

Heading for the future in oncology

“We need to join all available forces if we want to win the battle against cancer.” Christoph Zielinski, Chairman and one of the founders of the Comprehensive Cancer Center Vienna explains why this is key to innovative treatment strategies, such as personalised medicine.

Many different reasons including exponential aging, detrimental lifestyles, and others which are still unknown today increase the burden of cancer worldwide. In the future, the hazard of an increased cancer burden will constitute an important issue for societies worldwide. This not only will involve early recognition of malignancies, rising treatment costs for an ever increasing patient number, but also the provision and costs for nursing and palliative care. Thus, innovative strategies have to be developed in order to control for either variable.

Groundbreaking treatment strategies

Currently, we are witnessing the emergence of a new era which is mainly the consequence of insights from the Cancer Genome Atlas which has indicated the emergence a series of targetable or actionable genetic and molecular targets. Thus, anatomic tumour location upon which treatment decisions were based hitherto, diverted or molecularly modulated signaling pathways often transgressing anatomic borders are getting into the foreground of treatment decisions. Applying immunohistochemical and molecular biological diagnosis, the characteristics of the tumor and the corresponding therapeutic targets can be determined, although the distinction between driver and passenger mutations is still under way for the majority of malignancies. However, the discovery of diversity of cancers of the breast, lung, colon or even soft tissue sarcomas previously considered to represent an entity, respectively, have indicated the correctness of this approach in generating not only a new classification of some malignant disorders, but also – as a consequence – introducing various treatment options based upon biology rather than histological characteristics. The many positive results of clinical trials testing for the efficacy of targeted drugs in various malignancies prove that “personalised treatment” or – better – “precision medicine” will represent one of the most important future developments in medical oncology. The Comprehensive Cancer Center Vienna plays a key role in the further development of this research.

Moreover, the insight that the modulation of immune suppression caused by malignancies can be targeted therapeutically by new treatment options resulting in an immune modulation leading to the emergence of an equilibrium between the tumour and the host’s immune system. These developments are currently only in its initial stages, but preliminary results are very promising.

Interdisciplinary approach

In order to make personalised or precision medicine work, a series of medical disciplines – from clinicians from various disciplines over to diagnostic disciplines with molecular pathology at the forefront to biostatistics and diagnostics by targeted radioactive imaging - need to join hands. While molecular biological diagnosis is crucial for an effective targeted therapy, molecular pathology and targeted nuclear diagnostics are essential for therapeutic individualized decision-making. Although there are still a lot of unanswered questions, the entire and worldwide scientific oncologic community is striving to find the right answers resulting in cancer turning into a truly chronic disease.

A brief look at the CCC

With this goal in mind, the Comprehensive Cancer Center (CCC) was founded in 2010 as part of the Medical University Vienna and the General Hospital in Vienna, Austria. Since then, the CCC has bundled the strengths of all employees working in the fields of cancer. Our goal is to improve patient care, foster scientific output and provide the highest quality in education and training. We do this according to international standards for Comprehensive Cancer Centers and implement a quality management system as well as Quality Austria's certification programme. Finally, the CCC actively supports Patient Advocacy Groups. The CCC is part of the Organisation of European Cancer Institutes (OEI).

Three-pillar approach

The CCC's main research activities focus on clinical and translational research as well as on basic science, using a three-pillar approach which includes Clusters with a main emphasis upon interdisciplinary basic research, Units which unite clinical and basic researchers around specific clinical fields and Platforms for interdisciplinary clinically applied research using specific techniques. This structure results in close interaction, networking and a fast translation of new findings from bench to bedside and back.

CCC Clusters cover Genetics and Epigenetics; Immunology and Inflammation; Experimental Therapy and Drug Resistance; Microenvironment, Vasculature and Metastasis; Cell Signalling and Metabolism; Biomarker Development; Diagnostic and Therapeutic Techniques.

The 9 CCC Units focus on the Breast Health Center, the Central Nervous System Tumor Unit, the Colorectal Cancer Unit, the Drug & Target Screening Unit, the Gastroesophageal Tumor Unit, Gynecologic Cancer Unit, the Musculoskeletal Tumors Unit, the Pancreatic Cancer Unit and the Urologic Oncology Unit

The two CCC-Platforms include Molecular Oncological Diagnostics and Therapies and the platform for Extravasation.

Focussing at teaching, the CCC runs four oncological Ph.D.-programmes, hosts lecture series for world renowned experts in the form of Grand Rounds, and has developed a special course for patients - the Cancer School CCC Vienna. Additionally, there is a programme for cancer and research nurses.

In summary, we believe that the CCC has generated an important new step in the interdisciplinary cooperation regarding patient care, scientific concepts and teaching bringing disciplines together and thus generating a networking basis leading to not only synergies, but also actually remarkably ameliorating endeavours centered around the understanding, the diagnosis and the treatment of cancer.

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