Asbestos related diseases in Slovenia: the search for molecular biomarkers of risk for developing, progress and treatment response needs to go hand-in-hand with education and raising public awareness

Franko A1, Dodič-Fikfak M1, Kovac V2, Dolžan V3
1 Clinical Institute of Occupational Medicine, University Medical Centre, Ljubljana, Slovenia
2 Institute of Oncology Ljubljana, Slovenia
3 Pharmacogenetics Laboratory, Institute of Biochemistry, Faculty of Medicine, University Ljubljana, Slovenia

Introduction
Asbestos exposure has been associated with the development of asbestos, pleural plaques, diffuse pleural thickening and pleural effusion, and several types of cancer. One of the most aggressive and fatal cancers associated with asbestos exposure is malignant mesothelioma (MM). Asbestos was banned by law in Slovenia in 1996, but the number of new cases of MM is expected to increase at least until 2030 due to the long latency period and the fact that asbestos is still present in the environment. As most patients with MM present with advanced disease at the time of diagnosis, the average survival time is 14 months with multimodal treatment. Despite improved survival, response rates to chemotherapy are still only up to 40% (Kovac et al., 2012).

Research projects
- National research project L3-3648: Molecular epidemiology of asbestos-related diseases and new approaches for an early detection and treatment of mesothelioma (2010-2013, PI Dolžan V).

Grant applications
- National research project application: Serum, genetic and epigenetic markers of risk for developing, progress and treatment response in asbestos related diseases (application, 2016, PI Dolžan V).
- H2020-WIDESPREAD-2016-2017:Teaming Phase 2: Advanced Regional Translation of Excellence into Medical Innovations for Delayed Ageing Phase 2 (ARTEMIDA 2; University of Ljubljana, Karolinska Institutet, EMBL-EBI).

Education
- Graduate programme in medicine, Faculty of Medicine, UL.
- Interdisciplinary doctoral programme Biomedicine, UL.

Workshops, courses
- International workshop „PHARMACOGENOMICS – From research to clinics: Workshop for high school and university lecturers“, June 8-10 2015, ULFM, Ljubljana, Slovenia.;
- Training course on Pharmacogenomics, November 14 2015, Institute of Biochemistry, ULFM, Ljubljana, Slovenia.;
- International Summer School GENOMIC MEDICINE – Bridging research and the clinic, May 3-7 2016, Hotel Histrion, Portorož, Slovenia.

Conclusions
The increasing incidence and poor prognosis of MM calls for new more effective detection methods, including the identification of novel biomarkers for early and reliable detection of MM, especially in high-risk populations with a known history of asbestos exposure. If people are more aware of the health risks associated with asbestos exposure and educated about the early signs and symptoms of asbestos related diseases, these diseases, especially malignant diseases could be recognized at earlier stages.

Dissemination and raising awareness
- AZBEST, KONKONČANA ZGODBA (L’AMIANTO, UNA STORIA INFINITA (Asbestos, an unfinished story); International Symposium, 23. 10. 2015, Vipož, Slovenia. VD, MDF).
- Kemične snovi na delovnem mestu - biološki monitoring (Chemical substances at workplace : Biologica monitoring) III. Sušnikovi dnevi, Radenci, 12. in 13. junij 2015 (MDF, AF).
- The expert meeting and roundtable on asbestos and the consequences for health and the environment and preventive measures, 30. 5. 2012 Ljubljana (MDF, AF).

Collaboration with associations, industry and local authorities
- Slovenian association of patients with asbestos related diseases, Deske.
- Cancer Patients Association of Slovenia, Ljubljana.
- Salont Anhovo, d.d, Deske, Slovenia.
- National Institute of Public Health, Ljubljana.
- Slovenian association of occupational, traffic and sports medicine, Slovenian Medical Association, Ljubljana.
- Municipality Kanal ob Soči.

Planned activities
- Congress of the Slovenian Biochemical Society with international participation, September 2017, Bled, Slovenia.
- 14th European ISSX Meeting, Cologne, Germany, June 26 - 29, 2017.