

What is iTrans and how does it work?

iTrans is a powerful web application that provides a panel of information summarizing the content of journal publications within a defined analysis group (where an analysis group can consist of a single article or a very large group of articles). Articles are assigned scores in three categories: Human, Animal, and Molecular/Cellular, based on the number of MeSH terms they have that fall into each of these categories. The data produced by *iTrans* can be downloaded as a customized report from the dashboard and could be used to understand the content of articles within an analysis group. An example application for *iTrans* might be to compare how close to human clinical applications two portfolios of articles are.

The following data are produced using *iTrans*:

- Total number of articles within the analysis group (Total Pubs)
- Mean number of articles published per year (Pubs/Year)
- Average “Human” score for articles in the analysis group
- Average “Animal” score for articles in the analysis group
- Average “Molecular/Cellular” score for articles in the analysis group
- Average “Translational Potential” score for articles in the analysis group (a machine learning-derived estimate of the likelihood that an article will be directly cited by a clinical article)
- The Number of articles within the analysis group that has already been cited by a clinical article

Translational Potential is a new measure developed within the Office of Portfolio Analysis (OPA) that uses the scientific community’s reaction to an article to estimate the likelihood that the knowledge from that paper will be used and cited in later clinical articles. It is generated by training a machine learning model with information describing the Human, Animal, and Molecular/Cellular scores of the article in question as well as those of the later articles that cite the paper.

The machine learning system learns, based on whether the training articles were eventually cited by a clinical article, which features serve as early signatures that a paper is moving toward clinical applications. It then uses these signatures of bench-to-bedside translation to make predictions for each article in PubMed published since 1995. For example, 25% of the papers that have a Translational Potential of 0.25 are cited by clinical articles on average. Likewise, 95% of papers that have a Translational Potential of 0.95 are cited by clinical articles on average. *iTrans* is limited to analyzing only articles that appear in PubMed; users upload the PubMed IDs for articles within the analysis group of interest (articles identified from either SPIRES or PubMed searches).