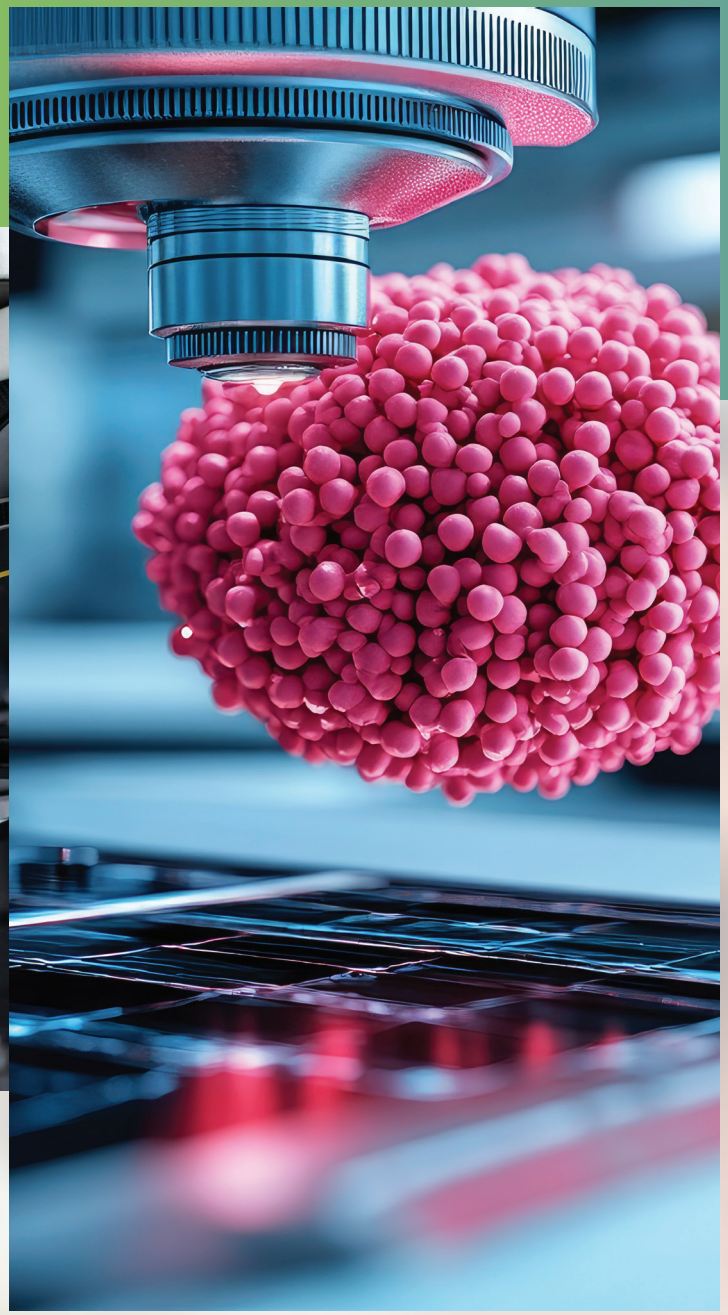

TechSci Research
from NOW to NEXT

Advances in Cancer Treatment

TechSci Research Analysts in Conversation with:

Ghazaleh Madani

Chief Executive Officer at CanChip

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What inspired your journey into oncology and cancer research?

My passion for oncology stems from the time my mom was fighting with cancer, and I could see the pain and fear in her. I felt the urgent need to develop more predictive and personalized drug testing platforms. Cancer is a complex disease, and traditional drug development often fails due to inadequate preclinical models. My background in biochemistry and molecular biology and my co founder´s background in tissue engineering and microfluidic systems led me to explore organ-on-chip technologies, which offer a promising approach to improving drug screening and personalized medicine.

From your perspective, what have been the most significant advancements in cancer treatment over the past decade?

The most transformative advancements include immunotherapy (checkpoint inhibitors, CAR-T cells), targeted therapies, and precision medicine approaches based on genetic profiling. Additionally, the rise of organ-on-a-chip technology has improved preclinical drug testing, bridging the gap between in vitro and in vivo studies and reducing the animal trials

How has the approach to cancer research evolved with emerging technologies?

Cancer research has shifted from a one-size-fits-all approach to a more personalized strategy. And that is where CanChip comes to the point. We offer customized tumor on chips and personalised medicine with our work. Technologies like AI-driven drug discovery, single-cell sequencing, and organ-on-a-chip models are accelerating both research and clinical translation. The integration of patient-derived tumor models has also improved our understanding of cancer heterogeneity.

Immunotherapy and targeted therapies have transformed cancer treatment—what do you see as the next big leap in this space?

The next leap will likely involve multi-modal approaches, where immunotherapy is combined with targeted treatments and personalized drug screening. Additionally, advancements in tumor microenvi-

ronment modeling, using platforms like tumor-on-a-chip, will refine immunotherapy strategies and enhance treatment efficacy predictions. All of these, plus the help of AI can lead to a very practical approach for cancer treatment.

How are organ-on-a-chip and tumor-on-a-chip technologies shaping preclinical drug testing and development?

These technologies replicate human tissue and microenvironment interactions more accurately than conventional 2D cell cultures or animal models. Tumor-on-a-chip models can provide real-time insights into drug efficacy, resistance mechanisms, and patient-specific responses, enabling faster and more reliable drug development. At CanChip GmbH, we are developing such platforms to improve preclinical drug testing for cancer therapies and we develop customized solution for our customers.

What role does AI and big data play in accelerating cancer research and treatment personalization?

AI is transforming cancer research by analyzing vast datasets from genomics, imaging, and clinical trials to identify new drug targets, predict patient responses, and optimize treatment regimens. Machine learning models can help stratify patients for personalized therapies, improving treatment outcomes.

Are there any recent breakthroughs in early cancer detection that excite you?

Liquid biopsies, which detect circulating tumor DNA (ctDNA) in blood, have shown promise for early cancer detection. AI-powered imaging and molecular

diagnostics are also improving early-stage identification, increasing the chances of successful treatment.

How close are we to making truly personalized cancer treatment a reality for most patients?

We are making progress, but challenges remain in cost, accessibility, and regulatory approval. Organ-on-a-chip technology could play a significant role in bringing personalized drug testing into clinical practice, helping to tailor treatments based on individual tumor responses. And we are working very hard on this approach to make it as trustable as possible.

What are the biggest hurdles in translating cutting-edge research into widely available treatments?

Major hurdles include regulatory approvals, high costs of development, and variability in patient responses. Bridging the gap between preclinical and clinical trials remains a challenge, and better predictive models like organ-on-a-chip could improve success rates.

With the rapid advancements in biotech, do you see a future where cancer becomes a manageable chronic disease rather than a life-threatening one?

Yes, with continuous improvements in targeted therapies, immunotherapy, and early detection, many cancers may become manageable chronic conditions. The goal is to turn aggressive cancers into diseases that can be controlled long-term with minimal side effects.

How do you envision the role of biotech startups and pharmaceutical companies evolving in the fight against cancer?

Startups are driving innovation by developing novel technologies, while pharmaceutical companies provide the resources to scale treatments. Collaborations between biotech, academia, and pharma will be crucial in accelerating drug development and bringing personalized treatments to market.

What are some of the most pressing global cancer trends that researchers and policymakers need to address?

Rising cancer incidence, treatment disparities, and the need for early

detection in low-income regions are key concerns. As well as early detection and screening for younger generations. Personalized medicine and AI-driven research can help address these issues, but accessibility and affordability must also be prioritized.

How do socioeconomic and geographic disparities impact access to the latest cancer treatments?

Access to advanced treatments is often limited in developing countries due to high costs and lack of infrastructure. Policies that support affordable generics, telemedicine, and decentralized clinical trials could help bridge the gap.

What are the biggest regulatory and ethical challenges in bringing new cancer therapies to market worldwide?

Regulatory agencies must balance safety and speed, often leading to lengthy approval processes. Ethical concerns include patient privacy in big data research and equitable access to expensive therapies. More flexible and adaptive clinical trial models are needed.

Are there any emerging regions or countries that are making unexpected strides in oncology research and treatment?

China, India, and Brazil are making significant investments in cancer research and biotech. Europe and USA as well but the speed may be slower. The expansion of AI-driven diagnostics and local biotech startups in these regions is accelerating innovation.

What advice would you give to researchers, entrepreneurs, and healthcare professionals looking to make an impact in oncology?

Focus on interdisciplinary collaboration—combining engineering, biology, and data science is key. Also, prioritize patient-centric approaches and consider translational applications early in your research.

Be open to new pathways and ideas, trust yourself and never get disappointed.

How can we foster better collaboration between biotech, academia, and healthcare systems to drive progress in cancer treatment?

Creating shared research platforms, open-access databases, and joint

funding initiatives can bridge gaps between academia, biotech, and clinical practice. Industry-academia partnerships should be encouraged to accelerate innovation.

What's one message or key takeaway you'd like to leave our listeners with regarding the future of cancer research and treatment?

The future of cancer treatment lies in personalized medicine and predictive technologies like organ-on-a-chip. By integrating advanced modeling, AI, and patient-specific testing, we can revolutionize drug development and treatment strategies, bringing more effective therapies to patients faster.

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