Role of an OIE Reference Laboratory
Trichinellosis

Edoardo Pozio
Istituto Superiore di Sanità
Rome, Italy
Historical background

- The OIE Reference Laboratory for Trichinellosis was appointed at the Istituto Superiore di Sanità (Rome, Italy) on July 6th, 1992
OIE Reference Lab functions

• Provision of a centre of expertise on trichinellosis
• Storage and distribution of
  – standard strains
  – diagnostic standards
  – antigens
  – other reagents
• Development of new methods
• Collection, processing and analysis of epizooological data
• Provision of consultant assistance to OIE
• Training
• Organisation of scientific meetings
• Coordination of collaborative studies
• Publication and dissemination of information
OIE Reference Lab functions

- Provision of a center of expertise on trichinellosis
  - since 1988, the reference lab had been appointed as International Trichinella Reference Center by the International Commission on Trichinellosis (ICT)
  - the first and only database on *Trichinella* isolates had been established (www.iss.it/site/Trichinella/index.asp)
OIE Reference Lab functions

- Provision of a center of expertise on trichinellosis
  - a new taxonomy of the *Trichinella* genus has been developed and continuously updated

Encapsulated clade

Non-encapsulated clade
OIE Reference Lab functions

- Provision of a center of expertise on trichinellosis
  - four scientists with different background and expertise (epidemiology, molecular biology, immunology and serology) and five technicians work full time on *Trichinella* parasites and trichinellosis
- facilities
  - five well equipped labs
  - an animal house
- the OIE reference lab is accredited according to ISO 17025 and will be accredited according to ISO 17043 within the end of the year
OIE Reference Lab functions

• Storage and distribution of
  – standard strains
    • two reference strains for each species/genotype are maintained in laboratory animals (24 strains)
    • more than 80 additional *Trichinella* isolates belonging to different taxa and from different regions and hosts are maintained in laboratory animals
  – diagnostic standards
    • official recognized diagnostic standards do not exist in Parasitology
    • this problem needs special attention of international agencies and institutions
  – antigens
    • excretory/secretory antigens from *Trichinella* muscle larvae is routinely prepared, aliquoted and stored
  – other reagents
    • nucleic acids, reference larvae, meat samples spiked with *Trichinella* larvae for PTs, reference serum and meat juice samples from pigs with anti-*Trichinella* antibodies
OIE Reference Lab functions

• Development of new methods
  – Serology
    • ELISA and western blot to detect anti-*Trichinella* antibodies in pigs and humans have been validated
      • for pigs and humans
      • for other animal species, the validation is on the way
OIE Reference Lab functions

• Development of new methods
  – Molecular test
    • a multiplex PCR to identify single larvae of *Trichinella* at the species/genotype level has been developed and validated
OIE Reference Lab functions

• Development of new methods
  – Molecular test
    • microsatellites have been identified in *T. spiralis* and *T. britovi* to distinguish the isolates among them and to trace the origin of the infection in animal and human outbreaks
OIE Reference Lab functions

- Collection, processing and analysis of epizooological data
  - the reference lab is continuously collecting epidemiological data, isolates, and sera from animal and human outbreaks occurring in the world
  - the information is processed and analysed and the final report is provided to the veterinary and/or public health services and to OIE
OIE Reference Lab functions

• Provision of consultant assistance to OIE
  – the personnel of the OIE Reference Lab actively participated at:
    • expert meetings organized by international agencies (e.g., OIE, FAO, WHO, ICT, EFSA, OECD)
    • guidelines preparation
    • OIE conferences
    • assistance to OIE country members
      – support to outbreak investigation
      – identification of larvae at the species/genotype level
      – serology for human, pig, wild boar, and dog sera
      – organization and management of PTs
      – twinning projects
OIE Reference Lab functions

• Training
  – every year, persons from all the continents visit the OIE Reference Lab to be trained on
    • detection of *Trichinella* larvae in meat samples by digestion
    • identification of *Trichinella* larvae at the species or genotype level by PCR
    • maintenance of *Trichinella* strains in vivo
    • production of excretory/secretory antigens
    • serology (ELISA and WB) to detect anti-*Trichinella* antibodies in human and animal sera, and in meat juices
    • preparation of PT samples
    • PT organization
OIE Reference Lab functions

• Training
  – since 1992, 127 scientists from 53 countries were trained
  – main requested training activities
    • detection of *Trichinella* larvae by artificial digestion of muscle tissues
    • morphological identification of *Trichinella* larvae
    • molecular identification of *Trichinella* species
    • preparation of PT samples
    • preparation of ES antigens
    • validation of serological tests (ELISA and/or WB)
OIE Reference Lab functions

• Organisation of scientific meetings
  – in 1993, the OIE Reference Lab organized the 8th International Conference on Trichinellosis in Orvieto (Central Italy)
  – since 2006, a workshop is organized every year for the personnel of National Reference Laboratories of the European Union and of candidate and potential candidate countries
  – The OIE Reference Lab has also organized meetings for:
    • The standardization of the digestion method for ISO
    • The preparation of guidelines for
      – Serology
      – PT organization and evaluation
OIE Reference Lab functions

• Coordination of collaborative studies
  – validation of an ELISA to detect anti-Trichinella antibodies in pig sera
    • There were 21 participating labs from Austria, Belgium, Hungary, Italy, Canada, Germany, France, Croatia, Czech Republic, Denmark, Finland, Lithuania, Netherlands, Portugal, Serbia, Slovenia, Spain, Sweden, Greece, Switzerland, USA
  – isochronous studies on the reference pig serum candidates
    • Participating labs: Belgium and Italy
  – detection of Trichinella larvae in meat samples:
    • There were 26 participating labs from EU and 3 labs from other European countries
OIE Reference Lab functions

• Publication and dissemination of information
  - Since 1992, epidemiological, serological and molecular results on *Trichinella* and trichinellosis
    • have been published in 179 papers on international journals 10% of which are review papers
    • have been disseminated at international and national congresses, conferences, workshops, etc.
    • Guidelines have been prepared with other international experts
OIE Reference Lab functions

- Twinning projects
  - the main objective of twinning is to assist laboratories in developing or in-transition countries to build their capacity and scientific expertise
  - a link between an existing OIE Reference Laboratory or Collaborating Centre and another laboratory or institution in a developing or in-transition country must be established for exchange of scientific expertise and capacity building
  - the OIE Laboratory Twinning Programme establishes sustainable links between OIE Reference Centres and national laboratories in areas that are currently under-represented, leading to an exchange of knowledge, skills, and experience. This creates opportunities to develop technical capacity for disease prevention, surveillance and control based on the OIE International Standards
  - The OIE Ref. Lab. for trichinellosis applied for two twinning projects.
Thank you for your attention