3Ranker

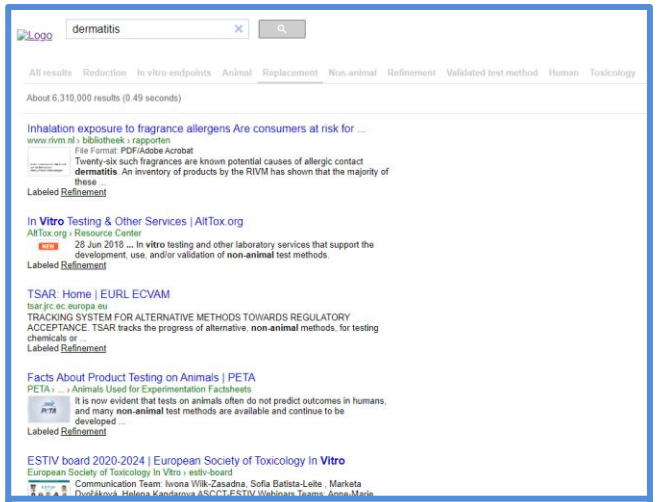
Wynand Alkema

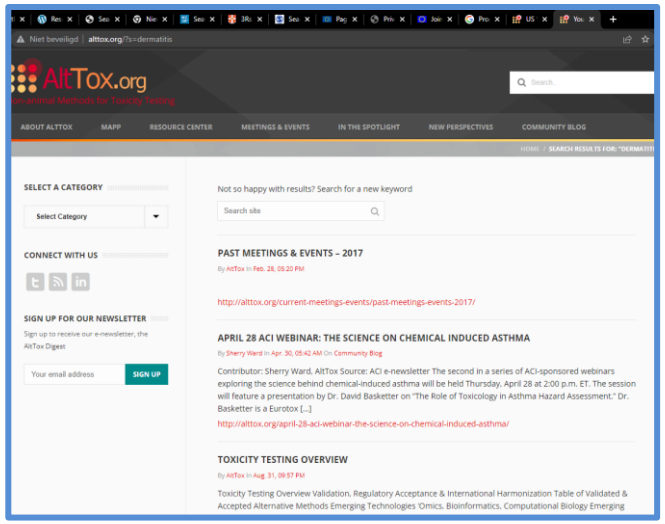
Information overload or filter failure

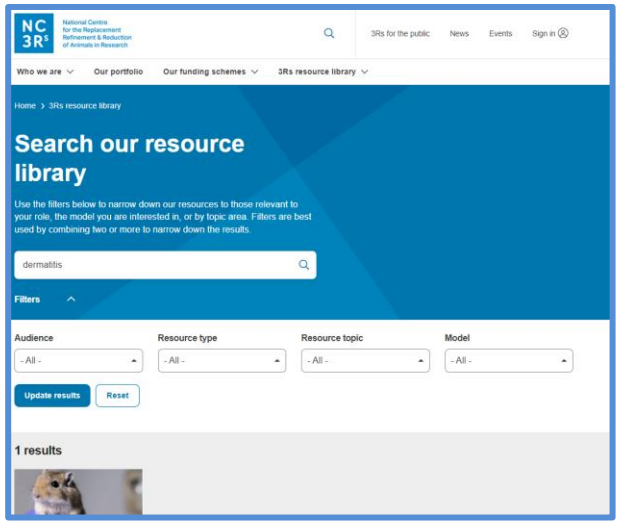
How can we identify literature and scientific articles that describe methods for **R**eplacement, **R**efinement and **R**eduction?

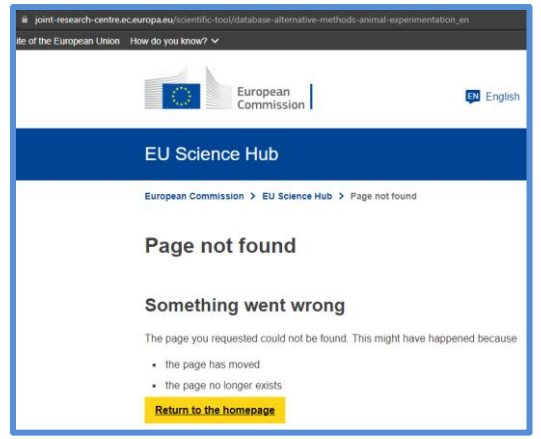
TENWISE
Making sense of data

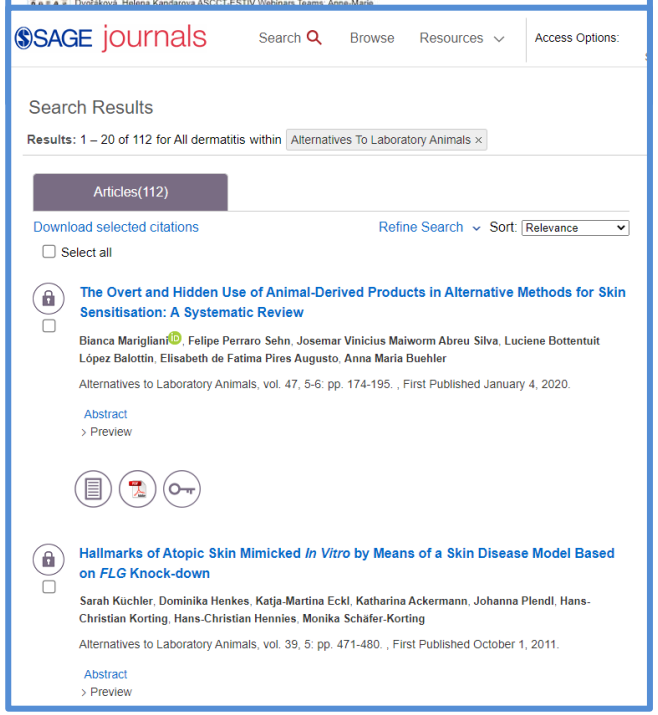
Search for dermatitis

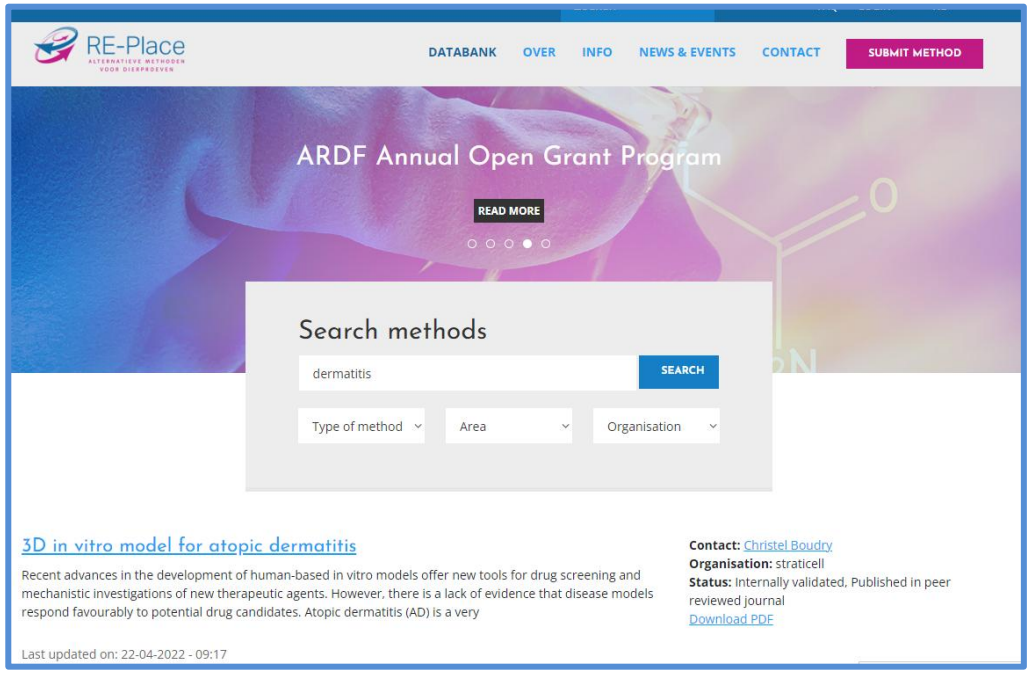


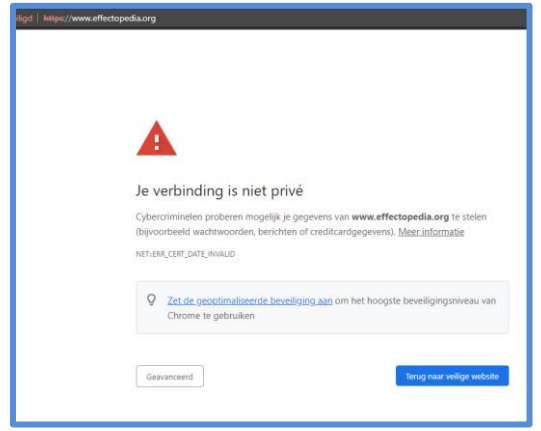






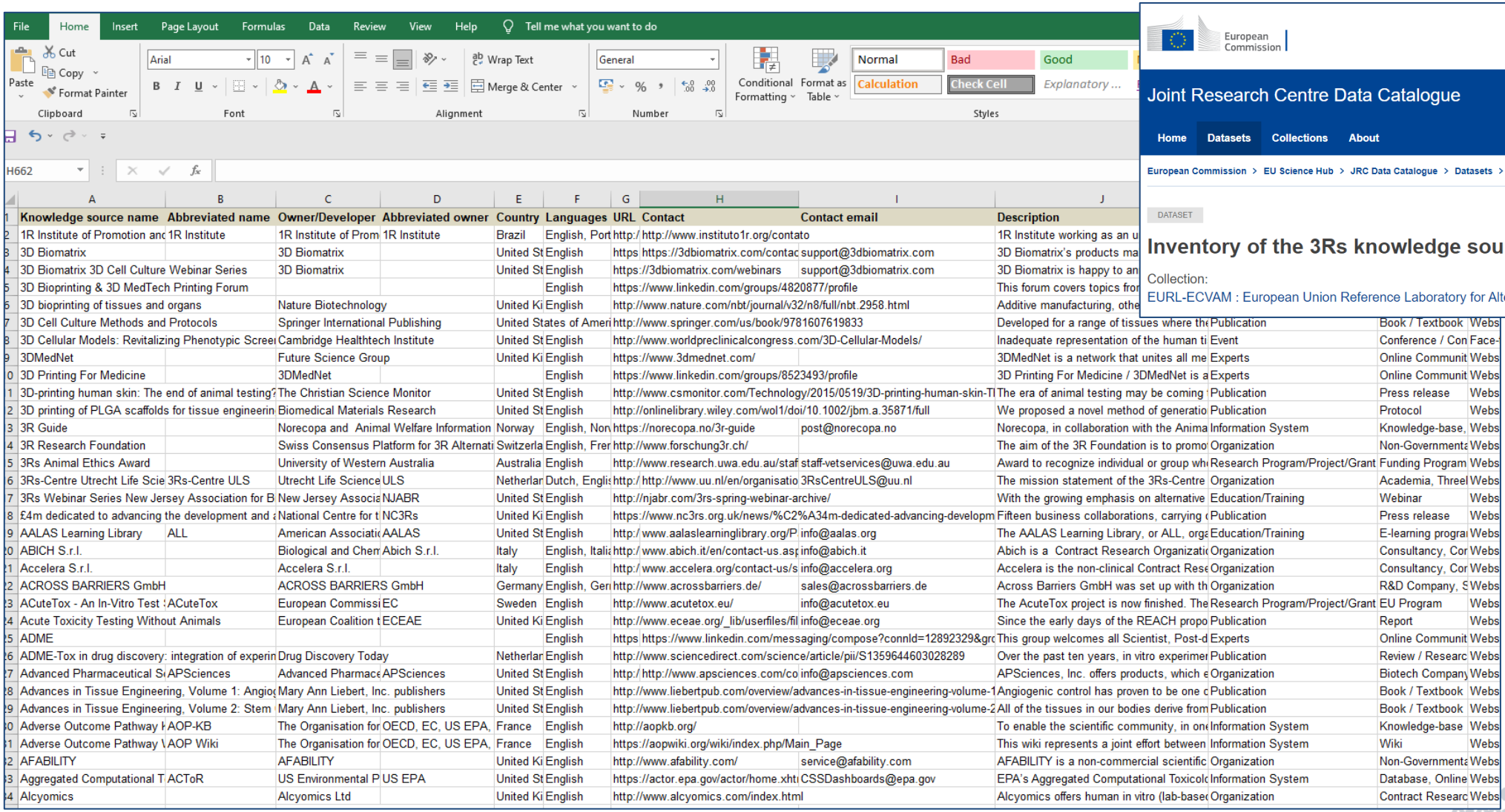






TENWISE
Making sense of data

A lot of information



Knowledge source name	Abbreviated name	Owner/Developer	Abbreviated owner	Country	Languages	URL	Contact	Contact email	Description
1R Institute of Promotion and	1R Institute	1R Institute of Prom	1R Institute	Brazil	English, Port	http:/	http://www.instituto1r.org/contato		1R Institute working as an u
3D Biomatrix		3D Biomatrix		United St	English	https	https://3dbiomatrix.com/contac	support@3dbiomatrix.com	3D Biomatrix's products ma
3D Biomatrix 3D Cell Culture Webinar Series		3D Biomatrix		United St	English	https://3dbiomatrix.com/webinars		support@3dbiomatrix.com	3D Biomatrix is happy to an
3D Bioprinting & 3D MedTech Printing Forum					English	https://www.linkedin.com/groups/4820877/profile			This forum covers topics fro
3D bioprinting of tissues and organs		Nature Biotechnology		United Ki	English	http://www.nature.com/nbt/journal/v32/n8/full/nbt.2958.html			Additive manufacturing, othe
3D Cell Culture Methods and Protocols		Springer International Publishing		United States of Ameri		http://www.springer.com/us/book/9781607619833			Developed for a range of tissues where the
3D Cellular Models: Revitalizing Phenotypic Scree		Cambridge Healthtech Institute		United St	English	http://www.worldpreclinicalcongress.com/3D-Cellular-Models/			Inadequate representation of the human ti
3DMedNet		Future Science Group		United Ki	English	https://www.3dmednet.com/			3DMedNet is a network that unites all me
3D Printing For Medicine		3DMedNet			English	https://www.linkedin.com/groups/8523493/profile			3D Printing For Medicine / 3DMedNet is a
3D-printing human skin: The end of animal testing?		The Christian Science Monitor		United St	English	http://www.csmonitor.com/Technology/2015/0519/3D-printing-human-skin-TI			The era of animal testing may be coming
3D printing of PLGA scaffolds for tissue engineerin		Biomedical Materials Research		United St	English	http://onlinelibrary.wiley.com/wol1/doi/10.1002/jbm.a.35871/full			We proposed a novel method of generatio
3R Guide		Norecopa and Animal Welfare Information		Norway	English, Non	https://norecopa.no/3r-guide		post@norecopa.no	Norecopa, in collaboration with the Anima
3R Research Foundation		Swiss Consensus Platform for 3R Alternati		Switzerla	English, Frer	http://www.forschung3r.ch/			The aim of the 3R Foundation is to promo
3Rs Animal Ethics Award		University of Western Australia		Australia	English	http://www.research.uwa.edu.au/staf		staff-vetservices@uwa.edu.au	Award to recognize individual or group wh
3Rs-Centre Utrecht Life Scie	3Rs-Centre ULS	Utrecht Life Science	ULS	Netherlar	Dutch, Englis	http:/	http://www.uu.nl/en/organisatio	3RsCentreULS@uu.nl	The mission statement of the 3Rs-Centre
3Rs Webinar Series New Jersey Association for B		New Jersey Associa	NJABR	United St	English	http://njabr.com/3rs-spring-webinar-archive/			With the growing emphasis on alternative
£4m dedicated to advancing the development and a		National Centre for t	NC3Rs	United Ki	English	https://www.nc3rs.org.uk/news/%C2%A34m-dedicated-advancing-developm			Fifteen business collaborations, carrying
AALAS Learning Library	ALL	American Associati	AALAS	United St	English	http:/	www.aalaslearninglibrary.org/P	info@aalas.org	The AALAS Learning Library, or ALL, orga
ABICH S.r.l.		Biological and Chem	Abich S.r.l.	Italy	English, Italia	http:/	www.abich.it/en/contact-us.asp	info@abich.it	Abich is a Contract Research Organizati
Accelera S.r.l.		Accelera S.r.l.		Italy	English	http:/	www.accelera.org/contact-us/s	info@accelera.org	Accelera is the non-clinical Contract Rese
ACROSS BARRIERS GmbH		ACROSS BARRIERS GmbH		Germany	English, Ger	http://www.acrossbarriers.de/		sales@acrossbarriers.de	Across Barriers GmbH was set up with th
ACuteTox - An In-Vitro Test	ACuteTox	European Commissi	EC	Sweden	English	http://www.acutetox.eu/		info@acutetox.eu	The AcuteTox project is now finished. The
Acute Toxicity Testing Without Animals		European Coalition t	ECEAE	United Ki	English	http://www.eceae.org/_lib/userfiles/fil		info@eceae.org	Since the early days of the REACH propo
ADME					English	https	https://www.linkedin.com/messaging/compose?connId=12892329&gr		This group welcomes all Scientist, Post-d
ADME-Tox in drug discovery: integration of experin		Drug Discovery Today		Netherlar	English	http://www.sciencedirect.com/science/article/pii/S1359644603028289			Over the past ten years, in vitro experimer
Advanced Pharmaceutical S	APSciences	Advanced Pharmace	APSciences	United St	English	http:/	http://www.apsciences.com/co	info@apsciences.com	APSciences, Inc. offers products, which e
Advances in Tissue Engineering, Volume 1: Angio		Mary Ann Liebert, Inc. publishers		United St	English	http://www.liebertpub.com/overview/advances-in-tissue-engineering-volume-1			Angiogenic control has proven to be one c
Advances in Tissue Engineering, Volume 2: Stem		Mary Ann Liebert, Inc. publishers		United St	English	http://www.liebertpub.com/overview/advances-in-tissue-engineering-volume-2			All of the tissues in our bodies derive from
Adverse Outcome Pathway k	AOP-KB	The Organisation for	OECD, EC, US EPA,	France	English	http://aopkb.org/			To enable the scientific community, in one
Adverse Outcome Pathway \	AOP Wiki	The Organisation for	OECD, EC, US EPA,	France	English	https://aopwiki.org/wiki/index.php/Main_Page			This wiki represents a joint effort between
AFABILITY		AFABILITY		United Ki	English	http://www.afability.com/		service@afability.com	AFABILITY is a non-commercial scientific
Aggregated Computational T	ACToR	US Environmental P	US EPA	United St	English	https://actor.epa.gov/actor/home.xht		CSSDashboards@epa.gov	EPA's Aggregated Computational Toxicol
Alcyomics		Alcyomics Ltd		United Ki	English	http://www.alcyomics.com/index.html			Alcyomics offers human in vitro (lab-base

								Publication	Book / Textbook
								Event	Conference / Con
								Experts	Online Communit
								Publication	Press release
								Publication	Protocol
								Information System	Knowledge-base,
								Organization	Non-Governmenta
								Research Program/Project/Grant	Funding Program
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								Organization	R&D Company, S
								Research Program/Project/Grant	EU Program
								Publication	Report
								Experts	Online Communit
								Publication	Review / Researc
								Organization	Biotech Company
								Publication	Book / Textbook
								Publication	Book / Textbook
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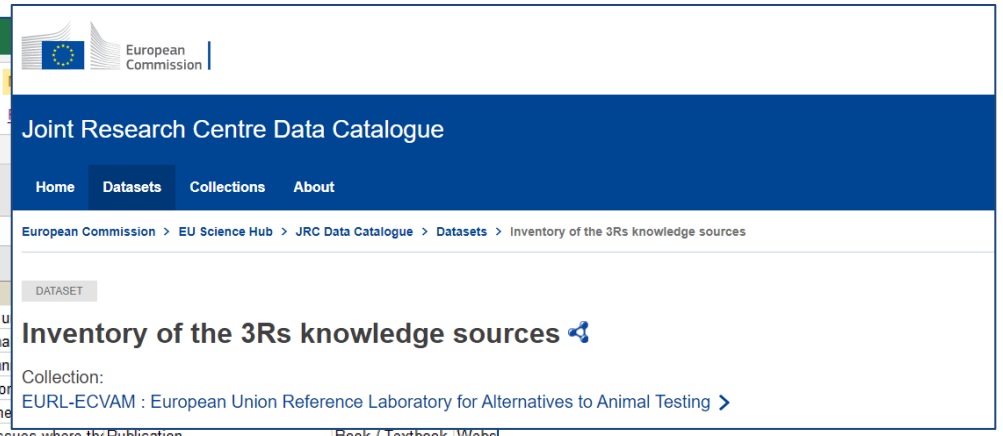
								Information System	Wiki
								Organization	Non-Governmenta
								Information System	Database, Online
								Organization	Contract Researc



TENWISE
Making sense of data

The problem

- How can we identify articles that describe methods for Replacement, Refinement and Reduction?
  - Often not explicitly described as such.
  - Hard to define the correct search terms.
- As a consequence the search is
  - Elaborate
  - Time consuming
  - **Biased**
  - Incomplete
  - **Not updated**

Main findings from a survey:

No budget/time for specific 3R search

Existing relevant 3R information not found / not used

TENWISE
Making sense of data

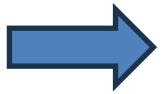
Solution: Mine the bibliome

EMBO reports

viewpoint

Mining the bibliome: searching for a needle in a haystack?

New computing tools are needed to effectively scan the growing amount of scientific literature for useful information • *by Les Grivell*



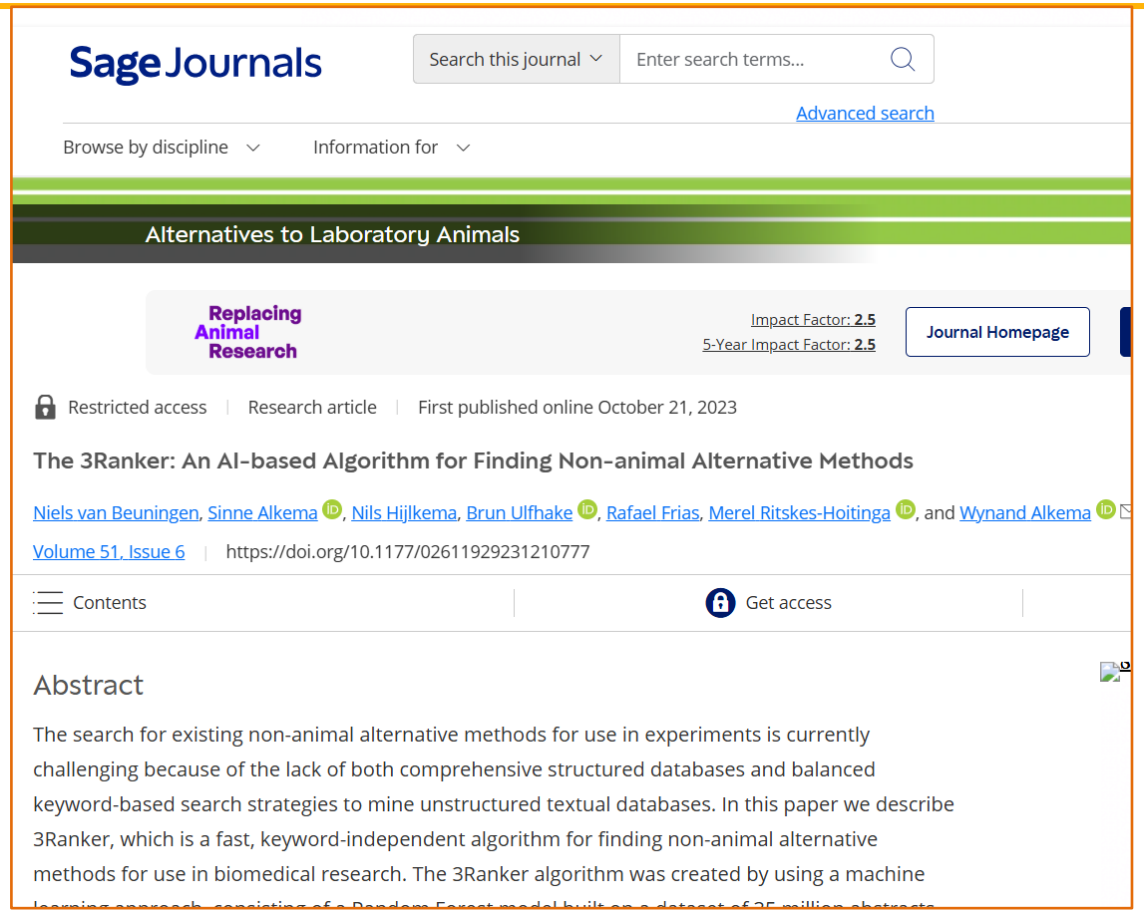
Altern Lab Anim. 2021 Jul;49(4):133-136. doi: 10.1177/02611929211048447. Epub 2021 Sep 28.

The Use of Artificial Intelligence for the Fast and Effective Identification of Three Rs-based Literature

Merel Ritskes-Hoitinga [1 2], Wynand Alkema [3 4]

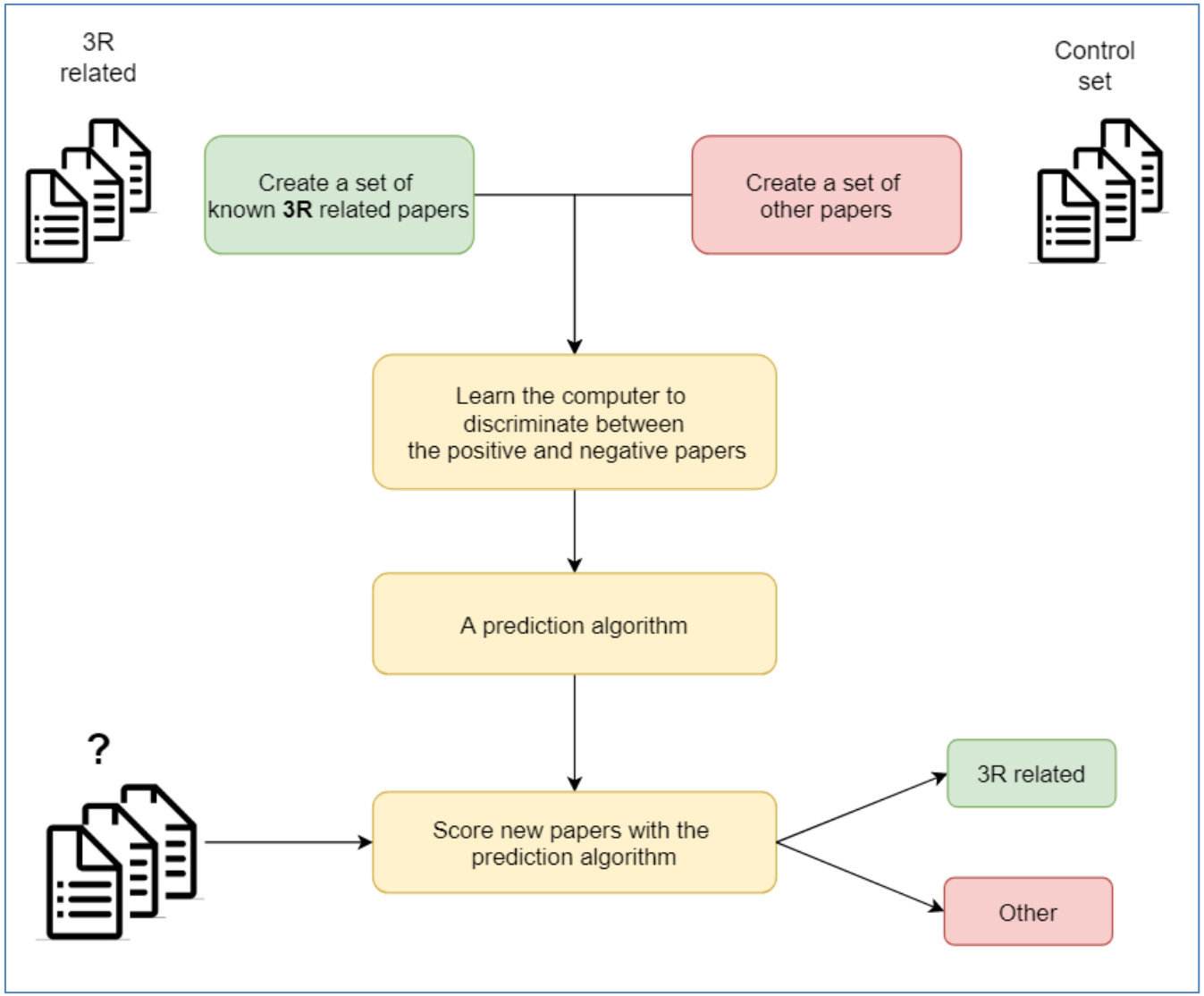
Affiliations + expand

PMID: 34581190 DOI: 10.1177/02611929211048447



TENWISE
Making sense of data

Machine Learning Approach



Based on a set of known positive and negative papers, a computer model is trained that can predict whether a paper is about a **3R** subject.

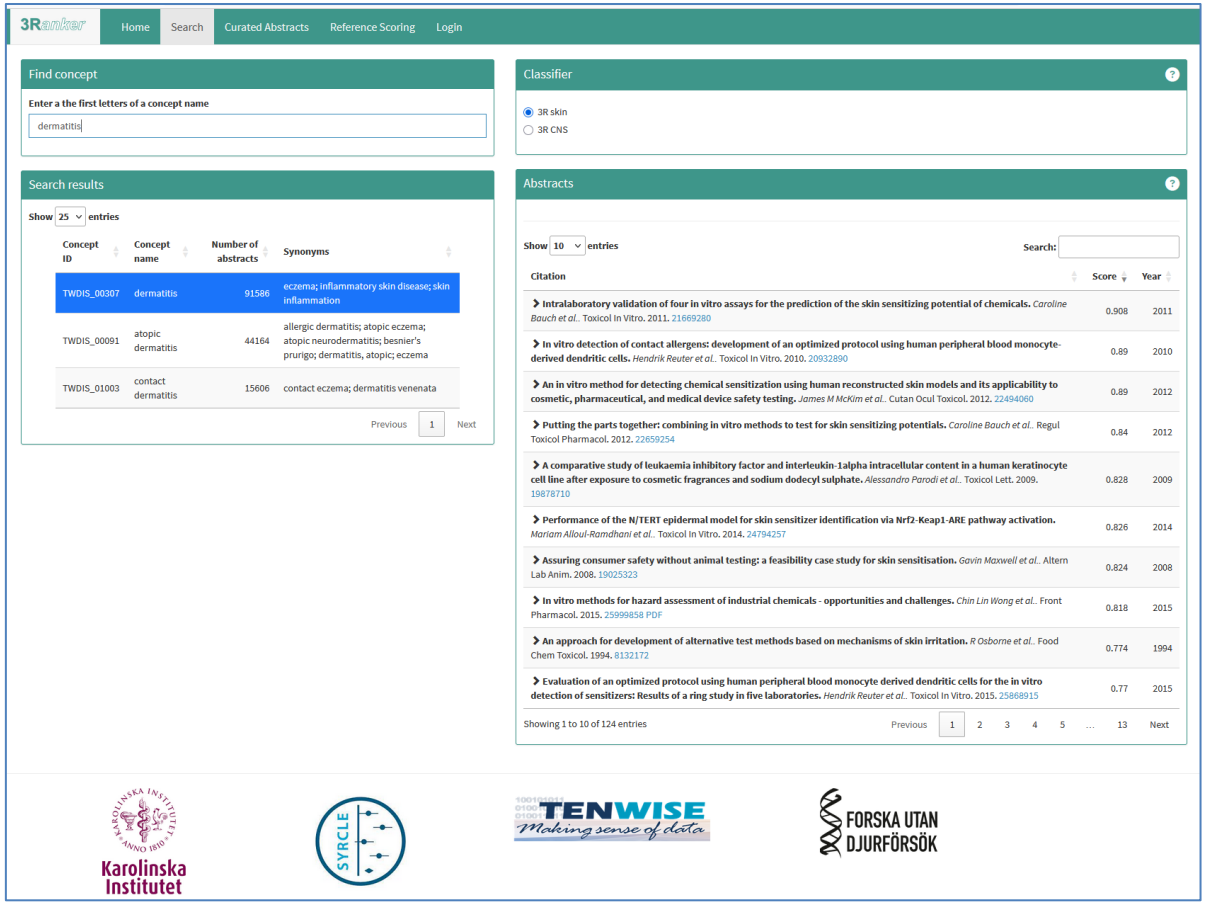
3865 papers describing Alternative Animal Tests (Mesh term)

A random abstract set

TENWISE
Making sense of data

Currently available

- 40 million PubMed abstracts with a 3R score for **skin** or **central nervous system** ranging from 0 to 1.
- An **Applied Programming Interface** is available for plugging in into your own workflow.
- **Searchable web interface** with 500.000 predefined keywords **(genes, pathways, diseases, drugs, products**).

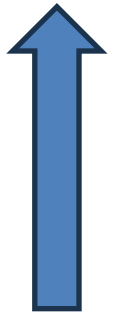


TENWISE Making sense of data

Access with an API

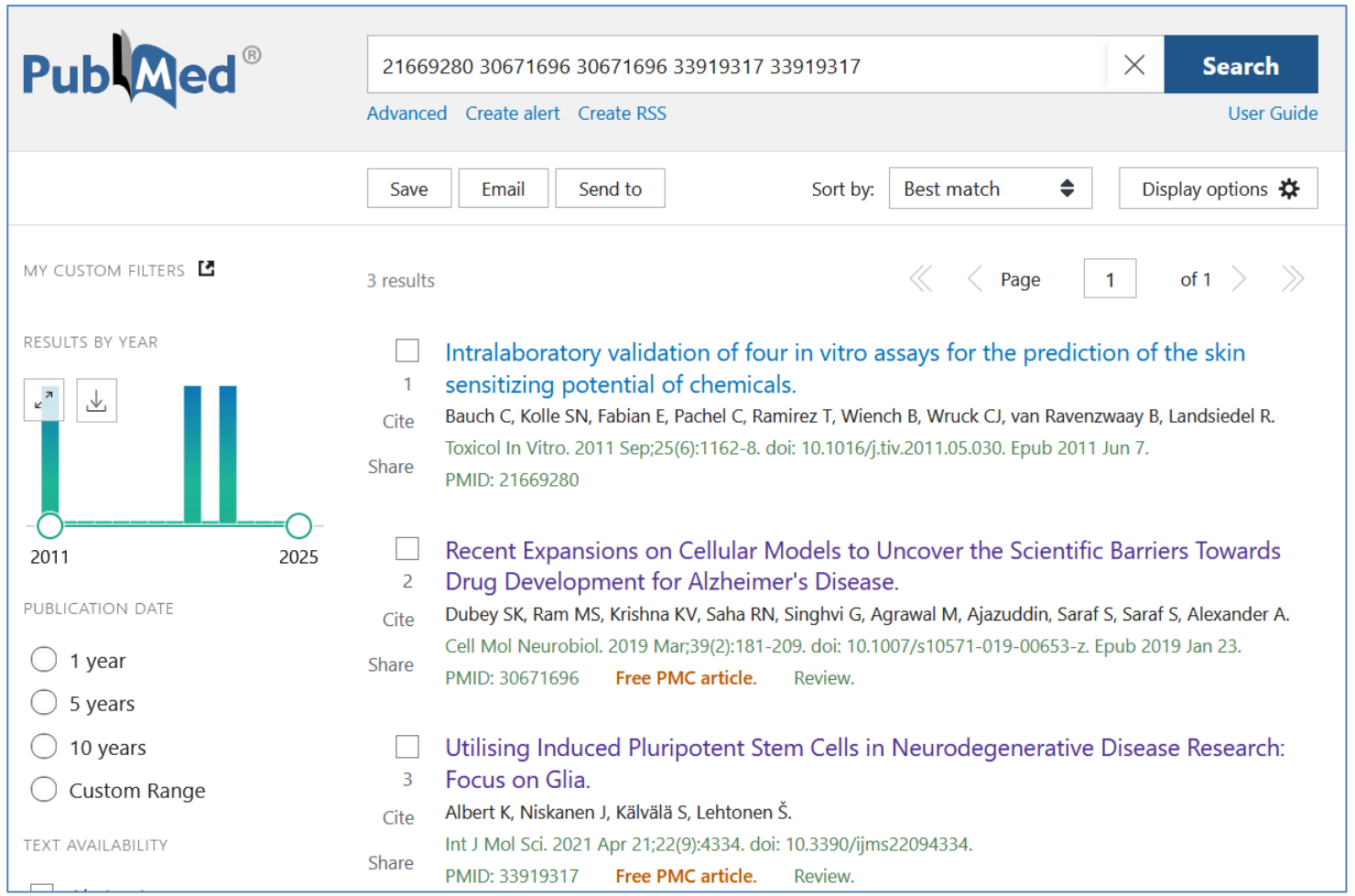
```python
import requests
import sys

### Setting up the connection to the api ###
# The valid APIKEY is read as the first argument from the command line
session  = requests.Session()
base_url = 'https://apimlqv2.tenwiseservice.nl/api/mlquery/'
session.headers['referer'] = 'https://apimlqv2.tenwiseservice.nl/'
session.get(base_url + "start/")
payload = {'apikey': sys.argv[1],
           'csrfmiddlewaretoken': session.cookies.get_dict()['csrftoken']}

### Get some PMIDs
payload['pmids'] = '33919317, 30671696, 21669280'
results = session.post(base_url + "refset/class_scores/",
                       payload)
json_response = results.json()

### Print out scores
for item in json_response['result']['class_scores']:
    print("\t".join(str(x) for x in [item['pmid'],
                                     item['classifier'],
                                     item['classifier_score']]
                    )
          )

```

	A	B	C
1	PMID	Model	Score
2	21669280	3r_skin	0.908
3	30671696	3r_cns	0.562
4	30671696	3r_skin	0.506
5	33919317	3r_cns	0.772



TENWISE
Making sense of data

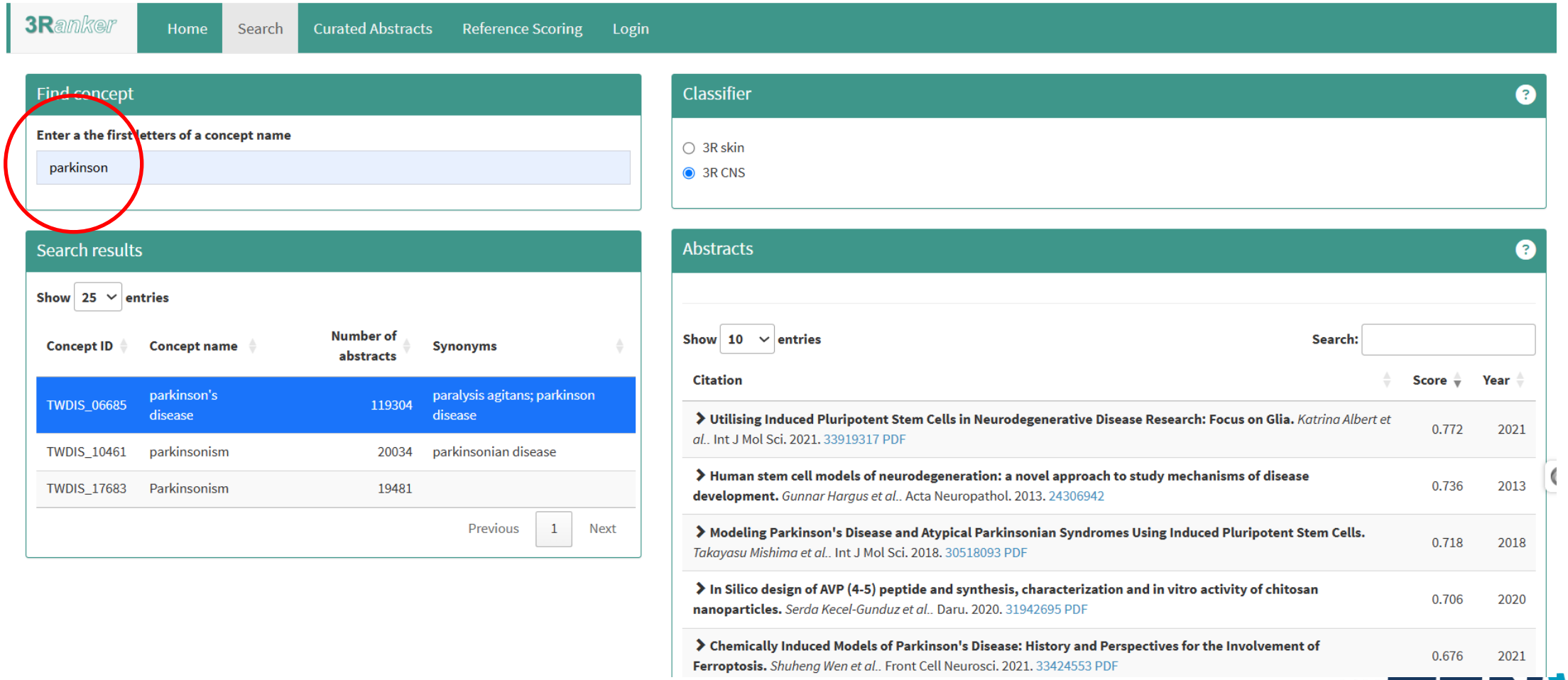
	A	B	C
1	PMID	Model	Score
2	21669280	3r_skin	0.908
3	30671696	3r_cns	0.562
4	30671696	3r_skin	0.506
5	33919317	3r_cns	0.772



DEMO

CNS: Parkinson's

Search 3R papers related to Parkinson's Disease:



TENWISE
Making sense of data

CNS: Parkinson's

Display only 3R papers that deal with induced Pluripotent Stem Cells (iPSC):

Abstracts

Show 10 entries

Search: ipsc

Citation	Score	Year
Utilising Induced Pluripotent Stem Cells in Neurodegenerative Disease Research: Focus on Glia. *Katrina Albert et al.*. Int J Mol Sci. 2021. 33919317 PDF	0.772	2021
Modeling Parkinson's Disease and Atypical Parkinsonian Syndromes Using Induced Pluripotent Stem Cells. *Takayasu Mishima et al.*. Int J Mol Sci. 2018. 30518093 PDF		
Modeling Human Neurological and Neurodegenerative Diseases: From Induced Pluripotent Stem Cells to Neuronal Differentiation and Its Applications in Neurotrauma. *Hisham Bahmad et al.*. Front Mol Neurosci. 28293168 PDF		
Human induced pluripotent stem cells and neurodegenerative disease: prospects for novel therapi *Wook Jung et al.*. Curr Opin Neurol. 2012. 22357218 PDF		
Using induced pluripotent stem cell neuronal models to study neurodegenerative diseases. *Xinwen* Biochim Biophys Acta Mol Basis Dis. 2019. 30898538 PDF		
Application of human induced pluripotent stem cells for modeling and treating neurodegenerative *Natalie L Payne et al.*. N Biotechnol. 2014. 24815224		

Showing 1 to 10 of 12 entries (filtered from 31 total entries)

Previous 1 2 Next

ENWISE making sense of data

Links to PDFs

Show 10 entries Search: ipsc

Citation
Utilising Induced Pluripotent Stem Cells in Neurodegenerative Disease Research: Focus on Glia. *Katrina Albert et al..* Int J Mol Sci. 2021. 33919317 PDF
Modeling Parkinson's Disease and Atypical Parkinsonian Syndromes Using Induced Pluripotent Stem Cells. *Takayasu Mishima et al..* Int J Mol Sci. 2018. 30518093 PDF
Modeling Human Neurological and Neurodegenerative Diseases: From Induced Pluripotent Stem Cells to Neuronal Differentiation and Its Applications in Neurotrauma. *Hisham Bahmad et al..* Front Mol Neurosci. 2017. 28293168 PDF
Human induced pluripotent stem cells and neurodegenerative disease: prospects for novel therapies. *Yong Wook Jung et al..* Curr Opin Neurol. 2012. 22357218 PDF
Using induced pluripotent stem cell neuronal models to study neurodegenerative diseases. *Xinwen Zhang et al..* Biochim Biophys Acta Mol Basis Dis. 2019. 30898538 PDF
Application of human induced pluripotent stem cells for modeling and treating neurodegenerative

International Journal of *Molecular Sciences*

MDPI

Review

Modeling Parkinson's Disease and Atypical Parkinsonian Syndromes Using Induced Pluripotent Stem Cells

Takayasu Mishima, Shinsuke Fujioka, Jiro Fukae, Junichi Yuasa-Kawada and Yoshio Tsuboi *

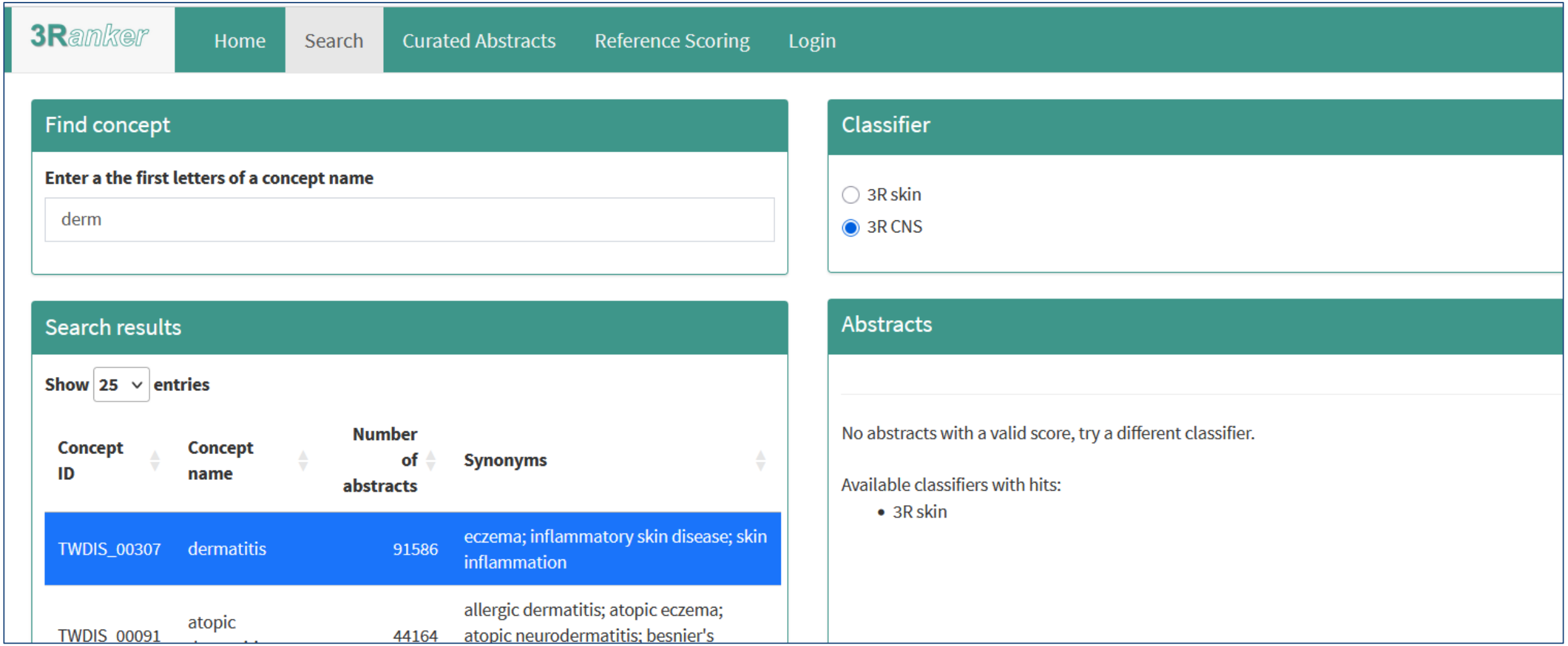
Department of Neurology, Fukuoka University, Fukuoka 814-0180, Japan; mishima1006@fukuoka-u.ac.jp (T.M.); shinsuke@cis.fukuoka-u.ac.jp (S.F.); j-fukae@juntendo.ac.jp (J.F.); junkichi@marine.email.ne.jp (J.Y.-K.)
* Correspondence: tsuboi@cis.fukuoka-u.ac.jp; Tel.: +81-92-801-1011 (ext. 3520)

Received: 3 September 2018; Accepted: 28 November 2018; Published: 4 December 2018

check for updates

Abstract: Parkinson's disease (PD) and atypical parkinsonian syndromes are age-dependent multifactorial neurodegenerative diseases, which are clinically characterized by bradykinesia, tremor, muscle rigidity and postural instability. Although these diseases share several common clinical phenotypes, their pathophysiological aspects vary among the disease categories. Extensive animal-based approaches, as well as postmortem studies, have provided important insights into the disease mechanisms and potential therapeutic targets. However, the exact pathological mechanisms triggering such diseases still remain elusive. Furthermore, the effects of drugs observed in animal models are not always reproduced in human clinical trials. By using induced pluripotent stem cell (iPSC) technology, it has become possible to establish patient-specific iPSCs from their somatic cells and to effectively differentiate these iPSCs into different types of neurons, reproducing

Dermatitis



TENWISE
Making sense of data

Dermatitis

Find concept

Enter a the first letters of a concept name

dermatiti

Classifier

- (●) 3R skin
- ( ) 3R CNS

Search results

Show 25 entries

Concept ID	Concept name	Number of abstracts	Synonyms
TWDIS_00307	dermatitis	91586	eczema; inflammatory skin disease; skin inflammation
TWDIS_00091	atopic dermatitis	44164	allergic dermatitis; atopic eczema; atopic neurodermatitis; besnier's prurigo; dermatitis, atopic; eczema
TWDIS_01003	contact dermatitis	15606	contact eczema; dermatitis venenata

Previous 1 Next

Abstracts

Show 10 entries Search:

Citation	Score	Year
Intralaboratory validation of four in vitro assays for the prediction of the skin sensitizing potential of chemicals. *Caroline Bauch et al..* Toxicol In Vitro. 2011. 21669280	0.908	2011
In vitro detection of contact allergens: development of an optimized protocol using human peripheral blood monocyte-derived dendritic cells. *Hendrik Reuter et al..* Toxicol In Vitro. 2010. 20932890	0.89	2010
An in vitro method for detecting chemical sensitization using human reconstructed skin models and its applicability to cosmetic, pharmaceutical, and medical device safety testing. *James M McKim et al..* Cutan Ocul Toxicol. 2012. 22494060	0.89	2012
Putting the parts together: combining in vitro methods to test for skin sensitizing potentials. *Caroline Bauch et al..* Regul Toxicol Pharmacol. 2012. 22659254	0.84	2012
A comparative study of leukaemia inhibitory factor and interleukin-1alpha intracellular content in a human keratinocyte cell line after exposure to cosmetic fragrances and sodium dodecyl sulphate. *Alessandro Parodi et al..* Toxicol Lett. 2009. 19878710	0.828	2009

TENWISE
Making sense of data

Autophagy (pathway)

Find concept

Enter a the first letters of a concept name

autophagy

Classifier

- (●) 3R skin
- ( ) 3R CNS

Search results

Show 25 **entries**

Concept ID	Concept name	Number of abstracts	Synonyms
PATH_002496	autophagy	73816	autophagic pathway

Previous 1 Next

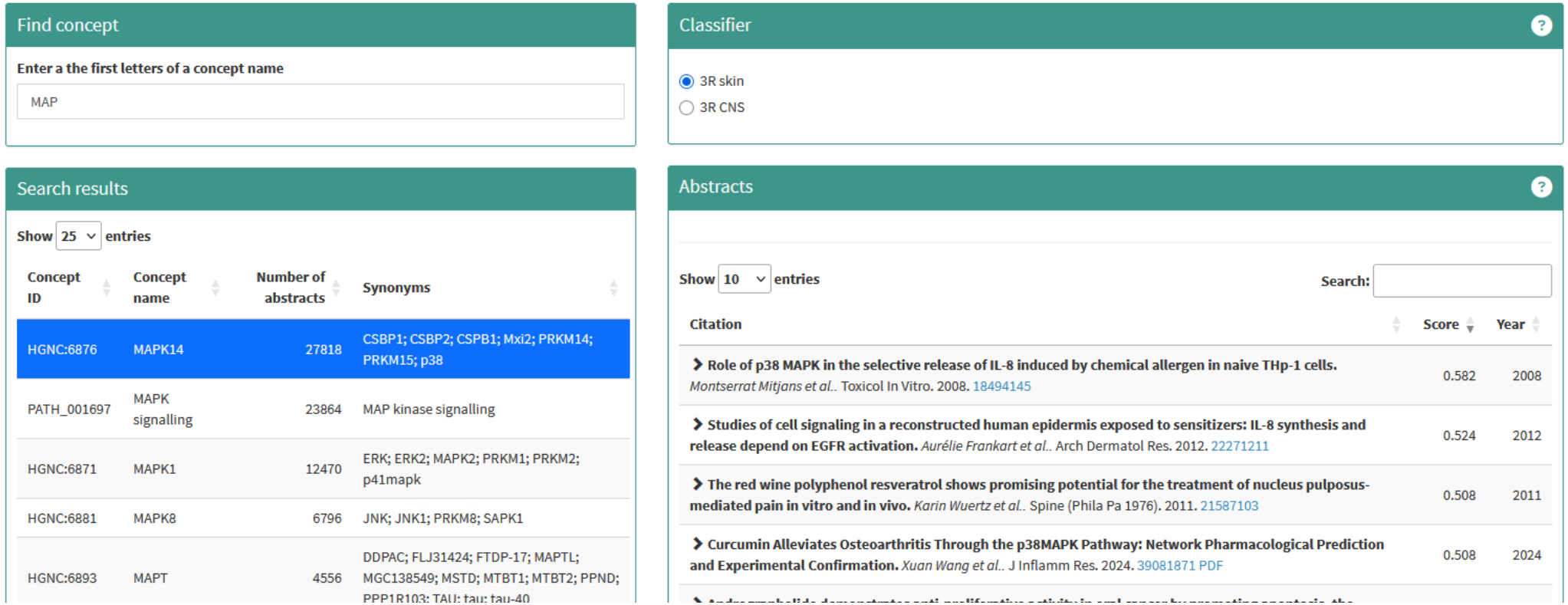
Abstracts

Show 10 **entries** **Search:**

Citation	Score	Year
A new approach for risk assessment of pulmonary toxicants: a preliminary study using didecyldimethylammonium chloride. *Jun Woo Kim et al..* Environ Sci Pollut Res Int. 2024. 39266878	0.714	2024
The Current Understanding of Autophagy in Nanomaterial Toxicity and Its Implementation in Safety Assessment-Related Alternative Testing Strategies. *Rong-Jane Chen et al..* Int J Mol Sci. 2020. 32235610 PDF	0.698	2020

TENWISE
Making sense of data

P38 (gene)



TENWISE
Making sense of data

Probiotic (product)

Find concept

Enter a the first letters of a concept name

probio

Search results

Show 25 **entries**

Concept ID	Concept name	Number of abstracts	Synonyms
TWRWO_002	probiotic	39117	

Previous 1 Next

Classifier

- (●) 3R skin
- ( ) 3R CNS

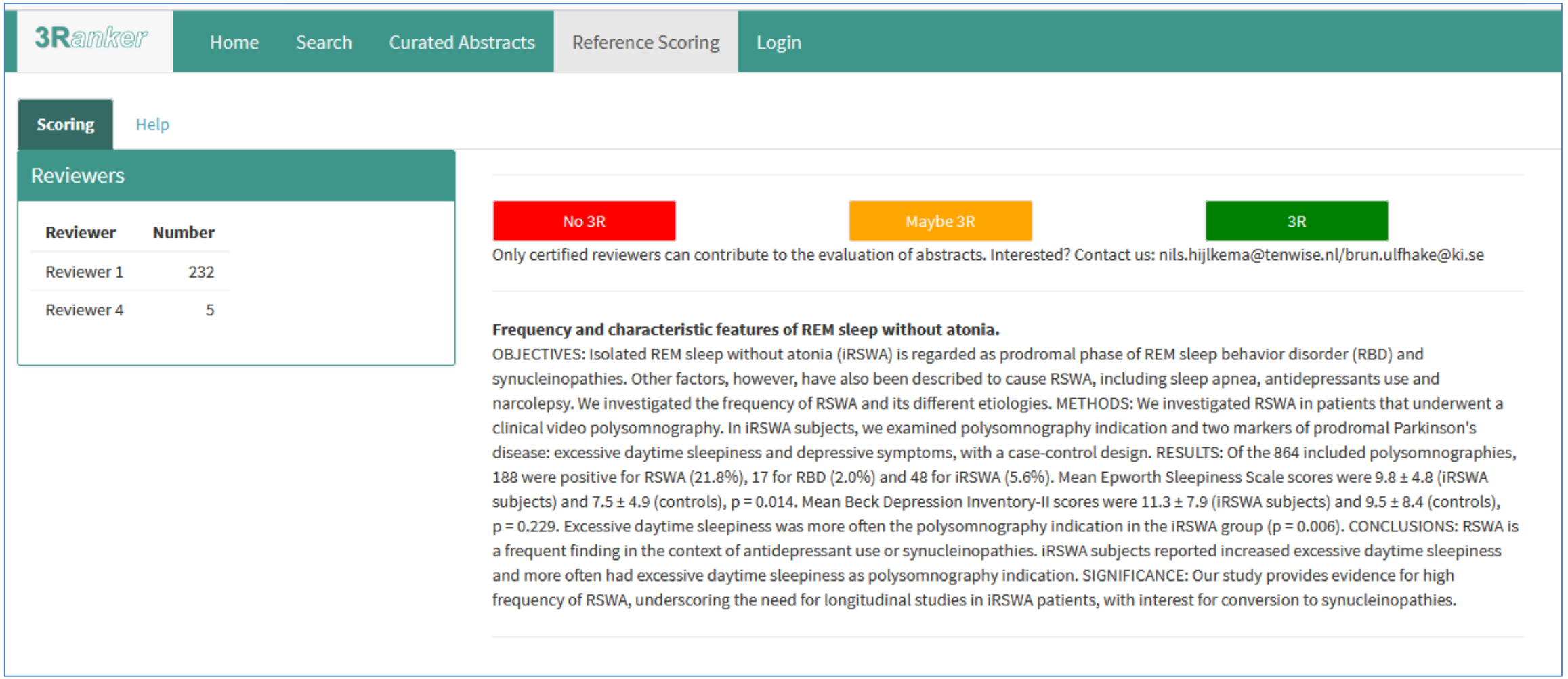
Abstracts

Show 10 **entries** **Search:**

Citation	Score	Year
Lactobacillus reuteri DSM 17938-A comparative study on the effect of probiotics and lysates on human skin. *Ia Khmaladze et al.*. Exp Dermatol. 2019. 31021014	0.56	2019
Antioxidant Properties of Postbiotics: An Overview on the Analysis and Evaluation Methods. *Negin Hosseinzadeh et al.*. Probiotics Antimicrob Proteins. 2024. 39395091 Antioxidants found naturally in foods have a significant effect on preventing several human diseases. However, the use of synthetic antioxidants in studies has raised concerns about their potential link to liver disease and cancer. The findings show that postbiotics have the potential to act as a suitable alternative to chemical antioxidants in the food and pharmaceutical sectors. Postbiotics are bioactive compounds generated by probiotic bacteria as they ferment prebiotic fibers in the gut. These compounds can also be produced from a variety of substrates, including non-prebiotic carbohydrates such as starches and sugars, as well as proteins and organic acids, all of which probiotics utilize during the fermentation process. These are known for their antioxidant, antibacterial, anti-inflammatory, and anti-cancer properties that help improve human health. Various methodologies have been suggested to assess the antioxidant characteristics of postbiotics. While there are several techniques to evaluate the antioxidant properties of foods and their bioactive compounds, the absence of a convenient and uncomplicated method is remarkable. However, cell-based assays have become increasingly important as an intermediate method that bridges the gap between chemical experiments and in vivo research due to the limitations of in vitro and in vivo assays. This review highlights the necessity of transitioning towards more biologically relevant cell-based assays to effectively evaluate the antioxidant activity of postbiotics. These experiments are crucial for assessing the biological efficacy of dietary antioxidants. This review focuses on the latest applications of the Caco-2 cell line in the assessment of cellular antioxidant activity (CAA) and bioavailability. Understanding the impact of processing processes on the biological properties of postbiotic antioxidants can facilitate the development of new food and pharmaceutical products.	0.56	2024

WISE sense of data

New development / disease areas

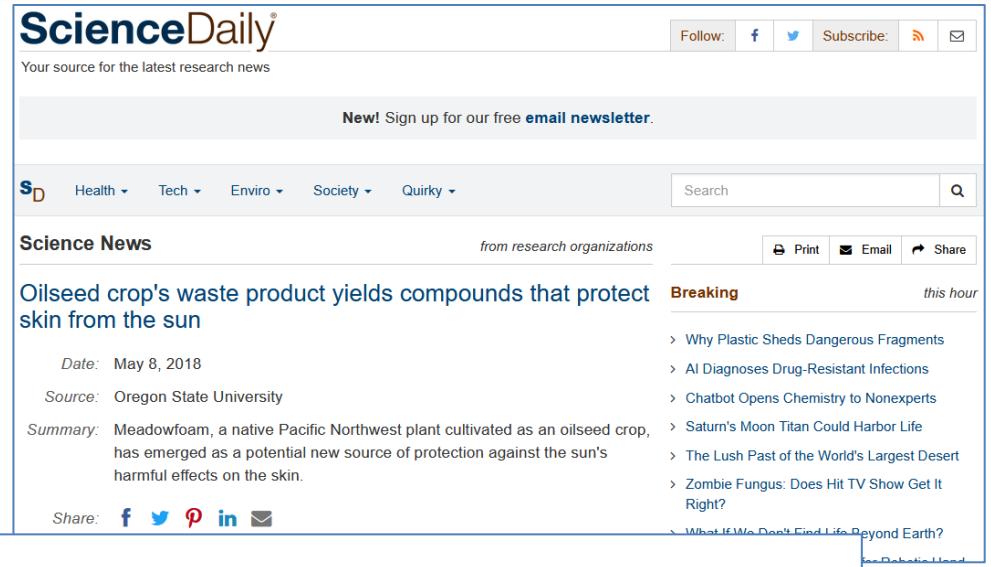


TENWISE
Making sense of data

Take home messages

3Ranker provides a versatile AI algorithm that can be

- **Extended** towards new research fields
- **Incorporated** in other tools via the API
- **Updated** automatically with new PubMed data
- **Applied** towards new text sources



The 3D skin reconstructions used in the study represent an important research tool, added Gitali Indra.

"It's very important to not use animal models in the testing of cosmetics and skin care products," she said. "People don't like to see animal testing data, especially in Europe, where they'll put a picture of a bunny rabbit on a product so people know animals weren't used in the testing. This is a very good model that we can use to test many kinds of drugs by using different assays."

www.open3r.org

TENWISE
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Related initiatives & Future

AI for detection of Human Biomedical Models

FRESCI - Human Health Innovation
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6mo •

We've arrived to Ispra, and everything is going pl

Our team, together with the European Commission's #JointResearchCentre and the BimmoH project partners, is having a highly productive time, presenting the latest developments of our AI-based solution aimed at enhancing the search for human biology methods and research.

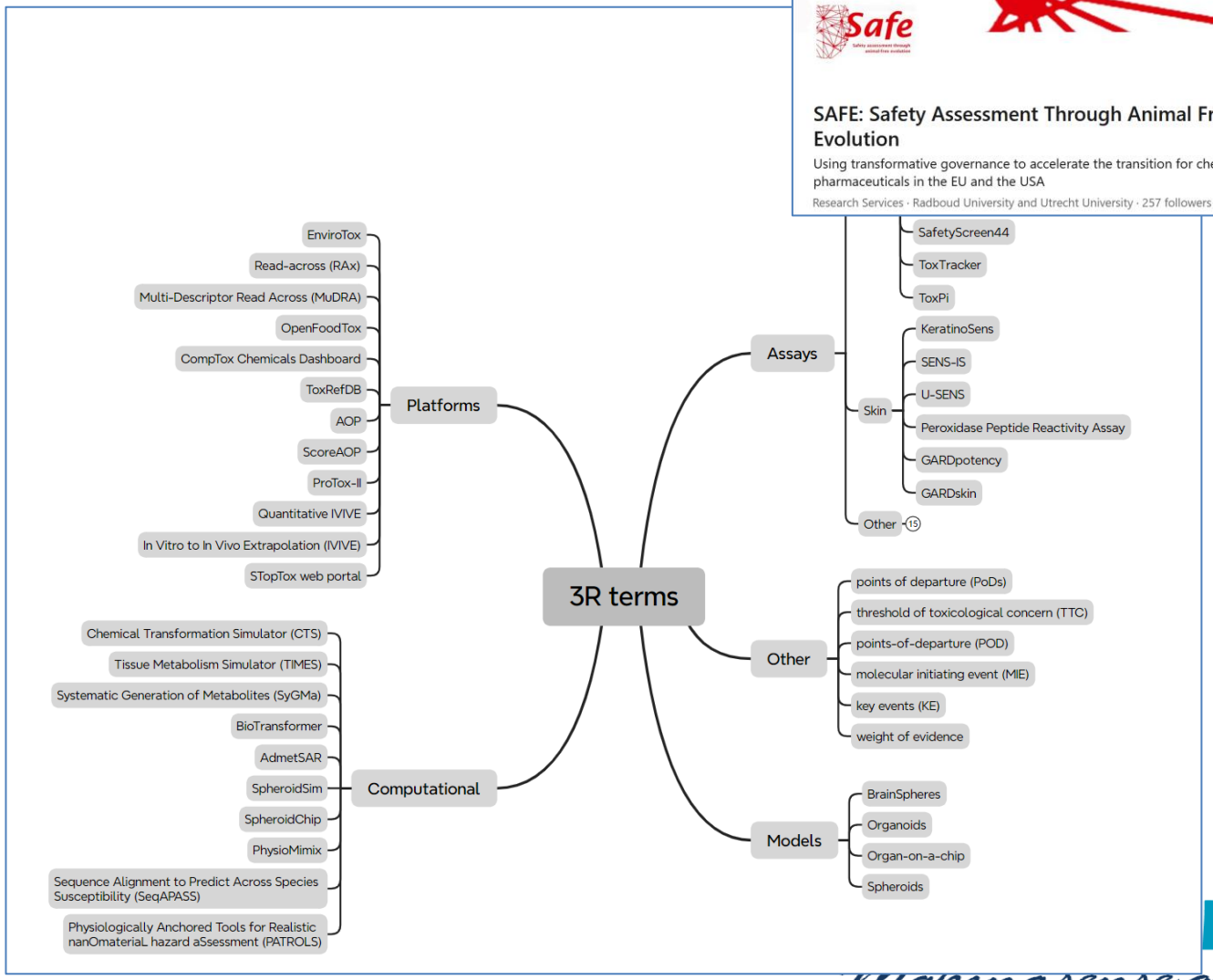
The reception has been fantastic, and we've already had the chance to connect with other professionals in the field, showcasing the potential of our prototype.

Here's a snapshot to share a bit of our experience.

#AI #HumanBiology #ResearchInnovation #DrugDiscovery #Toxicology #FRESCI #E

European Commission

3R Ontology building



Safe

SAFE: Safety Assessment Through Animal Free Evolution

Using transformative governance to accelerate the transition for chemicals and pharmaceuticals in the EU and the USA

Research Services · Radboud University and Utrecht University · 257 followers · 2-10 employees

ISE
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