

Expert meeting and training course on rapid detection of bird flu virus

A consultants meeting was held from 16 to 18 May 2006 to evaluate progress and recommend future direction in the development of tools used for detection of transboundary animal diseases, including zoonotic agents. The goal is to provide early warning tools used globally for improvement of livestock production and health.

Overall conclusion: The rapid spread of avian influenza between countries and into new species, continues to intensify the risk of a pandemic, and critically emphasizes the need for global efforts to provide early detection and diagnosis of high-threat transboundary animal diseases. The findings and direction proposed during the prior Joint FAO/IAEA Consultants Meeting were used by the international community in introducing new technologies for disease detection and diagnosis to the member states. Additionally, the identified need for enhanced collaborative efforts involving private industry, governmental agencies, and researchers were recognized, with progress in this area exceeding expectations in advancing appropriate technologies, including robotics, for field and laboratory use. Continued efforts are needed to improve affordability, enhance flexibility, and provide seamless integration from sample collection through reporting that would allow routine use by the farmer, by veterinary authorities, as well as by the range of local, regional, and reference veterinary laboratories.

Current and future devices: Technology is expanding to better adapt to fit-for-purpose use, encompassing a broader range of environments and diverse capabilities from rapid on-site detection to high-throughput multiple disease diagnosis and agent characterization. Alternate sampling technologies, including environmental-air sampling tools have demonstrated feasibility for detection of pathogens in animal environments, and now require appropriate validation in the field. Amplification systems, in the form of realtime PCR as well as isothermal amplification approaches have moved from research environments to routine diagnostic application. Biosensors and micro-array technology in solid (gene-chip, protein chips) and liquid (bead-based) formats are currently being developed and validated specifically for livestock applications. Broad distribution of standardized and specific reagents has been facilitated through bio-stabilization, in turn expanding user-accessibility to technologies ranging from dipstick and ELISA based antigen or antibody detection to closed-system realtime PCR. To ensure that affordable and quality diagnostic tools continue to be developed and available to the global veterinary community will require an expanded and sustainable partnership of academic, governmental, and commercial stakeholders.

Reagent stabilization, miniaturization, micro-fluidics and information technologies should be combined to provide tools for complete integration of the diagnostic process from sample collection, through processing, testing, to reporting. Lab-on-a-chip and autonomous-linking of devices that address the needs to detect, diagnose, and confirm are now being developed for veterinary applications. These rapid advances in technologies can facilitate the transfer of appropriate applications to developing country diagnostic laboratories and national veterinary authorities to assist them to address transboundary animal diseases of threat.

Present activities related to avian influenza:

The IAEA, in particular the Joint FAO/IAEA Programme (related to the control of transboundary animal diseases) is supporting Member States in their efforts to control diseases of importance. To this effect we are involved, through FAO (AGAH and EMPRES), regarding individual technical requests from Member States (or any other party) in giving technical advice to Member States as to the diagnosis of the disease, the best "fitness for purpose" tools and quality assured procedures, including vaccines, to use in close collaboration and consultation with experts in the field. In the case of avian influenza it is important for the rapid and differential diagnosis to classify isolates as highly pathogenic or not in order to activate appropriate control measures – this is seen as the bottleneck activity for most developing countries.

Future plan of action

The molecular diagnosis of avian influenza is important – PCR to determine that it is avian influenza and PCR sequencing (fluorescent or isotopic based) to determine whether it is H5N1 or another subtype. It is here that the Joint FAO/IAEA Programme can play a role in supporting the actions of the FAO, OIE, WHO and Member States. The subprogramme can provide technical assistance on (1) which tests and protocols to use, (2) technical and laboratory training, (3) expert missions (nominating relevant expert(s) or to perform expert missions by members of the subprogramme), (4) the analysis of avian influenza samples (as primary diagnosis or as confirmation) utilizing the OIE reference status of our Seibersdorf laboratory (i.e. the analysis of translation products of the virus genome), (5) the provision of technical quality assurance guidelines and support to ensure quality data and reporting, (6) training courses of which one is planned for this year.