The Language of Pharmacodynamics

The Oxford English Dictionary defines language as "the method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way." This CCR Focus section describes various ways in which anticancer agent pharmacodynamics (PD) is being studied, with the goal of clinical translation. PD is the study of drug action—and all the factors that modify that. Given a new agent in development, the clinical oncologist wants to know the response rate and toxicity, the translational oncologist wants to know whether the drug engaged its target and for how long, and the pharmacologist wants to generate a complex model, such as the one shown in Fig. 1, describing the interrelationship of various factors to treatment effect or toxicity. The authors in this CCR Focus section address various aspects of these equations. With William Douglas Figg and David R. Newell as Guest Editors, the articles show us the complex network that underlies the action of every drug and offer hope that we can eventually understand the factors that influence drug action well enough to use them in the clinical setting to improve cancer treatment. We learn in this CCR Focus section that modern methodologies are available to explore and possibly understand why some patients have side effects when others do not—the kind of science that could lead to further drug discovery. We learn new strategies for determining whether a drug distributes to the tumor tissue (imaging) and whether we can demonstrate a molecular effect in a circulating tumor cell (allowing repeated study and avoiding biopsy). And, we learn that once we know a drug can affect a target, we still are far from having reliable, validated, and widely usable PD assays to prove it. Oncologists and pharmacologists will have to work together, and speak a common language, to make continued progress. We see this CCR Focus section as a step in that direction. As always, we hope that these articles will inform those who are interested but not expert, and challenge and encourage those who are expert in the field.

Figure 1. PD can be defined as "what the drug does to the body," which includes activity and toxicity, and underlying mechanisms and molecular determinants. The drug effect on both normal and cancer cells may be on-target (T) or off-target (off-T). Genetic variation (PG) affects both pharmacokinetics (PK) and PD. In contrast, PK is "what the body does to drug": absorption, distribution, metabolism and excretion (ADME), and underlying mechanisms and determinants.

Susan E. Bates
Deputy Editor, CCR Focus
National Cancer Institute

See all articles in this CCR Focus section, "Progress in Pharmacodynamic Endpoints."

Published online May 15, 2014.
doi: 10.1158/1078-0432.CCR-14-0739
©2014 American Association for Cancer Research.
The Language of Pharmacodynamics

Susan E. Bates


Updated version
Access the most recent version of this article at:
http://clincancerres.aacrjournals.org/content/20/10/2524

E-mail alerts
Sign up to receive free email-alerts related to this article or journal.

Reprints and Subscriptions
To order reprints of this article or to subscribe to the journal, contact the AACR Publications Department at pubs@aacr.org.

Permissions
To request permission to re-use all or part of this article, contact the AACR Publications Department at permissions@aacr.org.