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83

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We Know Technology, We Know Patents



INTRODUCTION

Scope of the report

SAMPLE

- This report provides a detailed picture of the patent landscape for RNA Vaccine.
- This report covers patents published worldwide up to November 2020.
- About 489 relevant patent families have been selected and analyzed in this report.

Included in the report

- ✓ Single strand RNA Vaccine
- ✓ mRNA Vaccine
- ✓ Modified RNA vaccine
- ✓ RNA vaccine delivery system

Not included in the report

- X DNA vaccine
- X Replicon RNA
- X Adenoviral vector
- X siRNA, dsRNA, iRNA, shRNA, tRNA, rRNA, cDNA, miRNA
- X Dendritic cell vaccine
- X Attenuated virus



INTRODUCTION

Key features of the report

- Essential patent data for RNA Vaccine.
- In-depth patent analyses of key technologies and key players including:
 - Time evolution of patent publications and countries of patent filings;
 - Current legal status of patents;
 - Ranking of main patent applicants;
 - Joint developments and IP collaboration network of main patent applicants;
 - Key patents;
 - Relative strength of main companies IP portfolio; and
 - Matrix patent applicants/technology issues for main IP players.
- IP profiles presentation of key players, including key patents, technological issues, partnerships, IP strength: MODERNA, CUREVAC, BIONTECH, GLAXOSMITHKLINE, TRON, TRANSLATE BIO, ARCTURUS THERAPEUTICS, ACUITAS THERAPEUTICS, ARBUTUS BIOPHARMA, ETHERNA, ALNYLAM PHARMACEUTICALS, ASTELLAS, MORPHOGENESIS, VACCIBODY, PCI BIOTECH, etc.





INTRODUCTION

Key features of the report

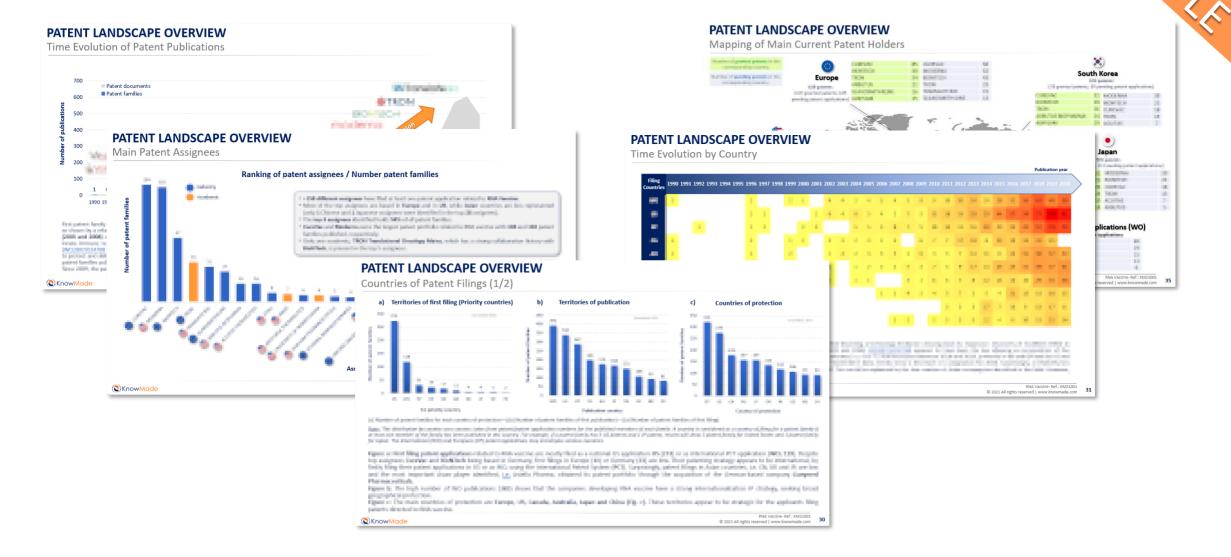
- Excel database comprising all analyzed patents of the report is provided.
- This patent database allows multi-criteria searches, including:
 - Patent publication number
 - Hyperlinks to the original documents (PDF)
 - Priority date
 - Title
 - Abstract
 - Patent assignees
 - Technical segmentation
 - Hyperlinks to an updated online database (legal status, documents etc.) for each selected patent family.
- The findings, interpretations and conclusions expressed in this report are entirely those of Knowmade and may not constitute or imply endorsement by a decision-making body such as a court of law or a patent office. Any assessment of the effect or scope of pending applications or granted patents reflects our own views and these are not necessarily those of a Patent Attorney. Should confirmation of our assessment in this respect be required, we recommend you seek the advice of a national Patent Attorney.





Patent Landscape Overview

Patent assignees, IP dynamics, patent legal status, patent geographical coverage

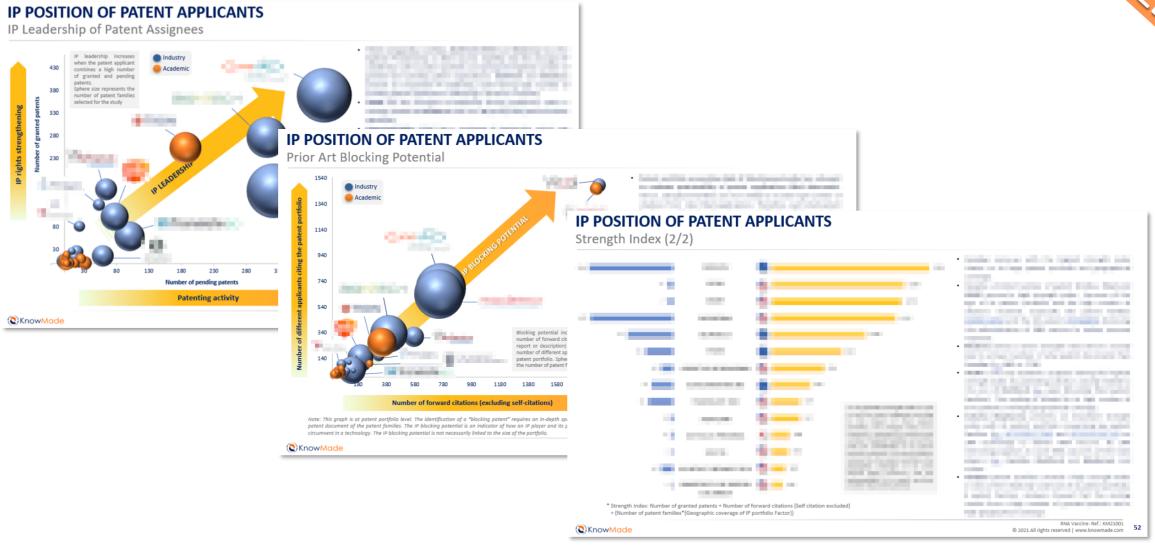




Patent Portfolios Benchmarking: Beyond the Quantity

Who has the best patent portfolio?

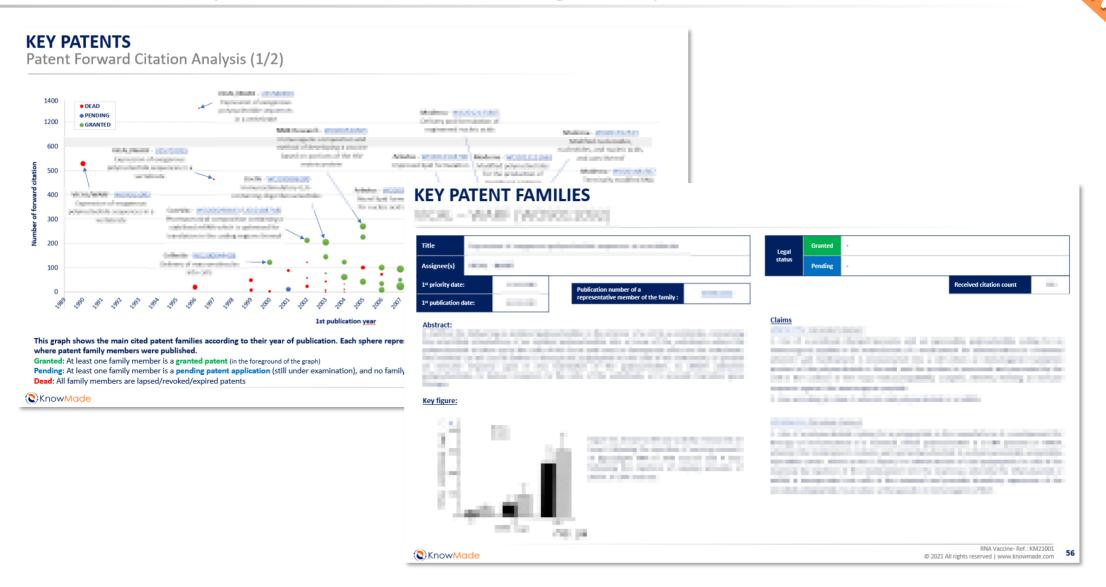






Key patent families

Identification of the patent families with the higher impact





Patent Segmentation

What are the key IP players for each segment?



PATENT SEGMENTATION Main Assignees by Technology Nb of patent familie RNA modifications BACKSTRONG THE RESERVE AND PERSON. SACONATIVE DE ACCURAGE STREET, STREE AMBUTUS BIDYNAMIA 100,000 ARCTURE & THE READ RICH UNION PROTECTION OF MANAGEMENT ACROS ARCHARDAGE STORY ACTUAL PROPERTY. CHICAGO INCIDENTIAL SAME

CONCLUSION

Main players by Technology

For each segment (mRNA vaccine technologies), the main players are reported in this table. Their involvement in the area is also described and divided in various classes: Players with high number of patent families, players with high strength score and Pure IP player.



PATENT SEGMENTATION

Infectious diseases

and the

bel post

All parts ALC: YES State Street leaders of

and soft



the expector infection desires a finished representation of the property of th pared beneficially an particular 10%, beneficially of factors and beneficially recover in 200 and 200 a part of pared pullballors maded in 200. The pagestra is described by Express (AMA) publications) and Malatines (CMA) publications), both accounting for more than traff of introduction parent abcomments, benefitted patient Sentences presents and a softwarps, but pending photo four first potential is intended to their tentants. Butter, represent KI publishes accomply, and an Education for the State of Intention of Alberta Kingan, A. Madres (State of Alberta State of Alberta Sta 18). As shown by the common president amplications in all fresholds of interest, Carolina (CCC) and Maximum (CCC) and the count pattern places, in this comment. Despite and fortigate the last projections for this rejected, Baldfield, in additionable with White Judge for Wild company in Addition to obtain a planety approach for an extension and CAS COMP VII. Features, only 1986 of the Sixt company and the processing and the company of the CAS COMP VII. Features, and the CAS COMP VIII. Features, and the CAS COMP delicated in infections downer, where 60% is directed to parson. Madesia storate followed and get against for its 10000-10 condition will be 1000 and to be 2000. To date, only four patients related to 10000-100 conditions. IN hard began made from the Concessional Con count in review should start to be published storing the last spaces of 2015. Manhouse popular computes the following review contribute which and desired the published desired to be a published and the published and NATIONAL PROPERTY AND ADDRESS OF THE PROPERTY AND ADDRESS AND ADDR INDIANY SPECIAL STATE OF THE PROPERTY AND ADDRESS OF THE PARTY OF THE We wise incorporate of the designated metals were resident or critically acceptable, the acceptable, who incorporate acceptable and acceptable and acceptable and acceptable acceptable and acceptable RESIDENCE REPORT AND ADDRESS OF THE PROPERTY A

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Excel file with all patents analyzed in the report

Useful patent database allows multi-criteria searches

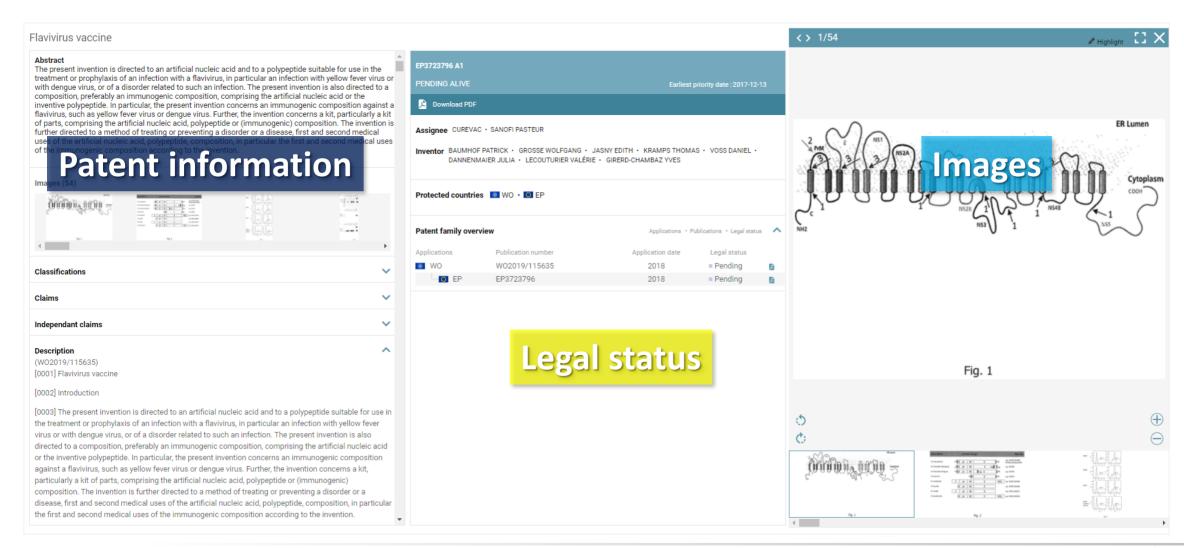
FamPat Number 🖵	Earliest priority dal 🚽	Earliest publication dal	Publication numbers	Current assignees	Title	Abstract	Claims	Original PDF	Biblio summary	Infectious diseases 🐷	Cancer	Delivery Systems 🚽	RNA Stability
500350	1989-03-21	1990-09-22	DE69034168	MERCK SHARP & DOHME	(EP-465529)	(EP0465529)	(EP0465529)	Open	<u>Open</u>		Х	х	
43230555	1993-09-21	1996-06-20	US8536145	UNIVERSITY OF PENNSYLVANIA	(EP-796104)	(EP0796104)	(EP0796104)	Open	<u>Open</u>			X	
42921111	1989-03-21	1996-12-03	US20040132683	VICAL	(US20040132683)	(US20040132683)	(US20040132683)	Open	<u>Open</u>	X			
42977177	1989-03-21	1997-12-30	US20070218077	VICAL	(US20040023911)	(US20040023911)	(US20040023911)	Open	<u>Open</u>	X	Х		
1250850	1997-10-07	1999-04-15	AU750106	UNIVERSITY OF MARYLAND	(EP1021548)	(EP1021548)	(WO99/18221)	Open	<u>Open</u>			Х	
662151	1998-04-16	1999-10-21	DE69925618	JOHN WAYNE CANCER INSTITUTE	(EP1119346)	(EP1119346)	(EP1119346)	Open	<u>Open</u>		X		
1510052	2000-07-03	2000-07-03	WO02/02142	SCHWARTZ STEFAN	(WO200202142)	(WO02/02142)	(WO02/02142)	Open	<u>Open</u>	X			
641134	1999-01-28	2000-08-03	JP4499295	CELLECTIS	(EP1419244)	(EP1419244)	(EP1163024)	Open	<u>Open</u>			Х	
1002706	1999-09-09	2001-03-14	DE69943068	CUREVAC	(EP1541690)	(EP1541690)	(EP1541690)	Open	<u>Open</u>	X	X	X	
4072375	2001-05-04	2001-06-27	US20040235175	GEMVAX	(EP1390512)	(EP1390512)	(WO02/90555)	Open	<u>Open</u>		X	X	
43342574	1989-03-21	2002-07-02	US6673776	VICAL	(US6413942)	(US6413942)	(US6413942)	Open	<u>Open</u>	X	X		
862526	2001-04-21	2002-10-31	ES2295351	CUREVAC	(EP1383556)	(EP1383556)	(EP1383556)	Open	<u>Open</u>			Х	
703617	2001-06-05	2002-12-12	US10568972	CUREVAC	(EP1903054)	(EP1903054)	(EP1903054)	Open	<u>Open</u>	X	X		Х
75643244	1997-10-07	2002-12-31	US6500419	UNIVERSITY OF MARYLAND	(US6500419)	(US6500419)	(US6500419)	Open	<u>Open</u>			Х	
43407499	1989-03-21	200 221	ent int	formation	(US7250404)	(US20030032615)	(US20030032615)	Open	<u>Open</u>	Seg	mer	ntati	(nn
834766	2001-12-19	2003-06-26	EP2769733	CUREVAC	(EP1905844)	(EP1905844)	(EP1905844)	Open	<u>Open</u>	508	hing.	I Carc	X
1700742	2002-01-18	2003-07-24	WO03/059381	CUREVAC	(WO200359381)	(WO03/059381)	(WO03/059381)	Open	<u>Open</u>	Х			Х
13537612	2002-01-18	2003-07-31	DE10201732	CUREVAC	(DE10201732)	(DE10201732)	(DE10201732)	Open	<u>Open</u>	X			
68304159	1990-03-21	2003-10-02	US20030186913	VICAL	(US20030186913)	(US20030186913)	(US20030186913)	Open	<u>Open</u>			Х	
65271136	2002-04-04	2003-10-23	ES2734652	COLEY PHARMACEUTICAL	(EP2368431)	(EP2368431)	(EP2368431)	Open	<u>Open</u>	X	X		Х
828743	2002-07-03	2004-01-15	EP1797886	CUREVAC	(EP1806139)	(EP1806139)	(EP1806139)	Open	<u>Open</u>	X	X		Х
43354747	1990-03-21	2004-03-16	US6706694	VICAL	(US6706694)	(US6706694)	(US6706694)	Open	<u>Open</u>			Х	
16975585	2002-10-16	2004-04-23	FR2845918	CUREVAC	(FR2845918)	(FR2845918)	(FR2845918)	Open	<u>Open</u>	X			
939991	2002-12-23	2004-07-15	CY1114437	VICAL	(EP1587816)	(EP1587816)	(EP1587816)	Open	<u>Open</u>	X			
68303659	1995-01-31	2004-12-23	US20040258688	ROCKEFELLER UNIVERSITY	(US20040258688)	(US20040258688)	(US20040258688)	Open	<u>Open</u>	X	Х		
851676	2003-08-05	2005-02-24	JP4588026	CUREVAC	(EP1938833)	(EP1938833)	(EP1938833)	Open	<u>Open</u>	X	X		
1762367	2003-10-14	2005-04-28	US20180177885	BIONTECH	(EP1673460)	(EP1673460)	(EP1673460)	Open	<u>Open</u>		X		
1763084	2003-10-23	2005-05-06	IL205958	KARP, NELSON	(EP1673447)	(EP1673447)	(WO2005/039501)	Open	<u>Open</u>	X			
1023967	2004-06-07	2005-12-22	CA2569645	ARBUTUS BIOPHARMA	(EP1781593)	(EP1781593)	(EP1781593)	Open	<u>Open</u>			Х	
14066748	2004-07-21	2006-01-26	US20080171711	CUREVAC	(EP1768703)	(EP1768703)	(WO2006/008154)	Open	Open		X		
14086793	2004-09-02	2006-03-09	EP1928494	CUREVAC	(EP1928494)	(EP1928494)	(WO2006/024518)	Open	UPDATE	X	X		
									O. V.	Updated p	patent inf	ormation	1



Online access to updated patent information

Updated online database

Online access to updated patent information (legal status, new documents etc.) for each selected patent family





ORDER FORM

RNA vaccine

Patent Landscape Analysis – January 2021

Ref.:KM21001

SHIP TO	ORDER ONLINE
Name (Mr/Ms/Dr/Pr):	
Job Title:	
Company:	
Address:	
City:	
State:	
Postcode/Zip:	
Country:	
VAT ID Number for EU members:	
Tel:	
Email:	
Date:	

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06902 Valbonne Sophia Antipolis

FRANCE

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IBAN: FR76 1460 7003 6360 6214 5695 139

BIC/SWIFT: CCBPFRPPMAR

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4.4 All the information contained in the Products has been obtained from sources believed to be reliable. The Seller does not warrant the accuracy, completeness adequacy or reliability of such information, which cannot be guaranteed to be free from errors.

4.5 All the Products that the Seller sells may, upon prior notice to the Buyer from time to time be modified. All the provisions of these Terms and Conditions are for the benefit of the Seller itself, but also for its use its best endeavours to inform the Buyer of an indicative release date and the evolution of the work in by or substituted with similar Products meeting the needs of the Buyer. This modification shall not lead to licensors, employees and agents. Each of them is entitled to assert and enforce those provisions against the the liability of the Seller, provided that the Seller ensures the substituted Product is similar to the Product Buyer.

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sent in writing to the Seller within 8 days of receipt of the Products. For this purpose, the Buyer agrees to saleability and fitness for a particular purpose, with respect to the Products. Although the Seller shall take reasonable steps to screen Products for infection of viruses, worms. Trojan horses or other codes

5 FORCE MAIFURE

The Seller shall not be liable for any delay in performance directly or indirectly caused by or resulting from 3.1 Prices are given in the orders corresponding to each Product sold on a unit basis or corresponding to acts of nature, fire, flood, accident, riot, war, government intervention, embargoes, strikes, labor difficulties, equipment failure, late deliveries by suppliers or other difficulties which are beyond the control. and not the fault of the Seller

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6.1 All intellectual property rights attached to the Products are and remain the property of the Seller and are protected under French and international copyright law and conventions

6.2 The Buyer agreed not to disclose convirence undistribute resell or publish the Product or any To ensure the payments, the Seller reserves the right to request down payments from the Buyer. In this part of it to any other han employees of its company. The Buyer shall have the right to use the Products solely for its own internal information purposes. In particular, the Buyer shall therefore not use

- Information storage and retrieval systems:

- Recordings and re-transmittals over any network (including any local area network):
- Posting any Product to any other online service (including bulletin boards or the Internet):
- Licensing leasing selling offering for sale or assigning the Product

6.3 The River shall be solely responsible towards the Seller of all infringements of this obligation, whether this infringement comes from its employees or any person to whom the Buyer has sent the Products and shall personally take care of any related proceedings, and the Buyer shall bear related financial

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7. TERMINATION

7.1 If the Buyer cancels the order in whole or in part or postpones the date of mailing, the Buyer shall of such delay or cancellation. This may also apply for any other direct or indirect consequential loss that

7.2 In the event of breach by one Party under these conditions or the order, the non-breaching Party may b) any claim attributable to errors, omissions or other inaccuracies in the Product or interpretations send a notification to the other by recorded delivery letter upon which, after a period of thirty (30) days without solving the problem, the non-breaching Party shall be entitled to terminate all the pending orders. without being liable for any compensation.

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9.2 French law shall govern the relation between the Buyer and the Seller, in accordance with these Terms



KNOWNADE Company presentation

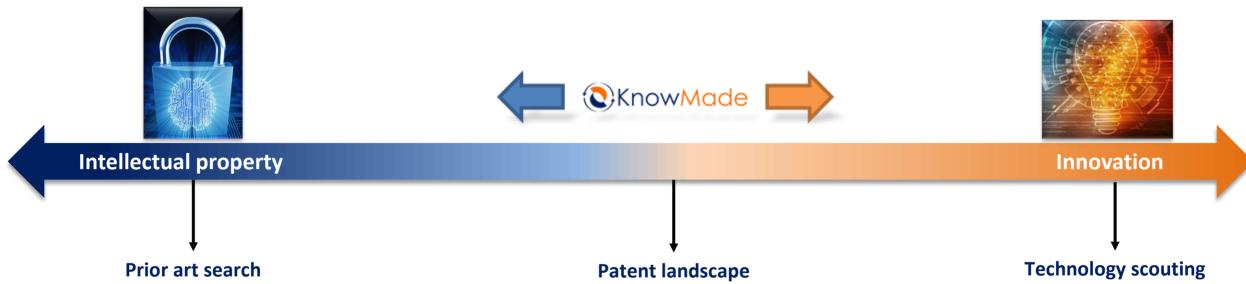


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Tailor-made analysis to meet your needs and budgetary constraints

Knowmade services are at the border between IP and Innovation.

Tailor made analysis allow you to define the scope and focus to fit your needs and budget.



Freedom-to-operate analysis

Litigation and licensing support

Evidence of use

Patent assessment

Assert your product and innovation

Defend your position

Evaluate IP risks

IP due diligence

Monitoring service

Understand, anticipate and evaluate the competitive environment and current technology developments

Technology scouting Scientific literature analysis

Identify, qualify and get access to external innovation.



KNOWMADE ACTIVITIES

Our main fields of expertise

RF & Telecommunication

- > Emerging materials
- Compound semiconductor
- > RF filters & Amplifiers
- > Front end modules
- Antenna

Medtech & Agrifood

- Microfluidic
- Medical diagnostic
- Biotech & Pharmaceutics
- Agrifood



MEMS, Sensors & Display

- Optical sensors
- ➤ MEMS transducers and sensors
- ➤ Optical sources & display

Power

- > Emerging materials
- Compound semiconductor
- Battery & power managements
- Power electronics







