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Oncology and the Lab:EuroMedLab 2013

This year's EuroMedLab took place in Milan, Italy. As usual the programme was packed full of interesting presentations on topics ranging from point of care testing to biomarkers to public relations and laboratory management. Oncology was another key topic of the congress and it is these sessions we have decided to include in our oncology supplement. The following summaries give an insight into the congress and the current trends in oncology and the lab.

Epigenetic Biomarkers For Early Detection Of Aerodigestive Tract Cancers In Biological Fluids T. Liloglou

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Cancers of the respiratory tract (lung and head and neck) contribute to more than 25% of human cancer-related mortality worldwide. Tumours along the respiratory tract share common aetiologies, risk factors and molecular characteristics. Major clinical challenges in reducing mortality from these cancers include the detection of early lesions, timely discovery of relapse and patient stratification into more efficient therapeutic regimens.

Epigenetic reprogramming is one of the hallmarks of human cancer. DNA methylation is currently the best-studied epigenetic modification pointing to a large number of genes being silenced by hypermethylation. These genes are now looked as potential biomarkers for clinical management of cancer. DNA methylation possesses many characteristics, which make it advantageous in biomarker development. The biological function of DNA methylation, its covalent chemical nature, the stability during fixation and the durability of DNA is clinical specimens are some of such characteristics.

The application of molecular biomarkers in biological fluids and specimens acquired in common clinical practice has been a long term demand. To date, there is significant literature on the applicability of DNA methylation biomarkers in a variety of specimens including bronchial washings, sputum, buccal has been demonstrated, the diversity of methods and study designs makes comparison particularly complicated. In addition, lack of statistical power is a frequent problem. Last but not least, is the lack of a continuum in DNA methylation biomarker studies thus very few groups move into proper clinical validation. This underlines the need of large consortia contributing clinical samples and information as well as the use of a consensus on the use of robust, high precision assays. Clinical validation of DNA methylation biomarkers is very important, especially when running along computed tomography (CT) trials, where it may be able to assist in the management of indeterminate nodules.

Molecular Genetic Approaches To The Diagnosis Of Thyroid Cancer

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Thyroid cancer is the most common type of endocrine malignancy and its incidence has been steadily increasing in many regions of the world. Papillary and follicular thyroid carcinomas are the two most common types of thyroid cancer. Initiation and progression of thyroid cancer involves multiple genetic and epigenetic alterations, of which mutations leading to the activation of the MAPK and PI3K/AKT signalling pathways are crucial. Nonoverlapping genetic alterations, including BRAF and RAS point mutations and RET/PTC and

PAX8/PPARg rearrangements, are found in more than 70% of papillary and follicular thyroid cancers. They represent the most common genetic alterations in thyroid cancer, as well as molecular markers of diagnostic and prognostic significance.

These mutational markers are being introduced into clinical practice, assisting the diagnosis of malignancy in fine-needle aspirates from thyroid nodules, and are particularly helpful for those nodules that have indeterminate cytologic diagnosis. Moreover, some of these markers, such as BRAF, provide additional prognostic information, which may facilitate more individualised operative and post-operative management of patients with thyroid cancer. New emerging laboratory technologies, such as next generation sequencing, will allow to significantly expand the extent and

precision of molecular testing for thyroid cancer in the near future.

Biomarker Strategies Currently Being Explored For Prostate Cancer C. Sturgeon Dept. of Clinical Biochemistry, Royal Infirmary of Edinburgh

More sensitive and specific diagnostic testing that can reliably distinguish aggressive from indolent prostate cancers is urgently required.

Measurement of prostate specific antigen (PSA) is integral to the clinical management of patients with prostate cancer, but its limitations for diagnosis and population screening are increasingly well-recognised. Many more men will be diagnosed with prostate cancer than will die of it and many of these men will never have needed to know they had the disease.

Biomarker strategies currently being explored include the Prostate Health Index (PHI) in which results for PSA, free PSA, and a PSA precursor form [-2]pro-PSA are combined in an algorithm to provide an estimate of the risk of prostate cancer and the Prostate Cancer gene 3 (PCA3) urine test. An age-based screening strategy with PSA which combines age and the presence of common genes for prostate cancer so that only the highest risk men are screened has been modelled. Some men would start screening at 45 years, some at 60 years and some would never be screened. Means of improving PSA monitoring in patients with diagnosed prostate cancer are also being developed, with major focus on the interpretation of serial changes in the biomarker and the effective use of this information in routine practice.

Results suggest that personalised approaches to screening could reduce the number of screens required by up to 50% and decrease the number of men diagnosed with prostate cancer by 18%, while also increasing the number of quality adjusted life years and significantly decreasing costs as compared with previously proposed screening strategies. More efficient models for posttreatment monitoring of prostate cancer patients, particularly those on active surveillance, are also likely to be cost-effective as well as more attractive to patients. Objective and rigorous evaluation of such strategies is essential before they can be introduced into clinical practice with particular attention paid to their effect on outcome. Improving the diagnosis of prostate cancer and the monitoring of diagnosed patients post-treatment remains a high priority.

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