stable isotope techniques were broken up into practical demonstrations from dosing and sampling to hands-on sessions on data processing and evaluation. This enabled participants to gain insight and understanding on how to use stable isotopes in their nutrition-related research.

Ranadip Chowdhury, scientist at the Centre for Health Research and Development, Society for Applied Studies in New Delhi, India, summarized what many participants voiced: “It was great to be part of a workshop that teaches how to measure public health outcomes using stable isotope techniques. Our group feels more confident now to design studies to answer relevant questions on where the isotopes will be useful to measure body composition or infant breast milk intake accurately.” Dimas Erlangga Luftimas, lecturer and researcher at the Universitas Padjadjaran in Indonesia, further emphasized the usefulness of the training: “I really hope this is the start of future collaboration with new colleagues to enhance education, empower the community and benefit society.”

The organization of the workshop was part of the Collaborating Centre’s outreach and capacity building activities, which was enabled by partial funding from the Indian Council of Medical Research. Professor Kurpad expressed his appreciation of St. John’s Research Institute being a Collaborating Centre of the IAEA: “This greatly facilitates our ability to attract additional funding for activities such as this training workshop.”

St. John's Research Institute in Bangalore was designated as the first IAEA Collaborating Centre for Nutrition in 2010. The designation was renewed in November 2015 for another four years. With a focus on nutrition as well as on infectious and lifestyle-related diseases, the Institute uses stable isotope techniques for nutrition-related research and programme evaluation.

NEW ZEALAND CAN IMPORT WINTER TOMATOES THANKS TO AUSTRALIA'S FOOD IRRADIATION FACILITY

歸功於澳洲的食品核設施，紐西蘭可以在冬季進口番茄

The Bowen region is Australia's largest winter producer of vegetables. Tomatoes are by far its biggest crop, totalling US $120 million a year. Yet, even though it could offer consumers access to fresh tomatoes in the winter, its export market has been extremely limited. The problem is the Queensland fruit fly, an aggressive pest that Australia once controlled with pesticides that are no longer allowed. However, thanks to a protocol in place that links Australia to New Zealand, tomato exporters have another option: irradiation. Australia irradiates the tomatoes to ensure there are no pests and New Zealand accepts irradiation as proof of insect control. The Joint FAO/IAEA Division has worked with Australia and other countries to bring irradiation to the fore as a suitable replacement for chemical treatments.

The timing is perfect. As Australia's tomatoes are ripening, New Zealand's tomatoes are going out of season. And because the two countries have agreed that irradiation is a safe and appropriate way to meet insect pest control requirements, New Zealand can import irradiated winter tomatoes and a host of other fresh produce from Australia's orchards and fields.

Australia was the world's first country to use irradiation as a phytosanitary measure in international trade. It started in 2004 with exports of mangoes and expanded to several other foods over the years. When its produce is sold in New Zealand, it is labelled as irradiated, and the amount sold is increasing steadily. In 2014, New Zealand consumers purchased some 2 000 tonnes of produce irradiated to protect their environment from invasive pests.

Irradiation has been used for decades to control bacterial growth and food-borne illnesses and to prevent spoilage. But Australia's battle against the Queensland fruit fly is indicative of the more recent adoption and acceptance of irradiation as a viable way to combat the spread of insect pests that can hide in fresh fruits and vegetables destined for export markets. Initially used mainly on dry herbs and spices to combat food poisoning organisms, the process was declared safe for an array of foods in the 1980s by FAO and the World Health Organization (WHO). Further, it is increasingly recognized as a viable way to cut back on the need for potentially harmful and expensive chemical pesticides.

The technique has had slow uptake in the ensuing years because retailers feared that consumers equated the term “irradiation” with “radioactivity”, even though, in reality, food irradiation harnesses the energy in beams of photons, electrons or X-rays – a process similar to airport security screening. The food never comes into contact with radioactive material. The beams do the work.

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ARGENTINA AND ROMANIA TO JOIN THE NEA

阿根廷和羅馬尼亞加入核能署

On 7 June 2017, the accessions of the Argentine Republic and Romania to the Nuclear Energy Agency (NEA) and its Data Bank were formalised with official exchange of letters between each country and Secretary‑General of the Organisation for Economic Co‑operation and Development (OECD), Angel Gurría. An official ceremony took place in the presence of a Romanian delegation led by Prime Minister Sorin Grindeanu and Minister of Public Finance Viorel Stefan, and an Argentine delegation led by Minister of Foreign Affairs and Worship Susana Malcorra and Minister of Energy and Mining Juan José Aranguren. NEA Director‑General William D. Magwood, IV officiated the ceremony. As each country may select the date at which its rights and responsibilities as an NEA member begins, Argentina has selected 1 September 2017 as the start of its membership and Romania has selected 15 October 2017. Both Argentina and Romania possess strong and highly experienced nuclear technology infrastructures that will enable them to be vibrant contributors to the mission of the NEA. These accessions highlight the commitment of both countries to implementing the highest standards in their national nuclear energy policies and programmes.

NEA ACTIVITIES TO STRENGTHEN NUCLEAR SAFETY AND SAFETY CULTURE

核能署舉行提升核能安全和重視安全意識的講座

On 9 June 2017, the University of Tokyo's Department of Nuclear Engineering and Management held a special lecture titled "NEA activities in the aftermath of the Fukushima Daiichi nuclear power plant accident". NEA Deputy Director‑General and Chief Nuclear Officer Daniel Iracane delivered a presentation on NEA activities that aim to enhance nuclear safety and to improve safety culture in NEA member countries, including the international joint projects on nuclear safety research. During his speech, Mr Iracane underlined the need to enhance nuclear safety by also taking into consideration factors such as competences, science and innovation. Organised as part of a human resource development programme for regulatory authorities, which is supported by Japan's Nuclear Regulatory Authority, the lecture also included discussions on current and planned activities related to human resource development in NEA member countries.