Industry perspective on optimizing the predictive value of preclinical studies

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What industry wants

1. Unbiased and reproducible estimates of effect size
2. Appropriate and reasonable precision of these estimates

These often cannot be obtained from the published literature

How industry does it

Design & planning

↓

Execution

↓

Analysis

Design and planning

- **Optimization**
  - Evaluating different platforms/technologies
  - Determining which technical factors affect the outcome variable (e.g. technician, location on plate, batch, machine, day, order of processing, litter, cage)
- **Validation**
  - Sensitivity, specificity, limits of detection, linearity, etc.
- **Power/sample size calculation**

Execution

- **Randomization and blocking**
  - Minimize bias (protect yourself from possible technical artefacts)
  - Maximize precision (get the most information out of the experiment)
- **Experienced staff**
  - Permanent technical staff
- **Standardization**
  - Everyone does it the same
- **Automation**

Analysis

- **Work flows**
  - Standardization, automation, reproducibility, audit trails
- **Statistical support available**

Finally...

- Replication
- Replication

There are very few ways to conduct any experiment well (low bias and variance), but an infinite number of bad ways. Without appropriate training (or support) in experimental design, experiments will likely be of little value.