REUTERS/Wolfgang Rattay

Intellectual Property and Science

THOMSON REUTERS IP & SCIENCE: APOIO TOTAL À INOVAÇÃO CIENTÍFICA E TECNOLÓGICA

Antero Macedo, PhD
antero.macedo@thomsonreuters.com

THOMSON REUTERS

MARKET TRENDS

Big Data

THOMSON REUTERS

Trends in Biological Information Generation – How to Keep Updated?

13.149
Publications with
“EGFR” &
“Cancer” in
title/abstract*

~1 hour per paper
= 548 days
without sleep/rest!

EGFR

28.961
Publications with
“EGFR” in
title/abstract*

~1 hour per paper
= 1.206 days
without sleep/rest!

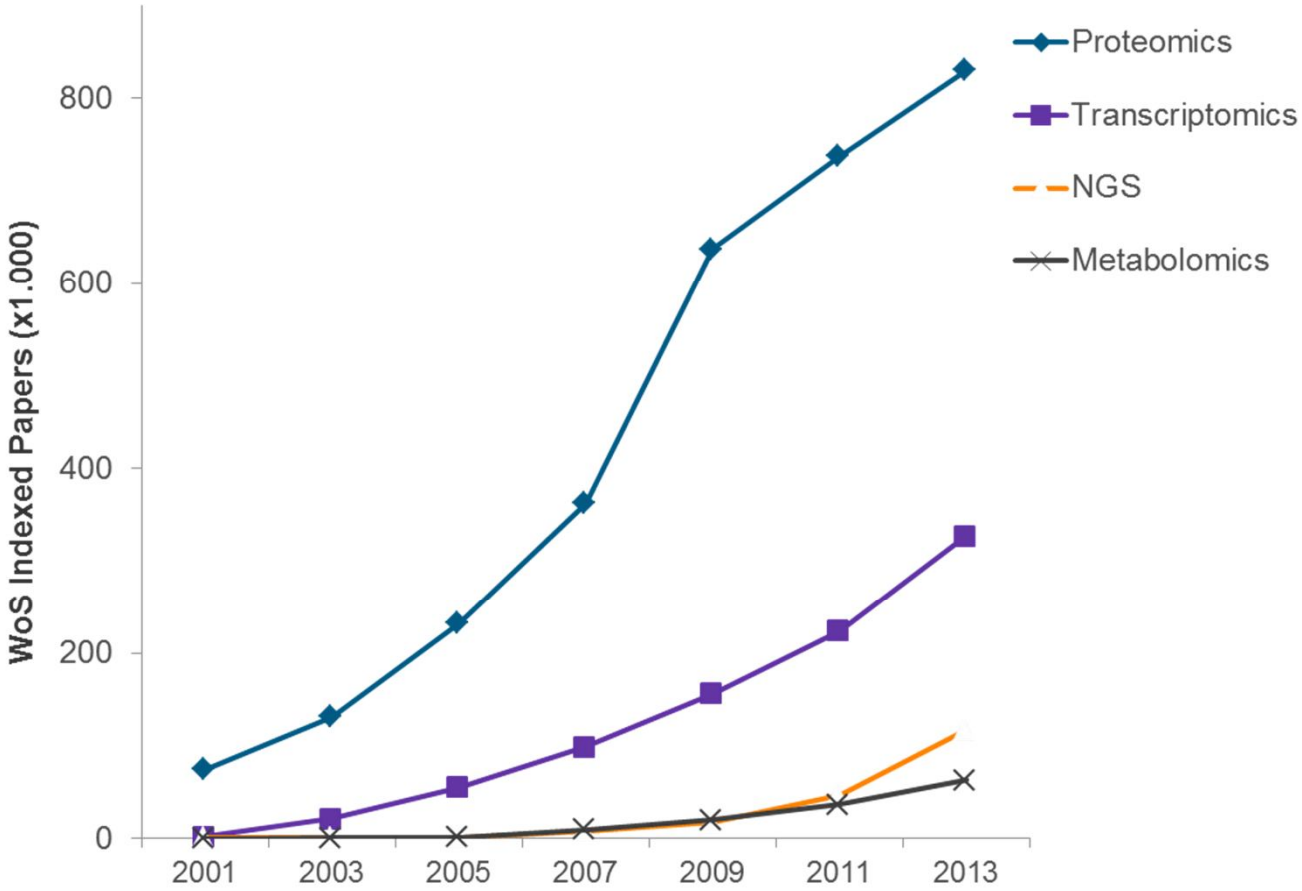
THOMSON REUTERS

*Searches performed 3rd of Set 2014 in Pubmed

Understanding molecular basis of disease = understanding whole GENOME & how it all interacts!

THOMSON REUTERS

Trends in Biological Information Generation – How to Keep Updated?



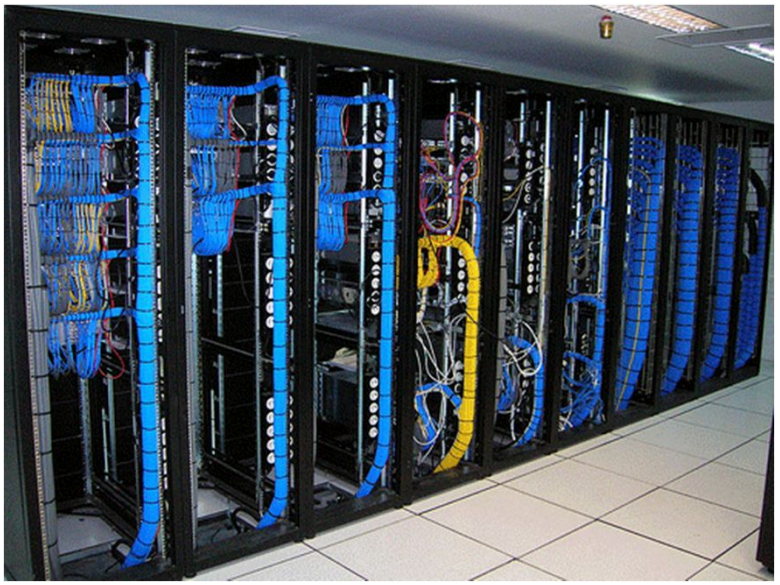
+229 Million
Scientific Papers in the last 100 years

THOMSON REUTERS

source: *TR Web of Sciences*

How to Structure Information?

VS



Unstructured

80%

Structured

20%

THOMSON REUTERS

THOMSON REUTERS

is the largest provider of intelligent information

to business and professional customers around the world. Generating a total revenue of $12.5 billion.

GLOBAL PRESENCE

We operate in 300 cities in over 100 countries.

PUBLICLY TRADED

We hold ourselves accountable through compliance with Sarbanes Oxley and a stringent code of business ethics.

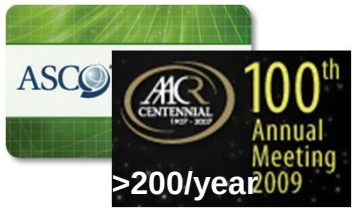
STRONG BRAND

Named 57th Best Global Brand of 100 as ranked by InterBrand.

Thomson Reuter Strategy for Information Management – Road to Knowledge

Patents

Journal papers



Conferences

Press Releases

Regulatory Information

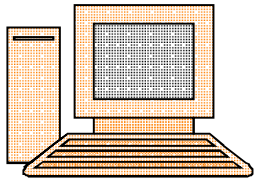
EDITORIAL TEAM:

- Hundreds of editors
- Most of them are PhD in Life Sciences-related disciplines
- More than 600 Specialyzed Consultants

Web Applications

MetaCore, MetaDrug,

Integrity, Geneseq…



Professional Services/Consultancy

THOMSON REUTERS

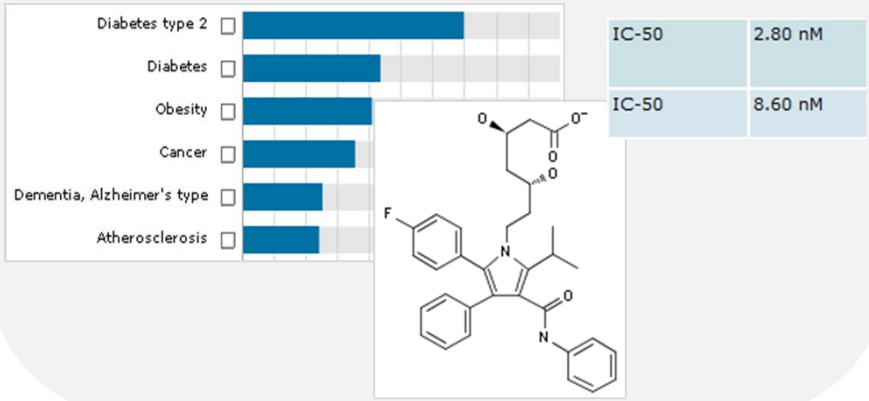
Thomson Reuters IP&Science: Full Support to Scientific Innovation

- How to make a comprehensive technological prospection to better position your research?
- Find the most influent authors on your field – define possible competitors and collaborators
- Find the most accepted cellular and animal models to your studies
- Discover the molecular mechanisms and main biomarkers related to the disease of your interest or your omics data
- Predict the therapeutic effect, toxic potential and mechanisms of action of your chemical compounds
- Explore what has been patented in your innovation area
- Define the most impactful journal to publish your data

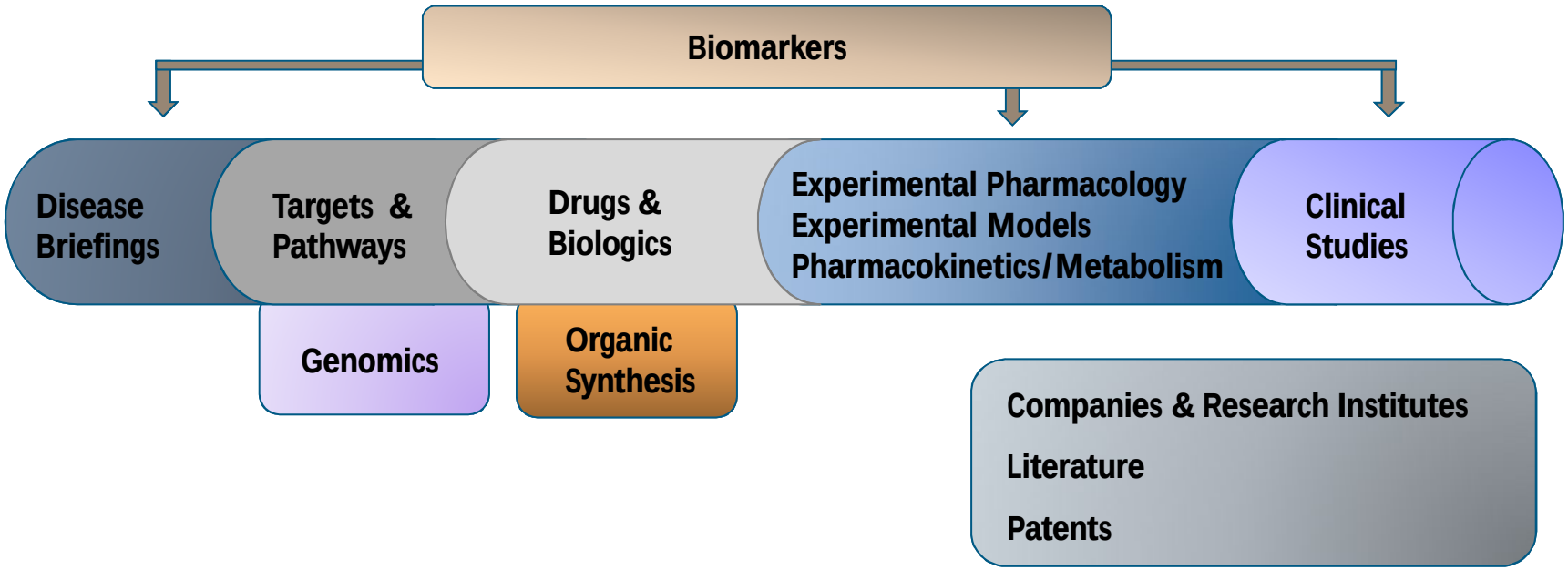
Scientific and Strategic Overview of Drug Research & Development

INTEGRITY

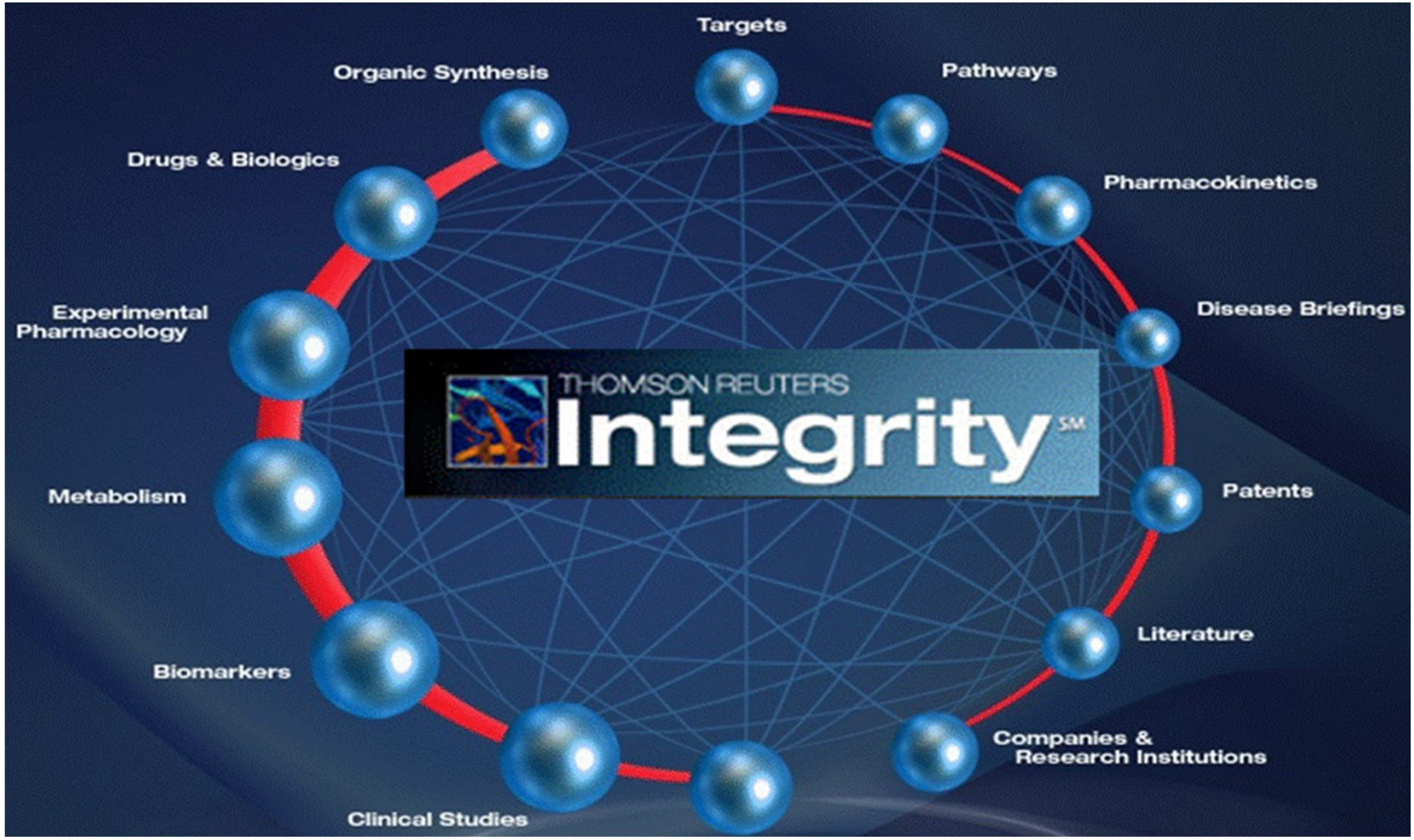
- Provides pharmaceutical pipeline competitor intelligence for the scientific researcher
- Prioritize research activities with evaluation of prior art and competitors
- Validate hypotheses with biomarker, drug, chemistry, pharmacology and PK content



Integrity: All the Most Relevant Data to Support Drug R&D Integrated in a Single Source



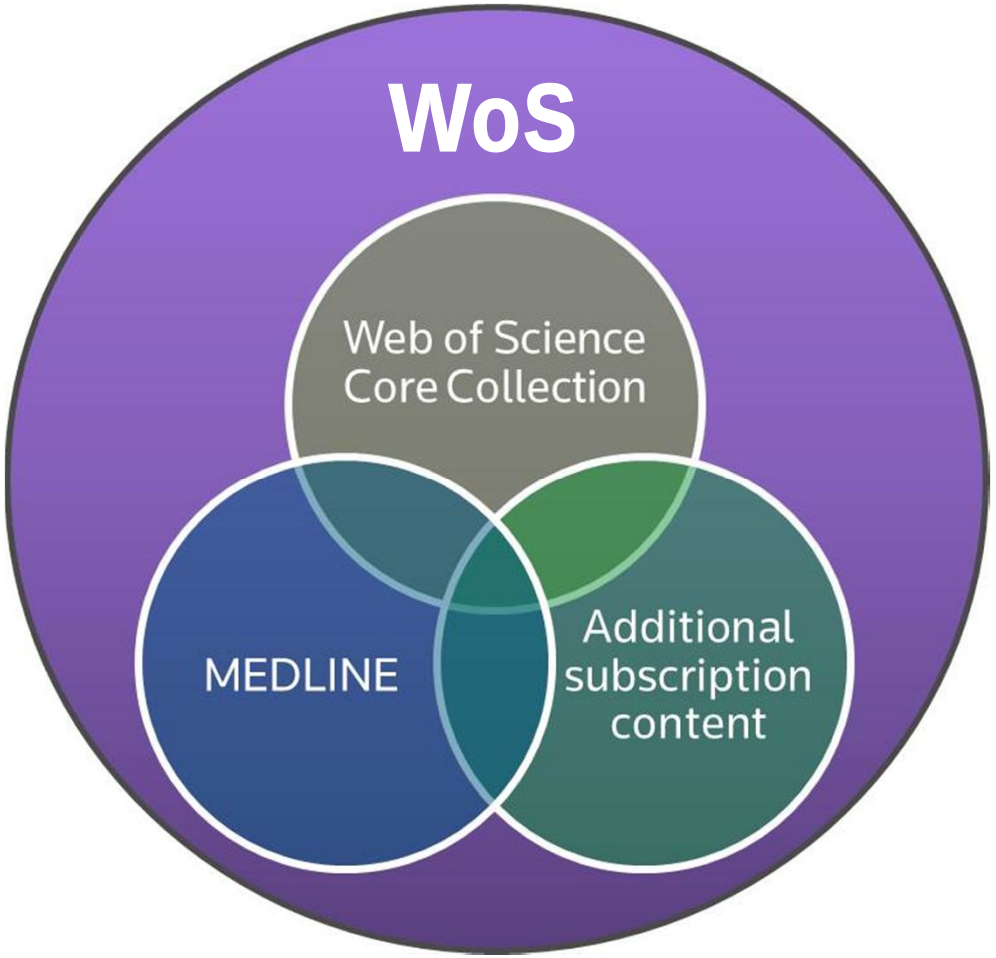
Integrity Concept



Thomson Reuters IP&Science: Full Support to Scientific Innovation

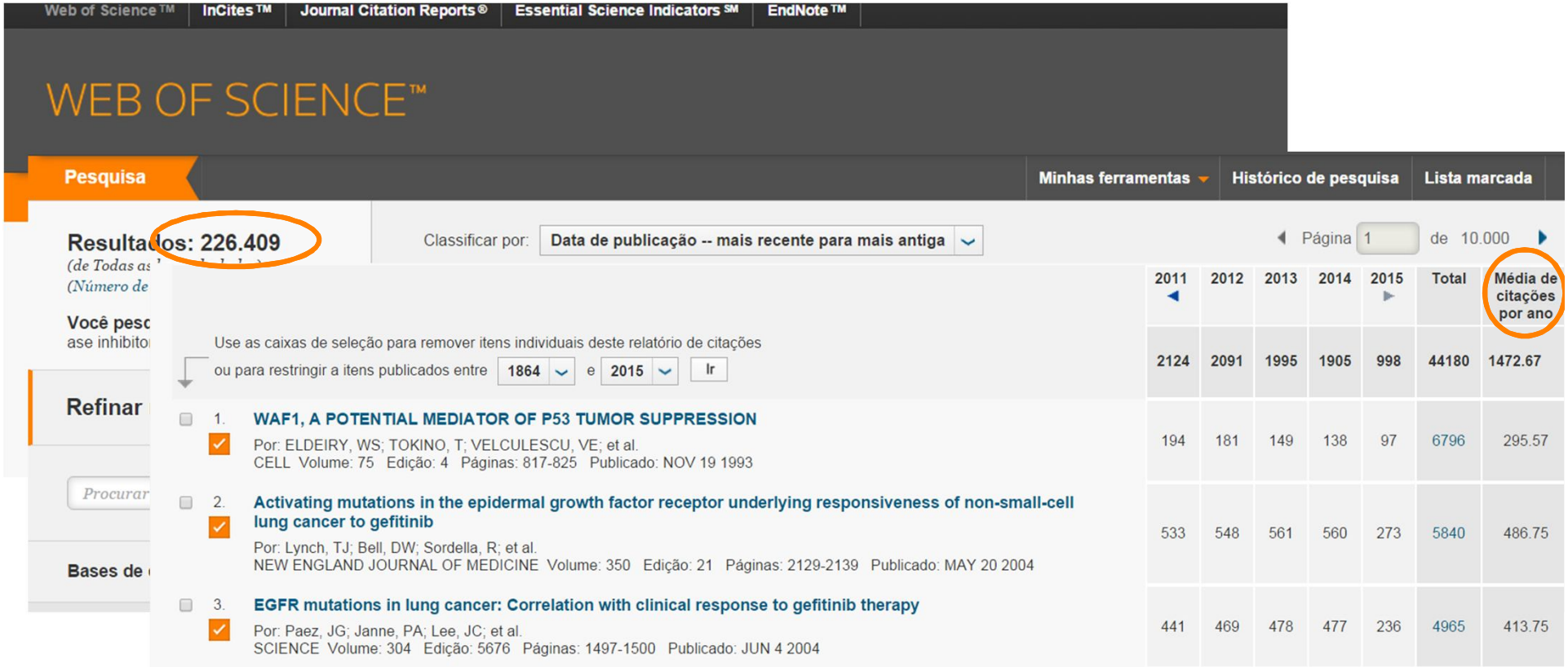
- How to make a comprehensive technological prospection to better position your research?
- Find the most influent authors on your field – define possible competitors and collaborators
- Find the most accepted cellular and animal models to your studies
- Discover the molecular mechanisms and main biomarkers related to the disease of your interest or your omics data
- Predict the therapeutic effect, toxic potential and mechanisms of action of your chemical compounds
- Explore what has been patented in your innovation area
- Define the most impactful journal to publish your data

The Web of Science platform



- The Web of Science platform includes papers from:
  1. Web of Science Core Collection indexed journals, books and conferences
  2. MEDLINE indexed journals
  3. Literature, datasets, and patents from 11 additional databases (by subscription)
- You can refine an All Databases search to see which papers are unique to one database, or to see which papers are covered in both the Core Collection and Medline.

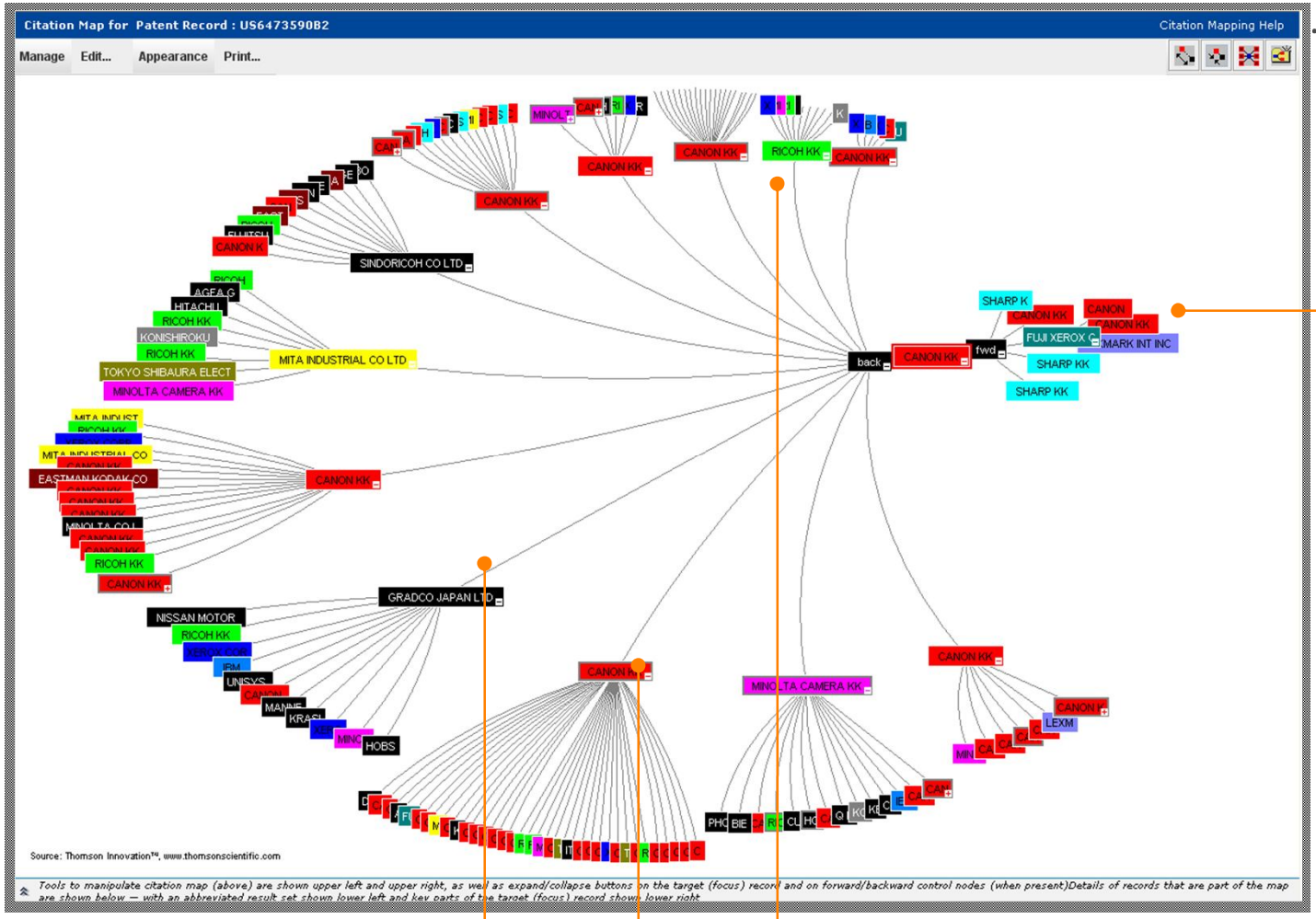
WoS: Track the Main Publications and Authors in Your Field



THOMSON REUTERS

.periodicos.

CITATION MAP ANALYSIS:
Easely Track the Development of a Concept



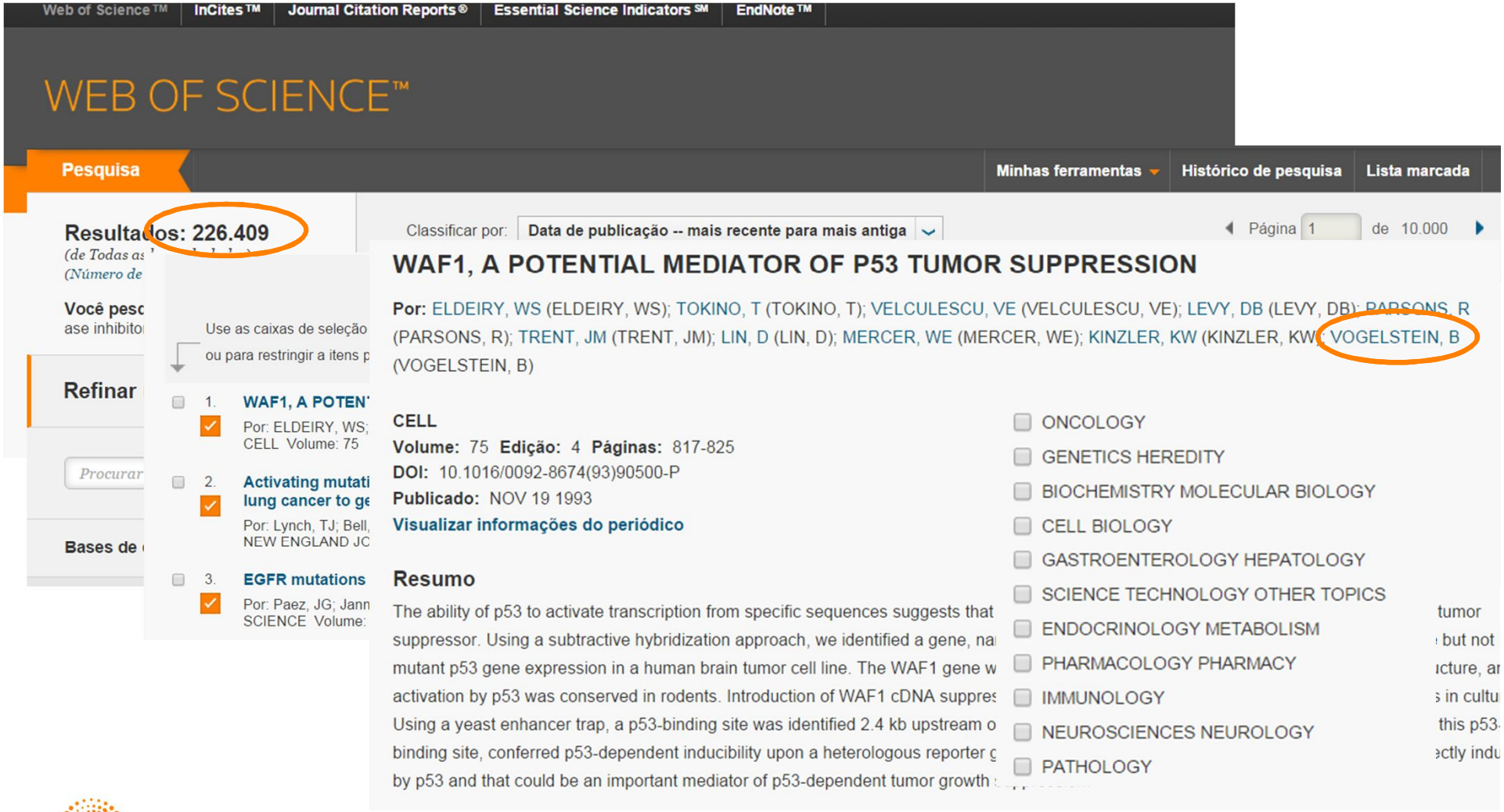
FUTURE: THE IMPACT OF AN IDEA ON THE SCIENTIFIC COMMUNITY

PAST: UNDERSTAND THE EVOLUTION OF AN INVENTION

THOMSON REUTERS

.periodicos.

WoS: Track the Main Publications and Authors in Your Field

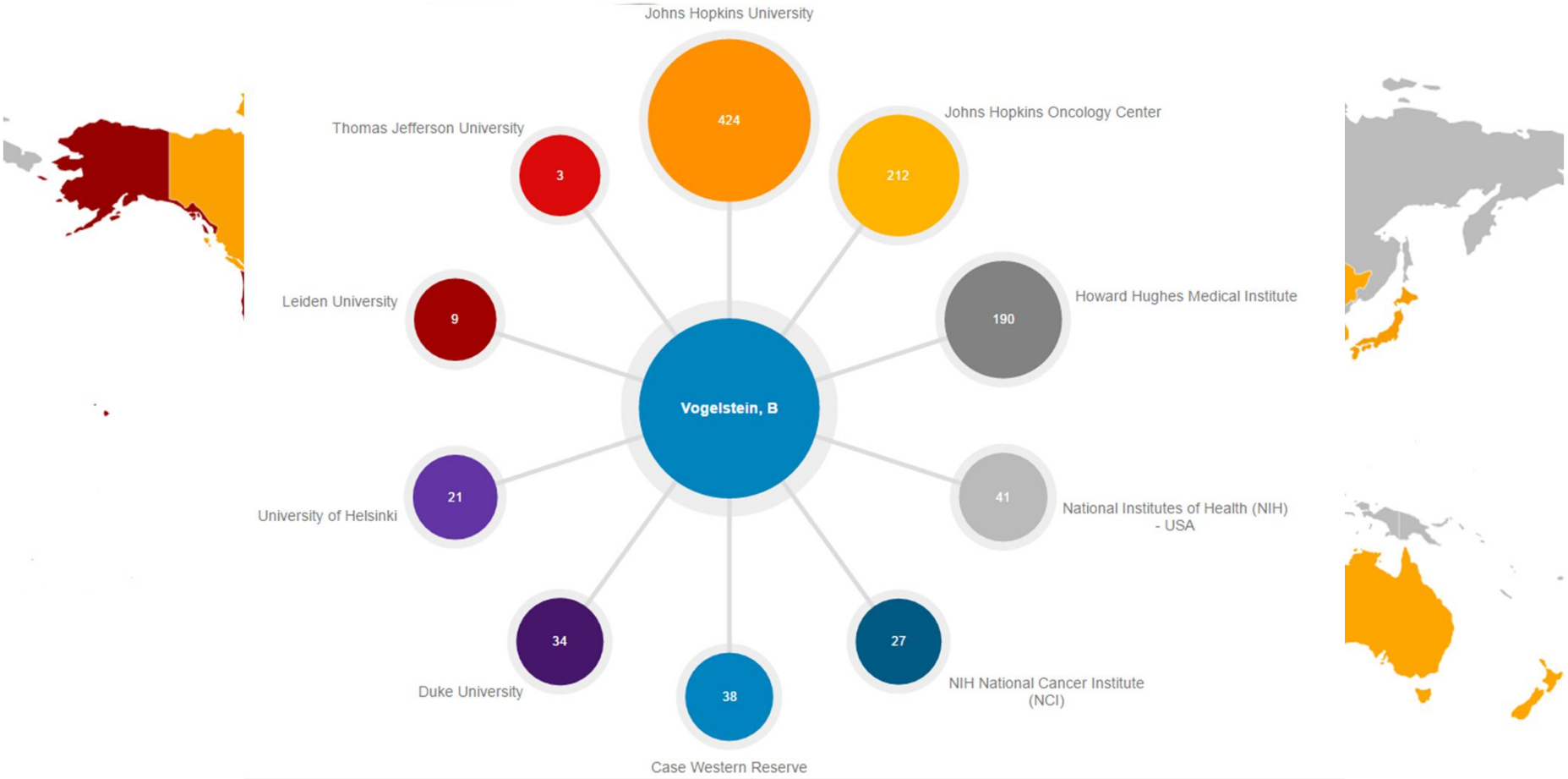


THOMSON REUTERS

.periodicos.

InCites: Map the Scientific Networks

Bert Vogelstein Collaborative Network



THOMSON REUTERS

Source: TR InCites

Thomson Innovation: Complete Coverage of Innovative Technologies

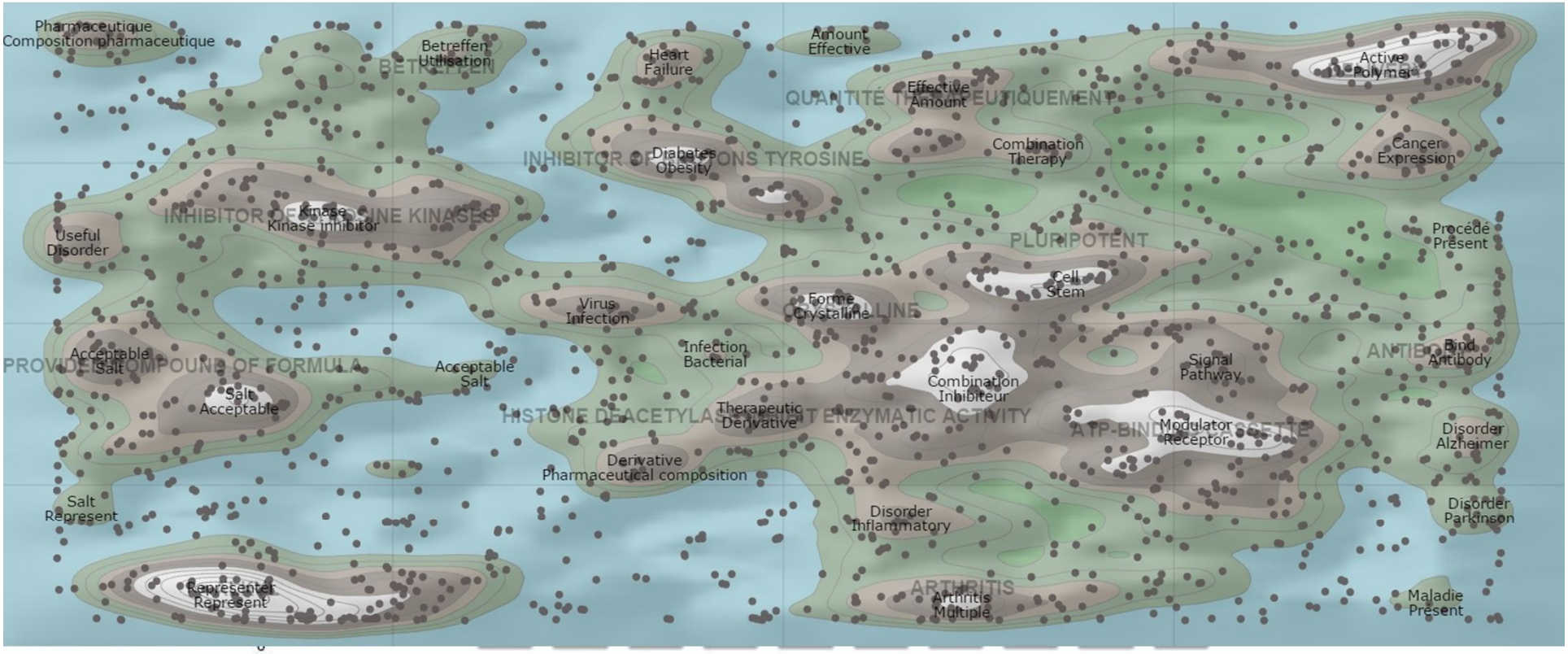
WORLD-CLASS CONTENT

=

THOMSON REUTERS

Themescape Map: Innovation Under a Different Perspective

Query: Kinase Inhibitors



Source: Thomson Innovation®, www.thomsoninnovation.com

THOMSON REUTERS

Source: Thomson Innovation

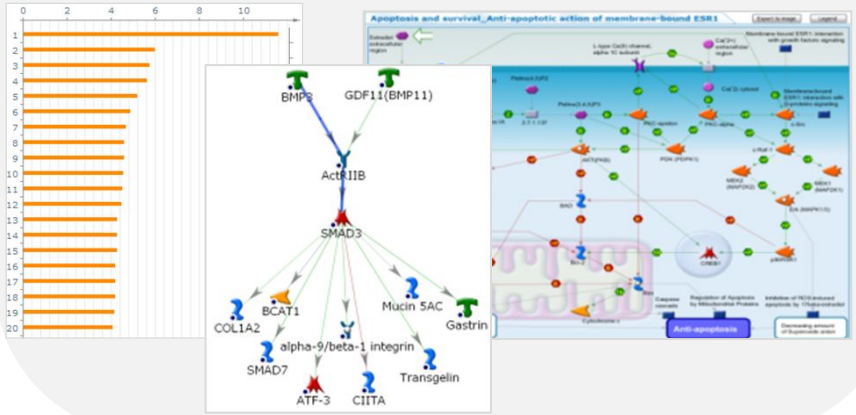
Thomson Reuters IP&Science: Full Support to Scientific Innovation

- How to make a comprehensive technological prospection to better position your research?
- Find the most influent authors on your field – define possible competitors and collaborators
- Find the most accepted cellular and animal models to your studies
- Discover the molecular mechanisms and main biomarkers related to the disease of your interest or your omics data
- Predict the therapeutic effect, toxic potential and mechanisms of action of your chemical compounds
- Explore what has been patented in your innovation area
- Define the most impactful journal to publish your data

LINKING BIOLOGICAL INSIGHTS WITH DRUG DISCOVERY KNOWLEDGE

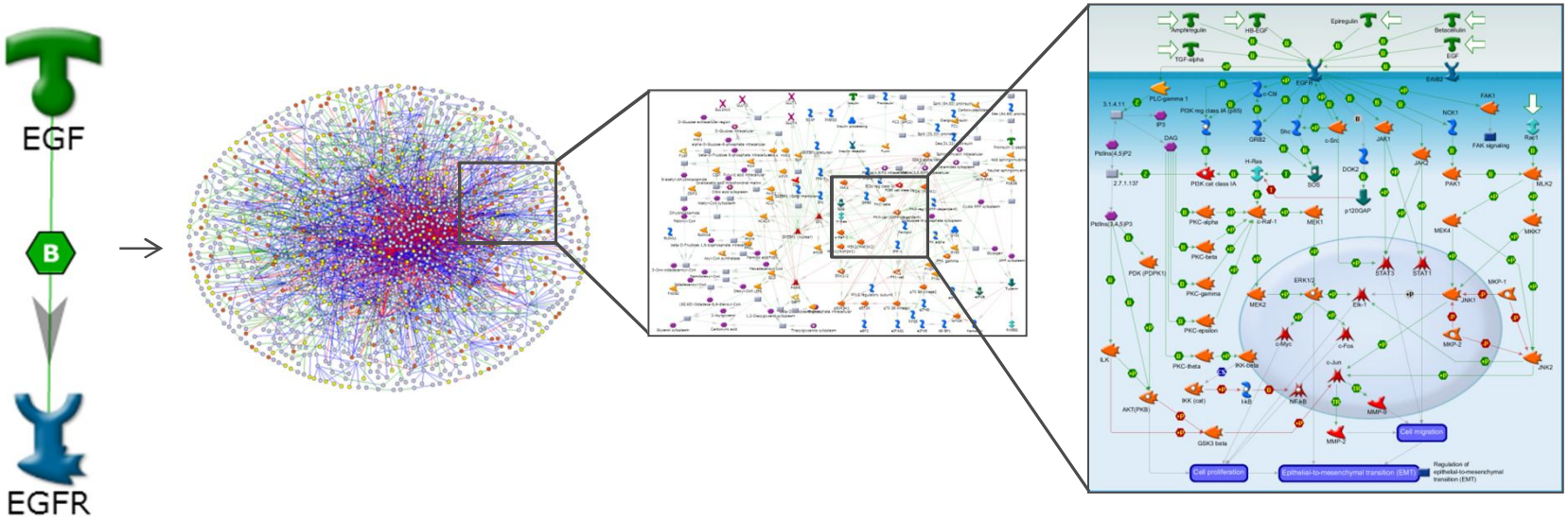
METACORE

- Provides molecular understanding of disease
- Analyze and understand experimental findings (Omics data) in the context of validated biological pathways.
- Generate hypotheses around novel targets, biomarkers, mechanisms of action



THOMSON REUTERS

HIERARCHY OF INFORMATION: FROM INTERACTIONS TO PATHWAYS



MOLECULAR INTERACTION

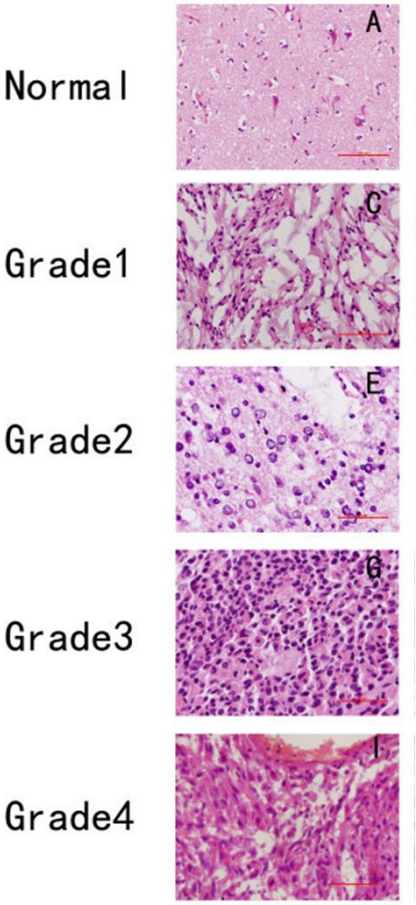
NETWORK:
~ 1,500,000 molecular interactions

PROCESS NETWORK
~1,103 process networks

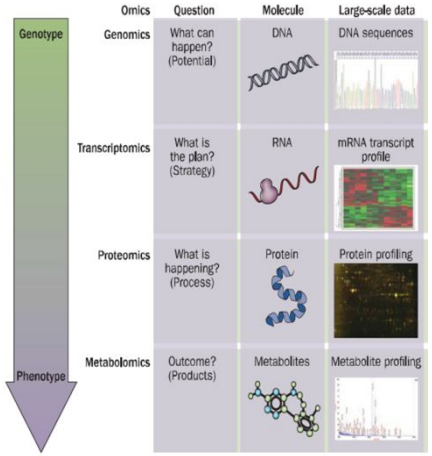
PATHWAY
~ 3,000 pathways

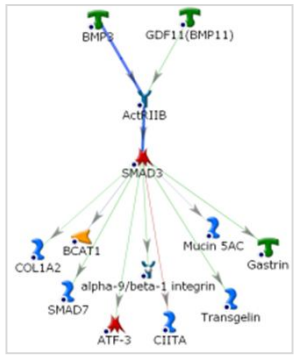
MetaCore – Molecular Understanding of Diseases

GBM-HE



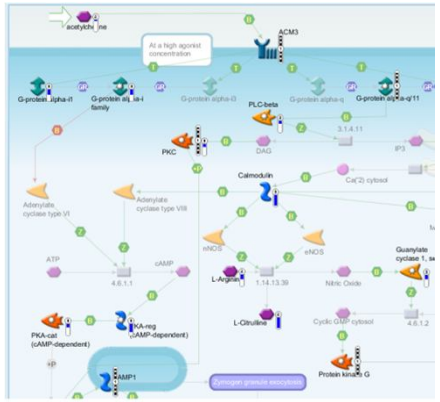
Wang M *et al* - BMC Cancer (2011)





Network Reconstruction

- **Mechanism of Action**
- **Onthology**
- **Biomarker Identification**
- **Therapeutical Targets**

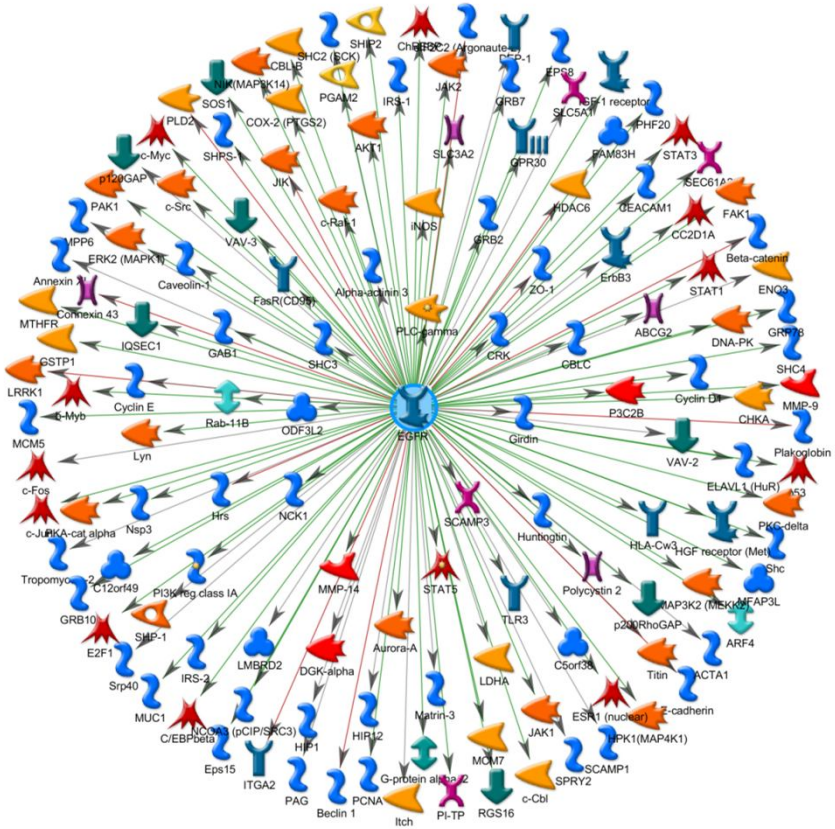


Functional Enrichment

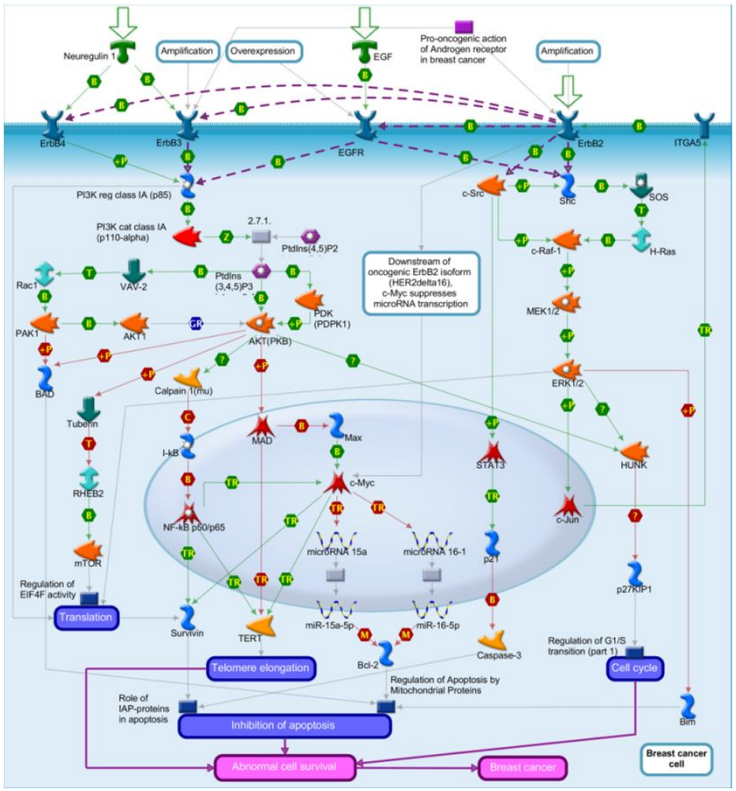
THOMSON REUTERS

What´s the Functional Consequences of Modulating my Favourite Target?

Downstream EGFR Effectors

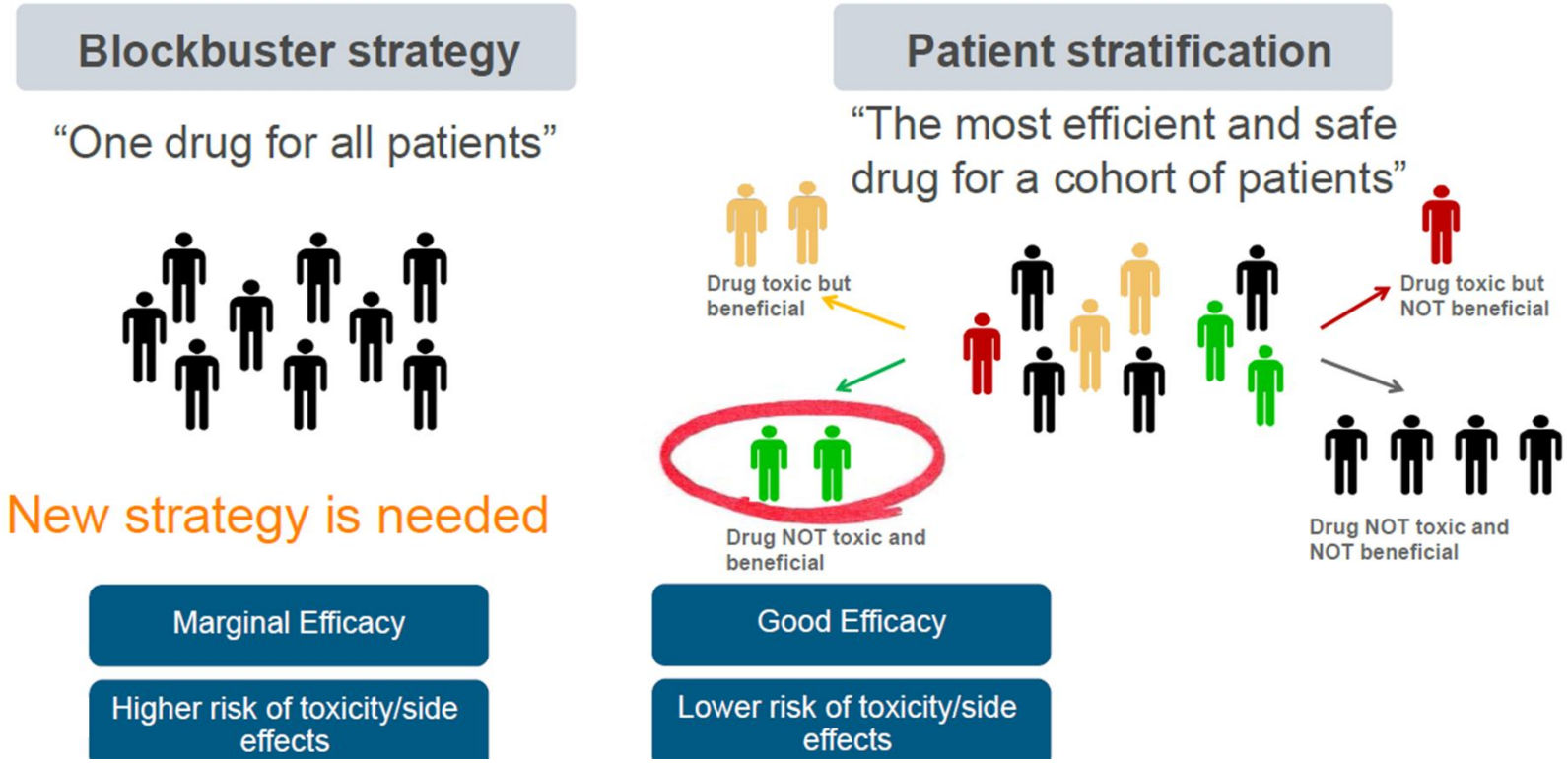


Functional Outcome



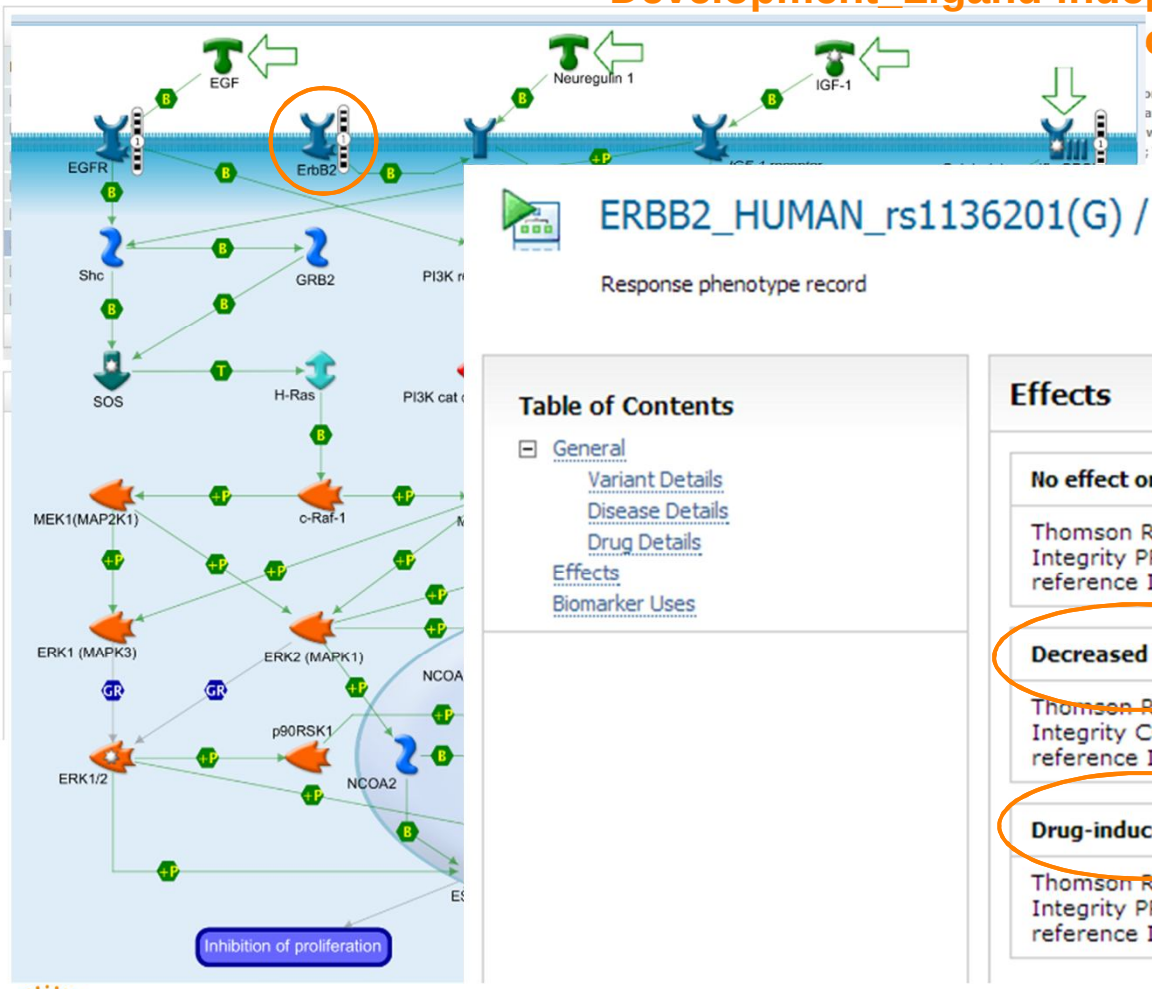
source: *TR MetaCore*

Patient Stratification – Beneficial Strategy for Drug Development and Use



Metacore NGS Analysis

Development_Ligand-independent activation of ESR1 and ESR2



ERBB2_HUMAN_rs1136201(G) / Breast Neoplasms / Trastuzumab

Response phenotype record

Table of Contents

- General
  - Variant Details
  - Disease Details
  - Drug Details
- Effects
- Biomarker Uses

Effects

No effect on response	
Thomson Reuters Integrity PP reference ID	2031131
Decreased response	
Thomson Reuters Integrity CO reference ID	1567560
Drug-induced toxicity	
Thomson Reuters Integrity PP reference ID	2031131

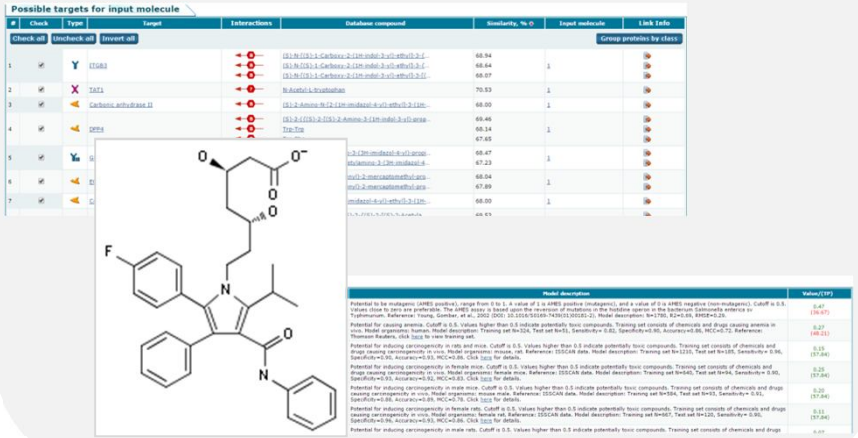
Thomson Reuters IP&Science: Full Support to Scientific Innovation

- How to make a comprehensive technological prospection to better position your research?
- Find the most influent authors on your field – define possible competitors and collaborators
- Find the most accepted cellular and animal models to your studies
- Discover the molecular mechanisms and main biomarkers related to the disease of your interest or your omics data
- Predict the therapeutic effect, toxic potential and mechanisms of action of your chemical compounds
- Explore what has been patented in your innovation area
- Define the most impactful journal to publish your data

LINKING BIOLOGICAL INSIGHTS WITH DRUG DISCOVERY KNOWLEDGE

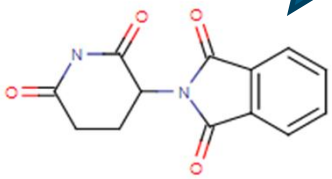
METADRUG

- Mechanism of action and drug target prediction for small molecules – QSAR models
- Highlights the main therapeutic groups that might be modulated by a given chemical compound
- Toxic effects prediction



THOMSON REUTERS

METADRUG - PREDICTING COMPOUND ACTIVITY FROM CHEMICAL STRUCTURES



MetaDrug™

QSAR MODELS

Disease and Toxic Predictions

Anti- Heart failure & Allergy

No Toxic Indications ☺

Structural similarity to other compounds

Predicted Targets

Enrichment Analysis

Pathway Maps

Export to image | Recalculate

#	Maps
1	Estradiol metabolism
2	Estradiol metabolism / Human version
3	Estradiol metabolism / Rodent version
4	Retinol metabolism / Rodent version
5	Retinol metabolism
6	Estrone metabolism
7	Estrone metabolism / Human version
8	PXR-mediated direct regulation of xenobiotic metabolizing enzymes / Rodent version
9	CAR-mediated direct regulation of xenobiotic metabolizing enzymes / Rodent version
10	CAR-mediated direct regulation of xenobiotic metabolizing enzymes / Human version
11	PXR-mediated direct regulation of xenobiotic metabolizing enzymes / Human version
25	[illegible]
26	Regulation of lipid metabolism FXR-dependent negative-feedback regulation of bile acids concentration
27	Fibroblast differentiation to myofibroblasts in asthmatic airways
28	Vitamin D2 (ergocalciferol) metabolism
29	IL-1 beta- and Endothelin-1-induced fibroblast/ myofibroblast migration and extracellular matrix production in asthmatic airways
30	Fibroblast/ myofibroblast proliferation in asthmatic airways
31	Trichloroethylene metabolism/Rodent version
32	Linoleic acid / Rodent version
33	MAPK-mediated proliferation of normal and asthmatic smooth muscle cells
34	2-Naphthylamine and 2-Nitronaphtalene metabolism
35	Hypertrophy of asthmatic airway smooth muscle cells

THOMSON REUTERS

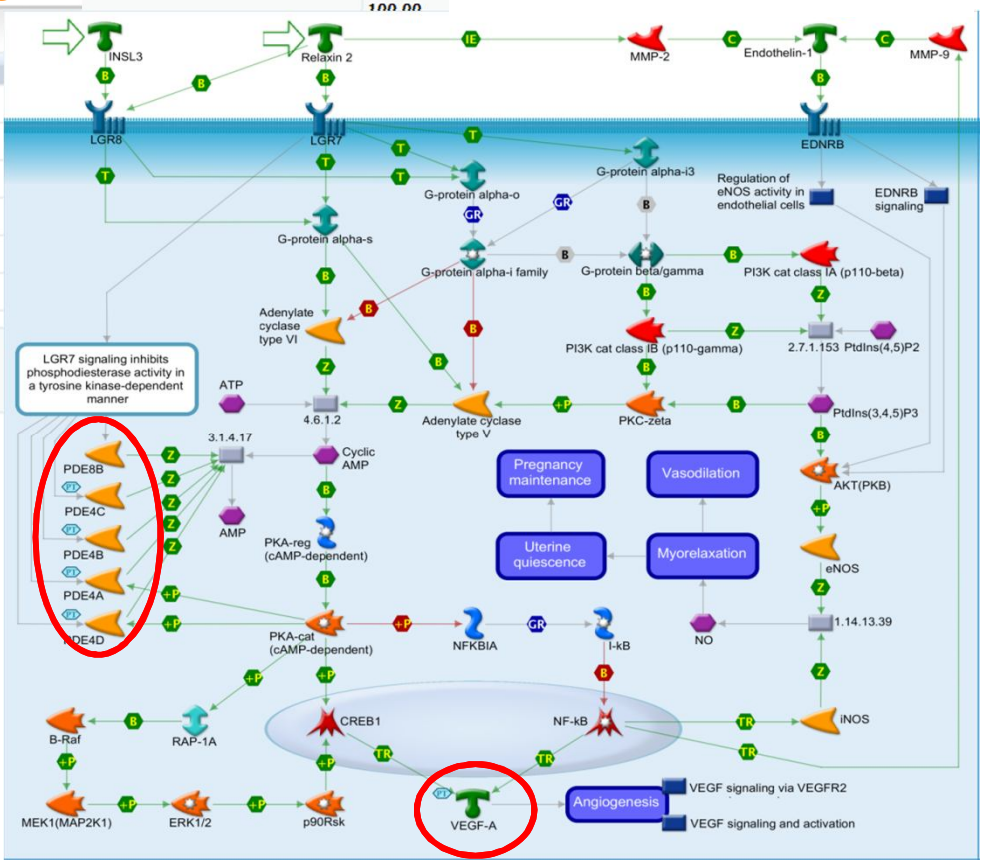
DRUG TARGETS/TOX/EFFECT PREDICTION

Possible targets for input molecule

#	Check	Type	Target	Interactions	Database compound	Similarity, %	Input molecule	Link Info
	Check all	Uncheck all	Invert all				Group proteins by class	
1	☑		AKT1		(S)-Thalidomide	100.00		
					Thalidomide	100.00		
						100.00		
2	Pathway Maps							
	Export to image	Recalculate						
	#	Maps						
3	1	Muscle contraction_Relaxin signaling pathway						
	2	Immune response_Inhibitory action of Lipoxins on pro-inflammatory TNF-alpha signaling						
4	3	Immune response_C3a signaling						
	4	Development_PEDF signaling						
5	5	Apoptosis and survival_Role of PKR in stress-induced apoptosis						
	6	Immune response_Role of PKR in stress-induced antiviral cell response						
6	☑		PERM		(S)-Thalidomide			
					(R)-Thalidomide			
					Thalidomide			
7	☑		Cereblon		Thalidomide			
					(R)-Thalidomide			
					(S)-Thalidomide			
					S-3APG			
					R-3APG			
					Pomalidomide			

Functional Enrichment

Mechanism of Action



THOMSON REUTERS

Thomson Reuters IP&Science: Full Support to Scientific Innovation

- How to make a comprehensive technological prospection to better position your research?
- Find the most influent authors on your field – define possible competitors and collaborators
- Find the most accepted cellular and animal models to your studies
- Discover the molecular mechanisms and main biomarkers related to the disease of your interest or your omics data
- Predict the therapeutic effect, toxic potential and mechanisms of action of your chemical compounds
- Explore what has been patented in your innovation area
- Define the most impactful journal to publish your data

THOMSON REUTERS

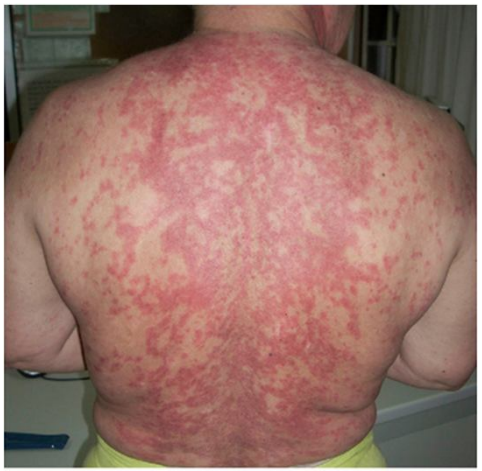
BIOTECH REVOLUTION

Bt-cry1Ac Gene

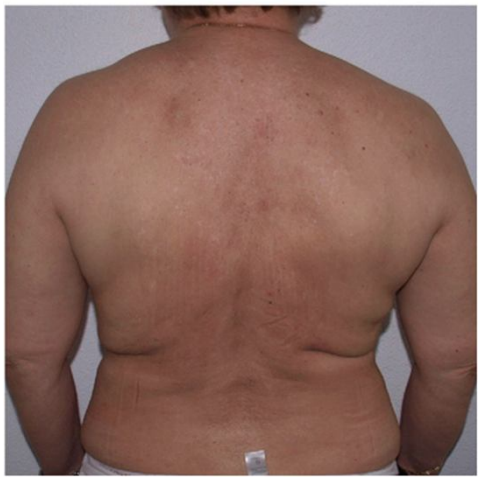
GFP Mice

Lupus:
Rituximab

\-



\+

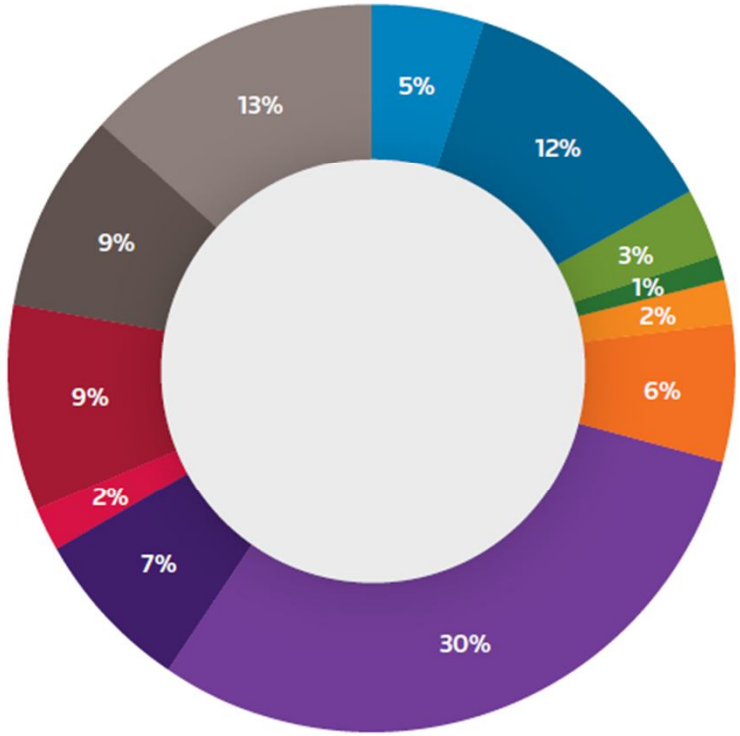


BIOTECH INNOVATION

Overall View of Innovation

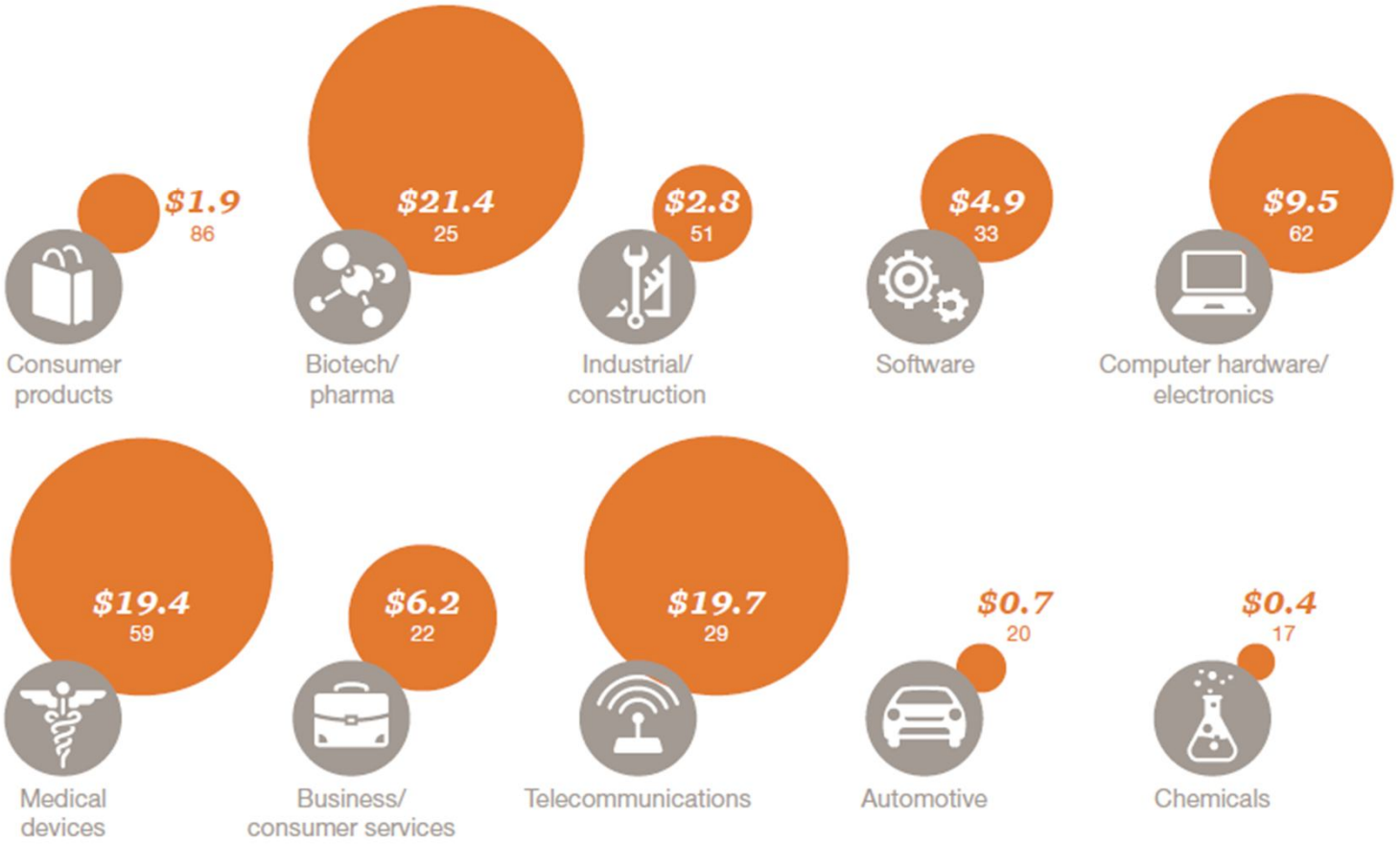
%	Industry	2014 Volume	2013 Volume	% Change
5%	Aerospace & Defense	62,162	63,080	-1%
12%	Automotive	153,872	152,221	1%
3%	Biotechnology	42,584	39,685	7%
1%	Cosmetics & Well Being	11,017	10,197	8%
2%	Food, Tobacco & Beverage Fermentation	26,333	21,758	21%
6%	Home Appliances	71,278	71,118	0%
30%	Information Technology	380,325	367,028	4%
7%	Medical Devices	93,462	99,290	-6%
2%	Oil & Gas	24,158	23,925	1%
9%	Pharmaceuticals	111,479	99,950	12%
9%	Semiconductors	112,625	119,099	-5%
13%	Telecommunications	161,739	153,153	6%

Source: Thomson Reuters Derwent World Patents Index



How to Avoid Damages Awards with the Biotech Industry?

Overall median damages award for all industries is about $5.4M



THOMSON REUTERS

Source: PCW 2015 – Patent litigation study

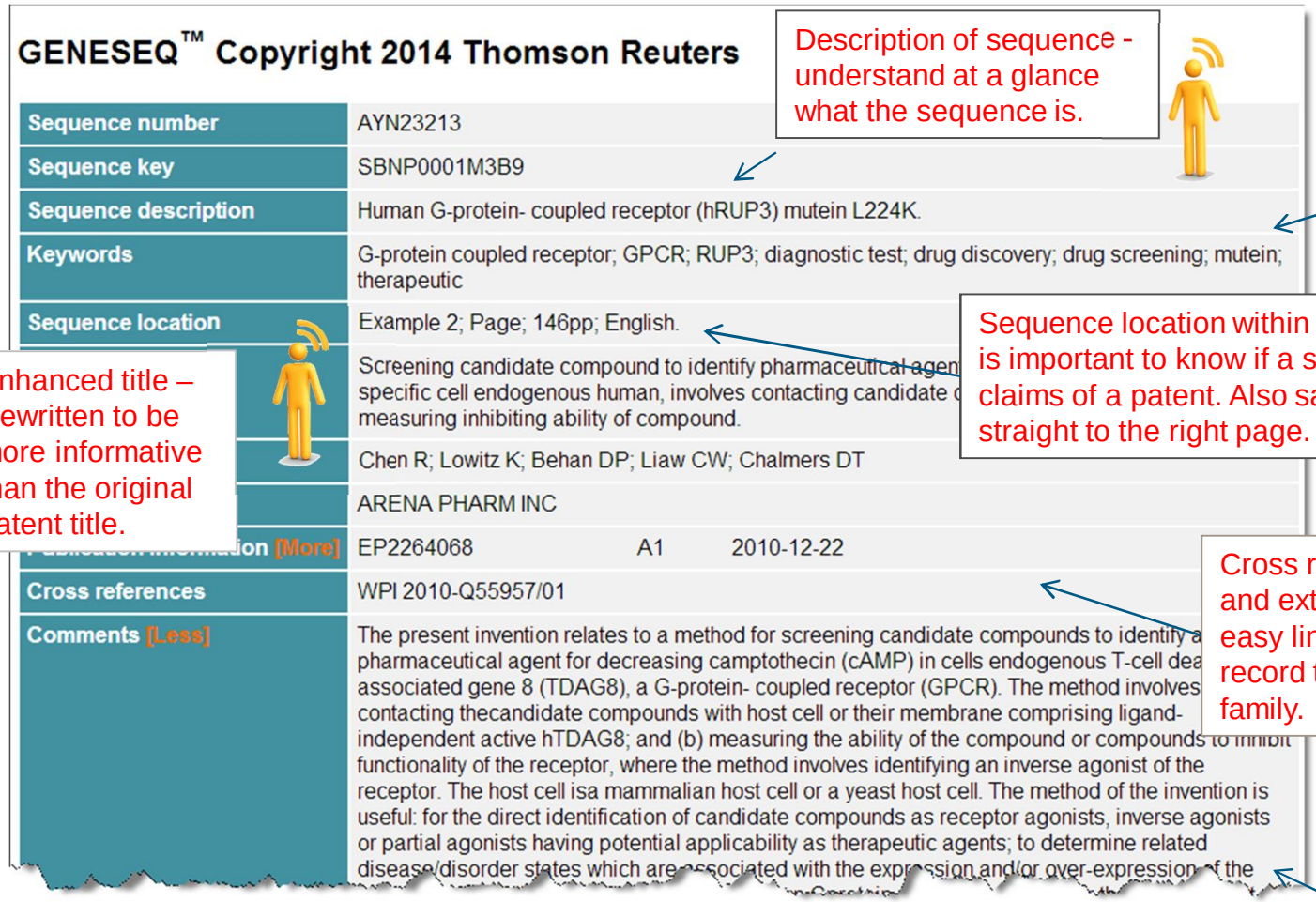
Explore Biological Products Innovation Scenery Through Sequence-Search Within Patents

GENESEQ

- The world's largest database of biological sequences from patents
- Prioritize research activities with evaluation of prior art and competitors
- Efficiently find patents containing any related biological sequence of your interest

THOMSON REUTERS

GENESEQ Record - Manual Annotations – Added Value Content



THOMSON REUTERS

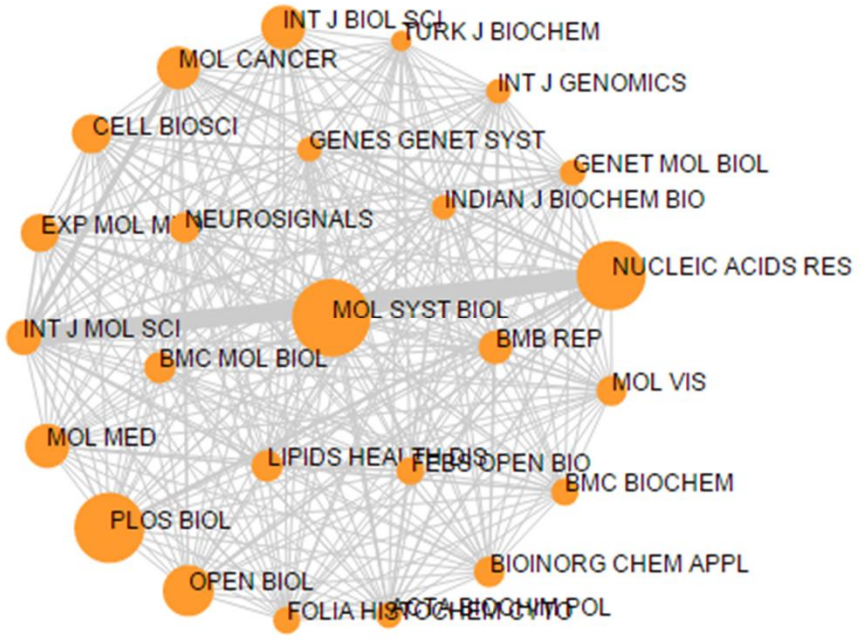
Thomson Reuters IP&Science: Full Support to Scientific Innovation

- How to make a comprehensive **technological prospection** to better **position your research**?
- Find the **most influent authors** on your field – define possible **competitors** and **collaborators**
- Find the most accepted **cellular and animal models** to your studies
- Discover the **molecular mechanisms** and main **biomarkers** related to the **disease** of your interest or your **omics data**
- **Predict** the therapeutic **effect**, **toxic** potential and **mechanisms of action** of your chemical compounds
- Explore what has been **patented** in your innovation area
- Define the **most impactful journal** to publish your data

JCR: Defining the Impact Factor of Scientific Journals

$$\text{Impact Factor}^{\circledR}\ \text{2010-JCR} = \frac{\text{number of citations in 2009 of articles published in 2007-2008}}{\text{number of articles published in the journal in 2007-2008}}$$

	Full Journal Title	Total Cites	Journal Impact Factor	Eigenfactor Score
1	Molecular Systems Biology	7,644	10.872	0.03895
2	PLOS BIOLOGY	25,729	9.343	0.09309
3	NUCLEIC ACIDS RESEARCH	136,883	9.112	0.34417
4	Open Biology	833	5.784	0.00555
5	International Journal of Biological Sciences	2,611	4.509	0.00936



THOMSON REUTERS

.periodicos.

Innovation Cycle - Drug R&D

Thomson Reuters IP&S – Complete Coverage for Big Decisions

REUTERS/Carlos Barria

http://ip-science.thomsonreuters.com/

antero.macedo@thomsonreuters.com

THOMSON REUTERS