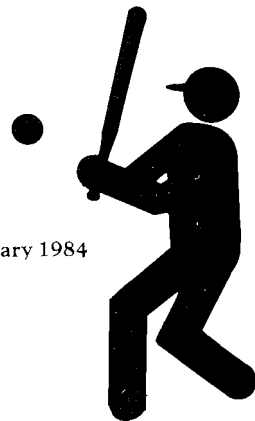


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Winning Plays in the R&D Game

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The same elements that produce competitive teams in baseball, football, and basketball can shape a successful new-drug development team.

Are my medicinal chemists playing baseball but being managed like a football team? Are my new-drug application (NDA) teams playing baseball instead of basketball? These may appear to be strange questions for pharmaceutical executives to ask themselves. However, such questions can be relevant and may provide powerful insights to help managers score points in the industry. Omit the sports terms, and they become questions pharmaceutical executives frequently ask themselves. Are the basic researchers in my organization being managed in a manner most compatible with their capabilities and their goals for new-drug discovery? Do my drug-development teams have the staff and stability to foster the cooperation necessary for effective NDA development?

There is fun and value in stepping back and observing the game. But first, here are some tools to help you determine what game is being played and what game is most appropriate for each phase of the R&D process.

HOME RUNS, TOUCHDOWNS, AND BASKETS

The three major team sports in the United States — baseball, football, and basketball — represent fundamentally different organizational models.

Baseball is the most individualistic of the three sports. The basic confrontation is one-on-one: pitcher versus batter. The teamwork required tends to involve the

interaction of relatively few players at a time; for example, pitcher with catcher, batter with baserunners, and infielder with infielder. Actually, teamwork is more a matter of individual execution than player interaction.

Indeed, baseball is made to order for the superstar. According to sportswriter Jim Murray of the *Los Angeles Times*, "Baseball is not precisely a team sport. It is more a series of concerts by the artists." The baseball manager's primary game responsibility is to fill out the line-up card — determining who should play where and who should bat in what order. Coordination is achieved through the structure of the sport.

Football is the least individualistic of the three sports. The basic unit is the group or "platoon" — offense, defense, and special teams. A pro football player usually is assigned to just one of these specialties, and his role is very strictly specified. In effect, football plays are highly programmed routines that include everyone on the field.

In the words of George Allen, then head coach of the Washington Redskins and currently head coach of the USFL's Chicago Blitz, "A football team is a lot like a machine. It's made up of parts. . . . We try to improve and replace some of the parts every year." The football head coach's main game responsibility centers on coordination: He must devise an intricate game plan, practice it exhaustively, and then implement and amend it.

Basketball, like football, requires a high degree of teamwork. But it is teamwork of a different kind. A basketball game — especially at the professional level — is an emerging flow of plays; unlike football, basketball teams do not pause and regroup after each play. Basketball also is much less of a "role" sport than football: Every team member must be able to play offense, defense, and transition; they all dribble, pass, shoot, and go for rebounds. Moreover, every player interacts with every other player on the court. Because of a basketball team's fluid interaction and because of its small size, the basic unit is the team itself.

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This article is derived from a more analytical one by Keidel, "Baseball, Football and Basketball: Models for Business," forthcoming in *Organizational Dynamics*.



As a consequence of the preceding factors, the basketball coach cannot plan and rehearse as much as his football counterpart. The critical task facing the basketball coach is to help the players coordinate themselves out on the court. Once they have this ability, the coach's responsibility is to influence the tempo of a game by using strategies such as calling time-outs, making match-up changes, and resting key players.

KNOWING WHAT GAME TO PLAY

Similarly, executives in the pharmaceutical industry must play a different game at each state of the drug discovery and development process.

Basic Research. Initially, scientists work more or less independently, like baseball players. Medicinal chemists produce new molecules for biological testing; biochemists and pharmacologists develop evaluation methods for detecting potential new drugs; and pharmacy researchers devise new dosage forms and drug delivery methods. The product of all these efforts is an increased pool of knowledge about how to discover a drug. It is the sum of individual contributions — as in baseball.

Lead Development. Once a promising drug has been identified, things move in train, like a series of first downs in football. First, developmental chemists engineer an economical process to manufacture the drug in adequate supply for further testing. Then, the drug is sent to pharmacy researchers, who develop specific dosages, and to toxicologists, who test the drug's toxicity in animals. Next, after government approval

has been secured, clinical trials are performed. The new drug is evaluated in healthy humans for side effects and later in patients with the disease that the drug is intended to treat. The sequence is cumulative — as in football.

Submitting an NDA. Only after all these steps have been completed successfully — and the company is convinced that the drug is safe, effective, and salable — does the preparation of an NDA begin. In this stage, relevant groups of specialists (physicians, statisticians, pharmacists, pharmacologists, toxicologists, and chemists) work together reciprocally — like a basketball team — to win FDA approval of their NDA.

GETTING ON THE R&D SCOREBOARD

What implications do the sports metaphors have for pharmaceutical executives? They can help managers answer those crucial questions posed at the beginning of this article. And that can make the difference between getting the winning point on the R&D scoreboard and losing the game.

Regarding the first question — Are my medicinal chemists playing baseball but being managed like a football team? — the medicinal chemistry department is charged with the design and synthesis of new drugs. The senior scientists pursue the paths of research that they believe will be the most productive and will lead to the development of useful compounds. They are like the batter in baseball trying to hit a home run. Imagine having an R&D dream team of high-percentage power hitters. In baseball, as the manager of a low-scoring team, you could acquire new sluggers by trade or

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THREE WAYS TO PLAY

Sports Model	The Basic Unit	Control of the Players	Degree of Cooperation Among Players	The Manager/Coach's Responsibility
Baseball	Individual	They control themselves individually within the design of the sport	A little	Fill out and revise the line-up card
Football	Group	The coach controls them	A moderate amount	Prepare and execute the game plan
Basketball	Team	They control themselves as a team	A lot	Influence the game's flow

develop them from within — relying on your farm system and the college draft.

But what happens in medicinal chemistry? Certainly, the college draft is used for employee recruitment. But what about trades? Turnover among medicinal chemists is usually low. Although some superstars remain in the lineup for a long time, many are developed as managers and lost as basic researchers. In addition, some potential superstars don't reach their expected performance levels in a given company, yet remain with the company as researchers for many years. Therefore, trading for new superstars seems to be infrequent.

The prudent manager could take a lesson from the baseball model and recruit experienced superstars from other companies. Because medicinal chemists work independently, turnover in this part of your organization need not be a concern. Like the baseball coach, you should hone the scientific skills of each team member and reward them when they perform well. The principles of baseball also apply when deciding how much direction to give to the medicinal chemist. Remember that in baseball, a tight game plan is not crucial for success. Likewise, broadly controlling therapeutic areas is probably more important than controlling the scientist's approach to discovering a new drug.

In considering the second question — Are my NDA teams playing baseball instead of basketball? — keep in

mind that the preparation of an NDA is a tightly coupled, highly interactive process, as in basketball. The interpersonal as well as the technical skills of the individuals are important. If the team members are acting independently instead of interactively, they are playing baseball, and the NDA effort is not likely to be effective. Therefore, the team leader should be good at coaching individual members in how to coordinate themselves.

And, because cooperation is important, low turnover is desirable. Developing a stable team from within the organization should be more effective than trying to acquire superstars from other companies. Ironically, turnover is high among the clinicians, statisticians, regulatory personnel, and various department managers who frequently comprise NDA teams. This can create problems because the successful filing of an NDA requires a strong team effort.

Every part of the pharmaceutical R&D process may not have such a precise sports analogue. Nonetheless, thinking about business situations in terms of sports models can be fun and insightful. Peter Drucker has advocated that executives ask two important questions regarding their companies: What is our business? and What should our business be? Perhaps two additional questions should be asked: What game are we playing? and What game should we be playing? **FE**