

MetaBase

Comprehensive manually curated database of mammalian systems biology data

MetaBase is the manually curated knowledge base behind *Clarivate Analytics* Systems Biology Solutions. Specifically, *MetaBase* is the knowledge database that powers *MetaCore*, an integrated software suite for functional analysis of next-generation sequencing, gene expression, CNV, metabolic, proteomics, microRNA, and screening data.

Delivered as an Oracle database with more than 200 tables, *MetaBase* is arguably the most comprehensive manually curated database of mammalian biology data available today in both industry and academia.

Clarivate Analytics offers direct SQL-level and/or BEL format access to *MetaBase* tables and schema to life sciences companies for pursuits in genomics, metabolomics, proteomics, and more.

Customers can integrate *MetaBase* content with their internal systems, edit the interaction information, and utilize the data for developing in-house data-mining solutions. *MetaBase* can be used as a central repository for experimental data, integrated with in-house databases, and distributed enterprise-wide within the organization. *MetaBase* is installed behind the customer's firewall as a stand-alone server. Optional cloud hosting by *Clarivate Analytics* is also available.

Use MetaBase for

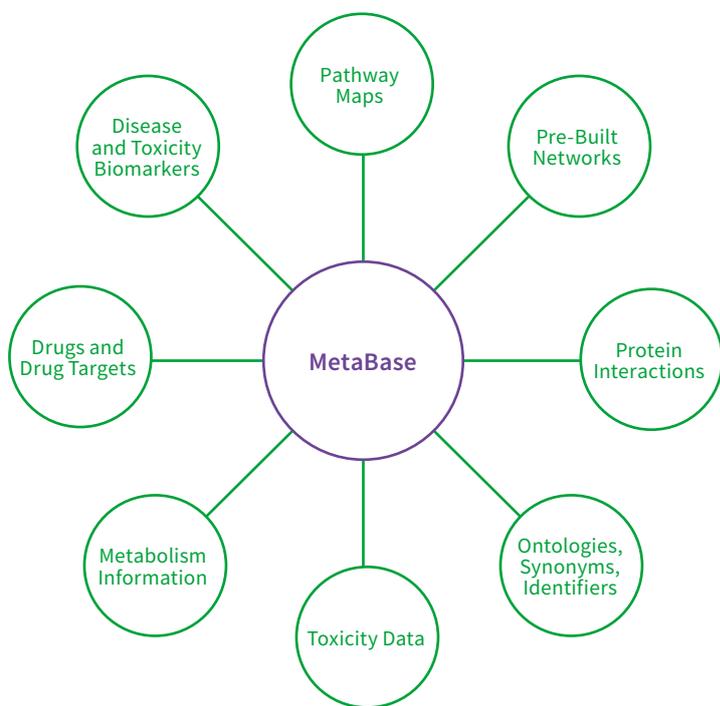
- Biomarker discovery
- Target identification
- Drug resistance and sensitivity analysis
- Drug repositioning
- Drug combination discovery
- Pharmacology and toxicity assessment
- Disease/treatment mechanism reconstruction
- Patient stratification

Use MetaBase with

- Complementary library of analytical algorithms and SQL scripts
- Optional advanced algorithms from *Clarivate Analytics* CBDD

Who can benefit

- Bioinformaticians
- Biological researchers
- Discovery biologists
- Biomarker groups
- Translational researchers
- Heads of therapy areas
- Clinical researchers
- Cheminformaticians
- Toxicity assessment groups
- Indication expansion/repositioning researchers
- New biological/chemical entity researchers

Figure 1: *MetaBase* content

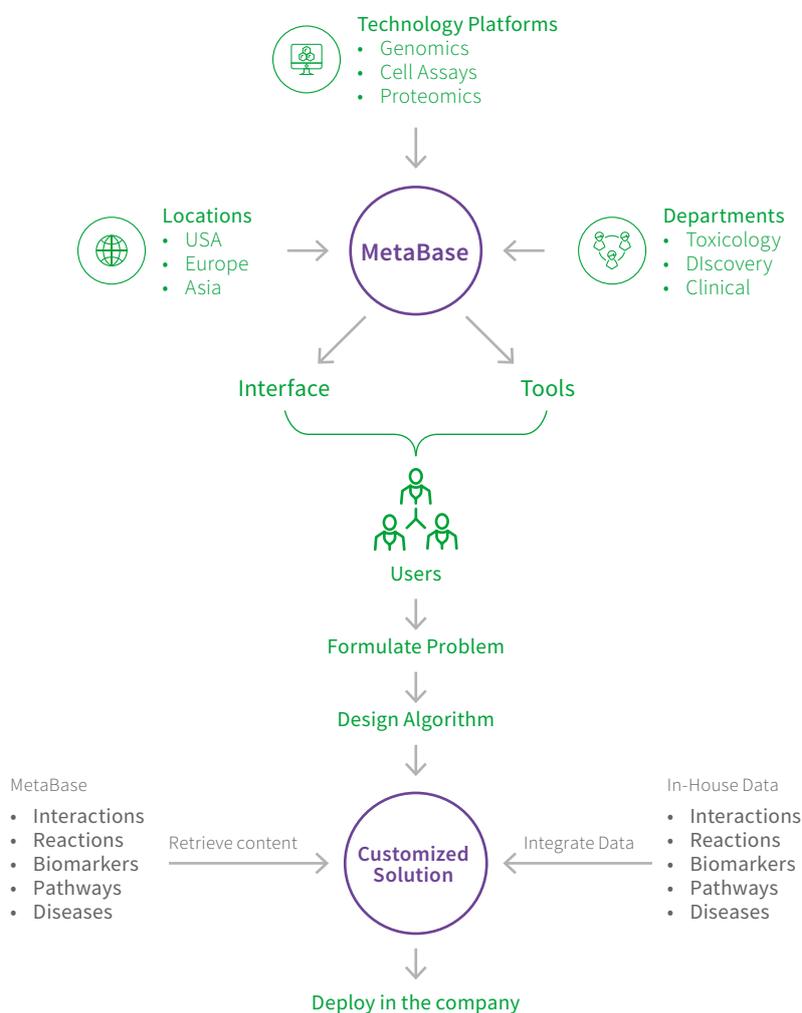
Hardware requirements

- Server (for in-house installations)
- 2 or more XEON CPUs with 8GB of RAM recommended
- 3.2 GHz CPU or higher recommended
- Minimum of 120GB of storage recommended
- Oracle 10.2 DMBS standard or enterprise and client tools

Table 1: *MetaBase* versus off-the-shelf pathways analysis tools

Off-the-shelf pathway analysis products	Custom solutions using <i>MetaBase</i>
Access to data is limited by vendor-designed interface	Unlimited SQL-level/BEL format access to all data fields and tables
Non-customizable tools and algorithms	Allows users to design custom solutions for data analysis
Product evolution controlled by the vendor	Solutions can evolve as projects and priorities change
Integration with some third-party software tools	Utilize <i>MetaBase</i> database architecture to integrate all in-house resources
Same for all customers — no competitive advantage	Provides competitive advantage by tailoring tools to your projects

Figure 2: *MetaBase* value in improving R&D productivity and gaining competitive advantage



Content highlights

- More than 1,600 interactive canonical pathway maps capturing nearly 200,000 human, mouse, and rat fine metabolic and signaling canonical pathways depicted based on consensus literature findings
- More than one million interactions of proteins with other proteins, DNA, RNA, metabolites, and xenobiotics
- Thousands of putative disease biomarkers
- Over 750,000 compounds with targets and bioactivity information
- More than 30,000 metabolic reactions
- Over 8,900 drugs
- Over 5,300 endogenous metabolites
- Millions of synonyms resolved for genes, proteins, and compounds
- Protein complexes and protein families resolved in human, mouse, and rat

Metabase: a small investment with a potentially big return

Understanding the science behind your research has multiple commercial benefits. With *Clarivate Analytics* Systems Biology Solutions, you maximize your chances for success and reduce your risk by using the best quality information available. Additionally, *Clarivate Analytics* Systems Biology Solutions can provide an increase in scientific understanding and result in increased productivity, cost savings, and risk reduction.

Save time with more powerful analytics

“Something that I do with *MetaCore* in one afternoon now would have taken a week before.”

– Dr. Charles Lecellier, Principal Investigator, IGMM

“Within a couple of hours, we can now identify targets that we previously hadn’t considered.”

– A computational drug development team in a top five pharma company

“It would have taken up to a year previously to make a decision, but we have been able to make decisions now in a matter of months.”

– A research scientist in a leading medical technology company

According to Payscale.com, a research scientist earns an average salary of \$76,601 per year. If that scientist takes one afternoon rather than a week to integrate and understand their data, and if this task is done weekly, this could provide a potential annual savings of up to the equivalent salaries for 10 research scientists (\$766,010).

Make the right decisions with high-quality data

Making fast decisions is not enough – they must also be the right decisions. The average drug takes up to 14 years to reach full market approval,¹ and there is increasing pressure on researchers to publish research early to secure further rounds of funding. If decisions are made on faulty data, a significant amount of wasted time, effort, and money can result.

Content in *Clarivate Analytics* Systems Biology Solutions is manually curated by scientists (Ph.D.- and M.D.-level). Independent studies have shown that the quality and completeness of the content in our solutions is significantly higher than any other solution studied – both commercial and public. In a 2011 study by Shmelkov et al. from the New York School of Medicine, *MetaCore* was found to have significantly higher levels of correct prediction of gold standard transcription factor targets when compared to other commercial and public databases (*MetaCore* 84% vs. second place 36%).²

Increase your chances for clinical success

An increased knowledge of the biology of your target and disease has a significant positive effect on clinical success. Recently, AstraZeneca introduced their “five Rs” for success.³ As part of the analysis, they found that 40% of clinical failures due to efficacy had no target disease linkage established and that 82% of projects with efficacy biomarkers succeeded.

Their in-depth analysis of their pipeline successes and failures showed a clear correlation between an understanding of basic target and disease biology on project success: “Projects that showed greater confidence in target validation, genetic target linkage to disease, or a stronger understanding of the role of the target in the disease etiology were less likely to fail owing to lack of efficacy.”

Pfizer also found that 43% of their failures due to efficacy had not had their mechanisms sufficiently

tested. Understanding the mechanisms and biology behind your research is a key indicator for success.⁴ Good understanding appears to correlate with good chances of success.

Clarivate Analytics Systems Biology Solutions allow an increase in scientific understanding and facilitate a significant opportunity to increase productivity, save money, and reduce risk.

References

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3. Cook, David; Brown, Darg; Alexander, Robert; March, Ruth; Morgan, Paul; Satterthwaite, Gemma; and Pangalos, Menelas N. 2014. Lessons learned from the fate of AstraZeneca’s drug pipeline: A five-dimensional framework. *Nature Reviews: Drug Discovery* 13: 419–431.
4. Nelson, Matthew R.; Johnson, Toby; Warren, Liling; Hughes, Arlene R.; Chisoe, Stephanie L.; Xu, Chun-Fang; and Waterworth, Dawn M. The genetics of drug efficacy: Opportunities and challenges. *Nature Reviews: Genetics* 17: 197–206.

Contact us to find out more about MetaBase or visit clarivate.com/products/life-sciences-professional-services/discovery+and+translational

To learn more, visit clarivate.com/products/metacore/

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