Trever G. Bivona: research requires motivation, persistence, open-mindedness and creativity

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Editor's note

Drug resistance describes the status when the effectiveness of a medication such as an antimicrobial or an antineoplastic in curing a disease or medical condition is reduced (1). While it is posing threats to clinical care, it is concurrently driving basic and translational research that strives to discover the mechanisms behind. As a medical oncologist, Prof. Trever G. Bivona from Department of Medicine—Division of Hematology/Oncology at the University of California, San Francisco has been studying into the molecular basis of targeted therapy response and resistance. Through this interview, *Journal of Thoracic Disease* (*JTD*) aims to get to know more about the research projects Prof. Bivona is currently working on, as well as some challenging and interesting aspects of these projects.

Figure 1 Prof. Trever G. Bivona.

Expert introduction

Trever G. Bivona, MD, PhD, currently serves as the Associate Professor of Hematology and Oncology at the University of California, San Francisco, CA, USA (*Figure 1*). He is also a member of UCSF Helen Diller Comprehensive Cancer Center and a faculty member of California Institute for Quantitative Biosciences (QB3).

Prof. Bivona is a medical oncologist with a PhD in cell and molecular biology. He is actively involved in academic clinical practice as well as basic and translational research focused on cancer genetics, precision medicine, and the molecular basis of targeted therapy response and resistance. Throughout his career, he has discovered several mechanisms of resistance to EGFR-targeted therapy, BRAF- and MEK-targeted therapy, and ALK-targeted therapy in lung and other cancers. His work has led to new clinical trials, including rational upfront polytherapy trials designed to forestall and eliminate resistance.

Interview

JTD: You are actively involved in basic and translational research focused on cancer genetics, precision medicine, and drug resistance. How are these research areas interrelated and which one do you think requires most urgent attention?

Prof. Bivona: These are all critical areas of research and clinical care in cancer that require substantial effort by the field in general. That said, I feel the most urgent challenge in the cancer field is drug resistance. This is because we are making unprecedented progress towards improving cancer patient survival using molecular therapies. But the treatments are not effective in all patients and eventually stop working in the patients where efficacy is initially observed. This is largely due to drug resistance. Thus, drug resistance plagues almost all cancer patients at some point.

JTD: The concept of cancer immunoediting was proposed in 2002 and has been evolving over time. How can our growing understanding of the concept expedite future research work?

Prof. Bivona: Immunoediting involves immunosurveillance and tumor progression. My lab is studying how the tumor microenvironment may contribute to targeted cancer therapy resistance. In unpublished work, we are assessing how different tumor microenvironment cells may contribute to cancer cell drug resistance and immune suppression. The hope in the field is that understanding immunoediting and the tumor microenvironment better will lead to new therapeutic strategies to better control or eliminate cancer. There is great promise going forward.

JTD: We realize that you are currently working on several projects funded by National Institutes of Health (NIH). Would you introduce us to some of these projects, including their objectives, scopes, research directions and current statuses?

Prof. Bivona: The goal of each of the NIH-funded projects is to dissect the molecular mechanisms of drug resistance in cancer and use the information to better stratify and treat patients. In one project, we are investigating the molecular basis of residual disease and what biological factors promote incomplete anti-tumor responses that are typical in lung cancer patients treated with either targeted therapy or immunotherapy.

JTD: What are the most enticing aspects of your work (including research, clinical practice and teaching)?

Prof. Bivona: Each research project contains ups and downs, and twists and turns. That is one exciting aspect of doing science—you never know where the findings will lead you and you have to work diligently to synthesize the data into a coherent model and story.

Clinical practice motivates me to improve outcomes for cancer patients. That, along with a natural curiosity about how the world works, drives my scientific research, which is most enticing to me.

I enjoy teaching as well, as we all benefit from our teachers and mentors and my goal is to pass that forward to my trainees. My advice to young researchers would be: this is a challenging field, but very rewarding in many ways. I would suggest being highly motivated, persistent, open-minded, and creative.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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