SECONDARY RESEARCH SERVICES

Pharma / Biotech Experience

SCITECH
PATENT ART

*Scientists powered by **ML & Deep Web** tools*

www.patent-art.com

ABOUT SCITECH PATENT ART (SPA)

- Established in 2002…one of India's leading technology intelligence firms for more than 17 years
- Maintaining ***confidentiality*** is core to our business
- Serve Fortune 500, universities and law firms
- 95+ advanced degree ***scientists and technologists***

Our Difference

Human experts powered by data engineering & AI / ML tools

Client advantages: Cost, Turnaround Time & Quality

TEAM BACKGROUND: R&D, IP & COMMERCIALIZATION

Dr. Srin Achanta

Founder & Managing Director

- 25+ years in technology commercialization
- Technology & business strategy expertise
- Past affiliations: P&G, Booz & Co., Honeywell

Ms. Linda Perucca

Representative, USA

- 25+ years in R&D and Quality
- Knowledge Management & Training
- Past affiliations: Mondelez International

Mr. Hitoshi Yoshino

Representative, Japan

- 25+ years in technology transfer / licensing
- Large JP network – universities, companies, etc.
- Past affiliations: BTG, QED, JPO

Mrs. Uma Parameswaran

Executive Advisor

- 25+ years in R&D, Indian patent agent
- 12 years in technology analytics
- Past affiliation: R&D team lead at ACC, Mumbai

Mrs. Harita Achanta

Director

- 15+ years in engineering and IP analytics
- U.S. patent agent
- Past affiliations: Convergys, Sherwin Williams

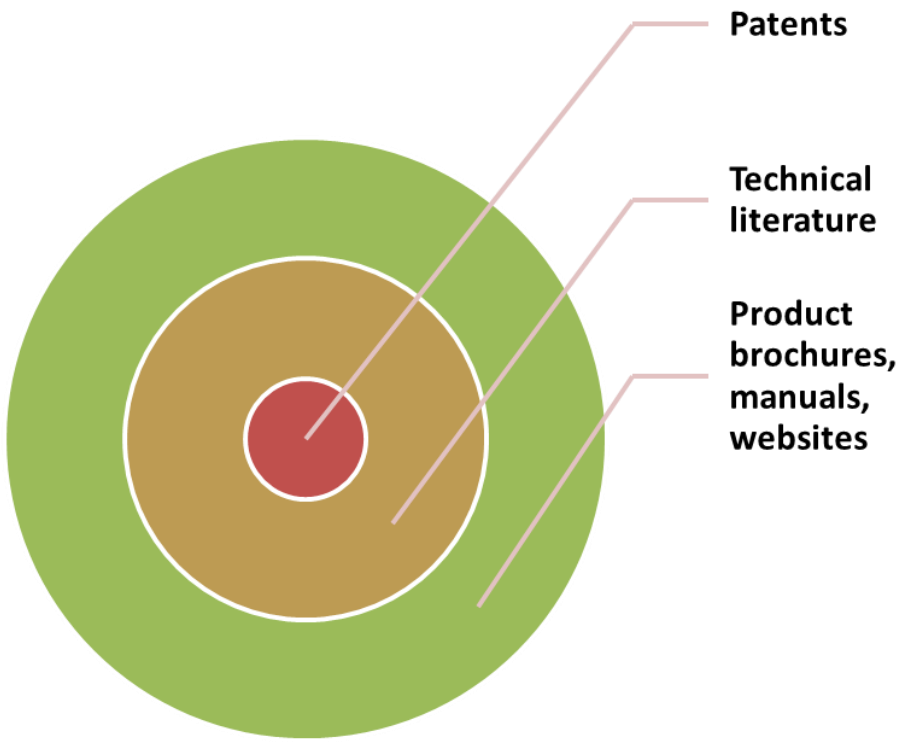
Mr. Mark Kline

Consultant, USA

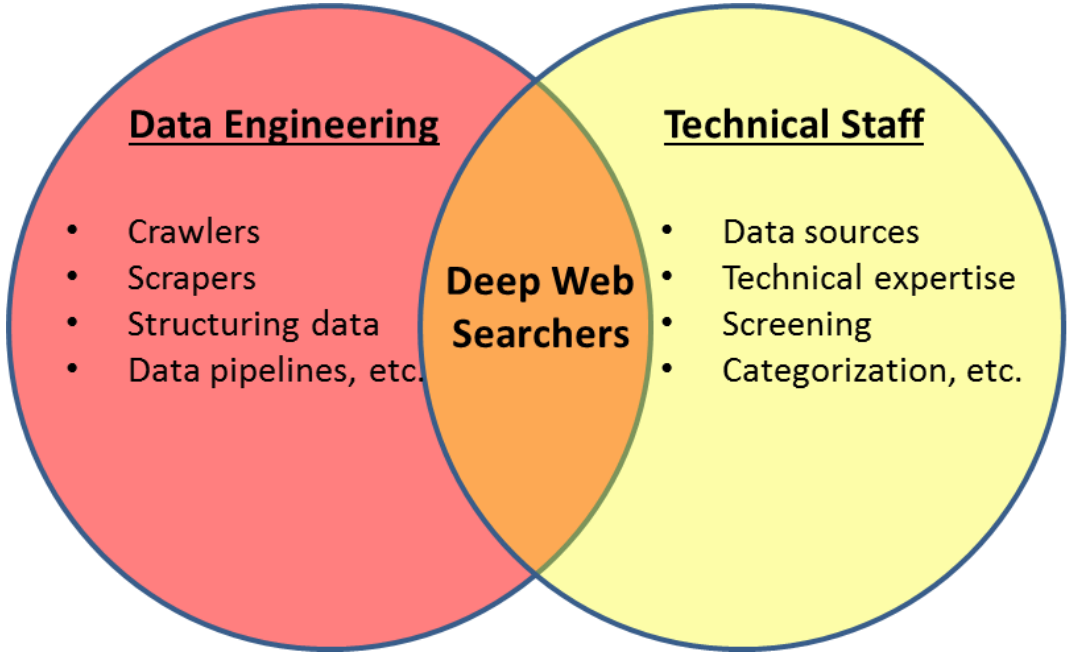
- 35+ years in research and open innovation
- Over 125 patents
- Patent strategy, patent prosecutions, patent litigations and training for inventors

OUR EVOLUTION

Patent research → ***Technology research***



Capability migration



SERVICES & TOOLS – AN OVERVIEW

R&D SERVICES

- Technology trends
- Patent landscape
- Non-patent landscape
- Product landscape
- One-page summaries
- White-space analysis
- Problem-solution analysis
- Open innovation partner identification
- Start-up tracking
- Competitor monitoring
- …other custom R&D requests

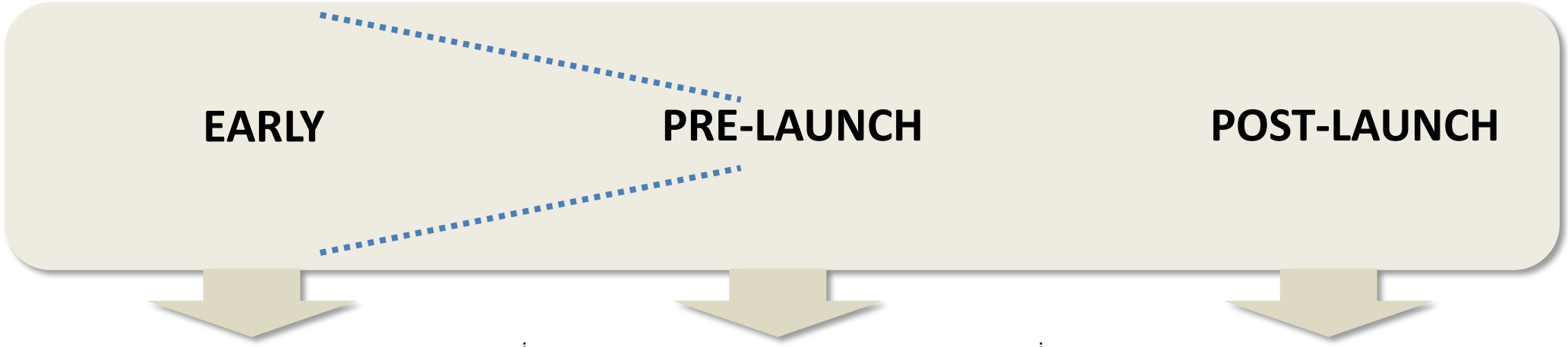
IP/NON-IP SEARCH SERVICES

- Prior art / State of the art
- Patentability assessment
- Freedom-to-operate
- Validity/Invalidity searches
- Evidence-of-use searches / patent-product matching
- Patent term extension
- Design searches
- Customized patent alerts
- Patent drafting/office action support
- Prosecution tracking

TOOLS/PORTALS

- Alerts portal
- Patent portfolio analysis portal
- Bloom of ideas portal
- Non-patent literature portal
- Auto-labeling tool
- Prosecution-tracking portal
- Start-up/Incubator/Accelerator tracker portal
- Deep Web search tool
- Subject-specific AI agents
- Screening/analysis assistant
- …other custom tools by request

SERVICE FUNNEL



- Technology trends
- Patent landscape
- Non-patent landscape
- Product landscape
- Problem-solution
- White-space analysis
- OI partners, etc.

- Patentability
- Freedom-to-operate
- Invalidation
- Designs
- Prosecution tracking
- Patent drafting
- Office action support, etc.

- Competitor monitoring
- Patent alerts, news alerts
- One page summaries
- Patent-product matching
- Evidence of use
- Start-up tracking
- IP-term extensions, etc.

PHARMA / BIOTECH EXPERIENCE

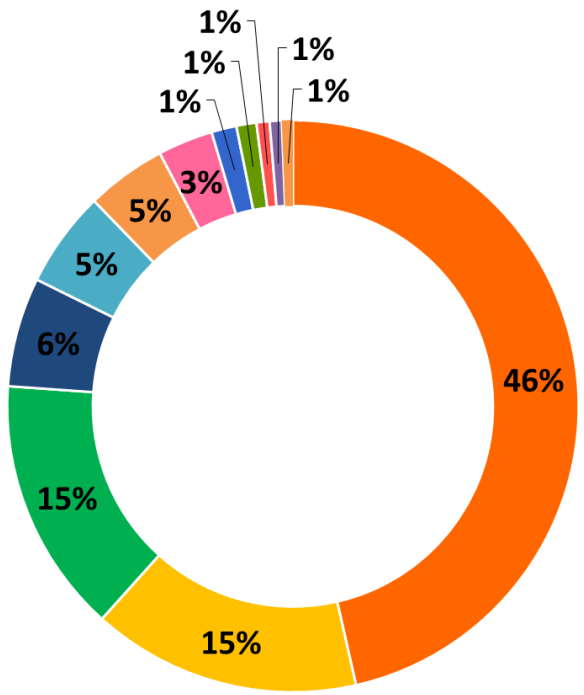
- **Technically qualified staff – most of SPA's work is inter-disciplinary**
  - Ph.D. in Material Science [2 staff members]
  - Master's / Ph.D. Pharmaceutical Sciences [2]
  - Master's in Biotechnology [6]
  - Master's/Ph.D. in Chemistry [12]
  - Master's/Ph.D. in Chemical Engineering [6]

- **Data sources used in research**
  - PubMed, ScienceDirect, Wiley, GoogleScholar
  - NIH Grants
  - STTR/SBIR/European funding agencies
  - US FDA and EMA (regulatory filings, product labels,…)
  - Product IFU's
  - Patents (TI, Orbit, Patbase, STN, Pacer,…)
  - Start-ups (Crunchbase, Pitchbook, Deep Web)
  - Web-sites, annual reports

RECENT WHITEPAPERS

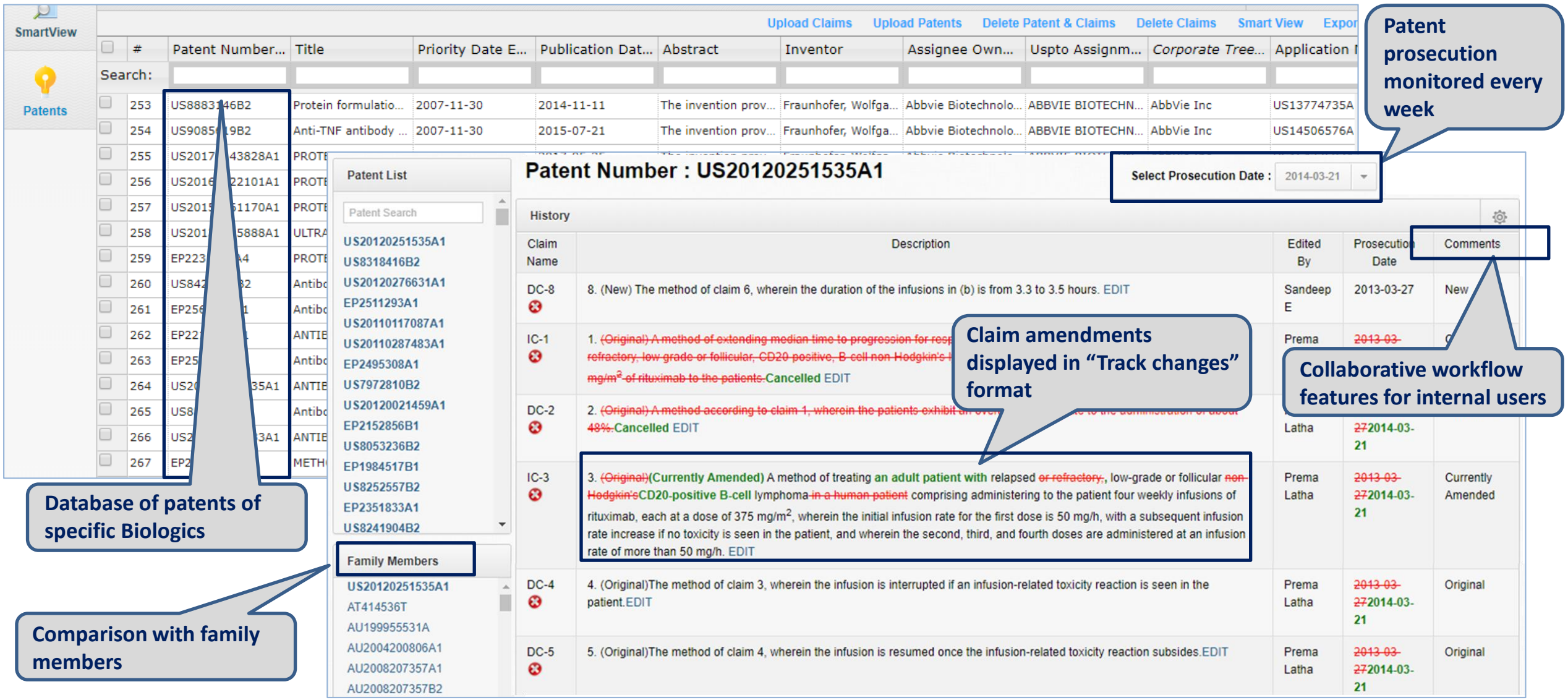
- *Cepheid, Inc. Company Profile*
- *Serology Testing – Competitive Report*
- *Covid-19 Vaccines - Update*

TYPES OF PROJECTS EXECUTED



- Patent Alerts
- Prior Art
- IP Landscape
- Novelty Assessment
- Freedom to Operate
- Patent Prosecution History
- Validity Search
- Scientific Literature Search
- Company Portfolio
- Competitor Intelligence
- Patent Drafting and Filing
- Quick/Swift Search

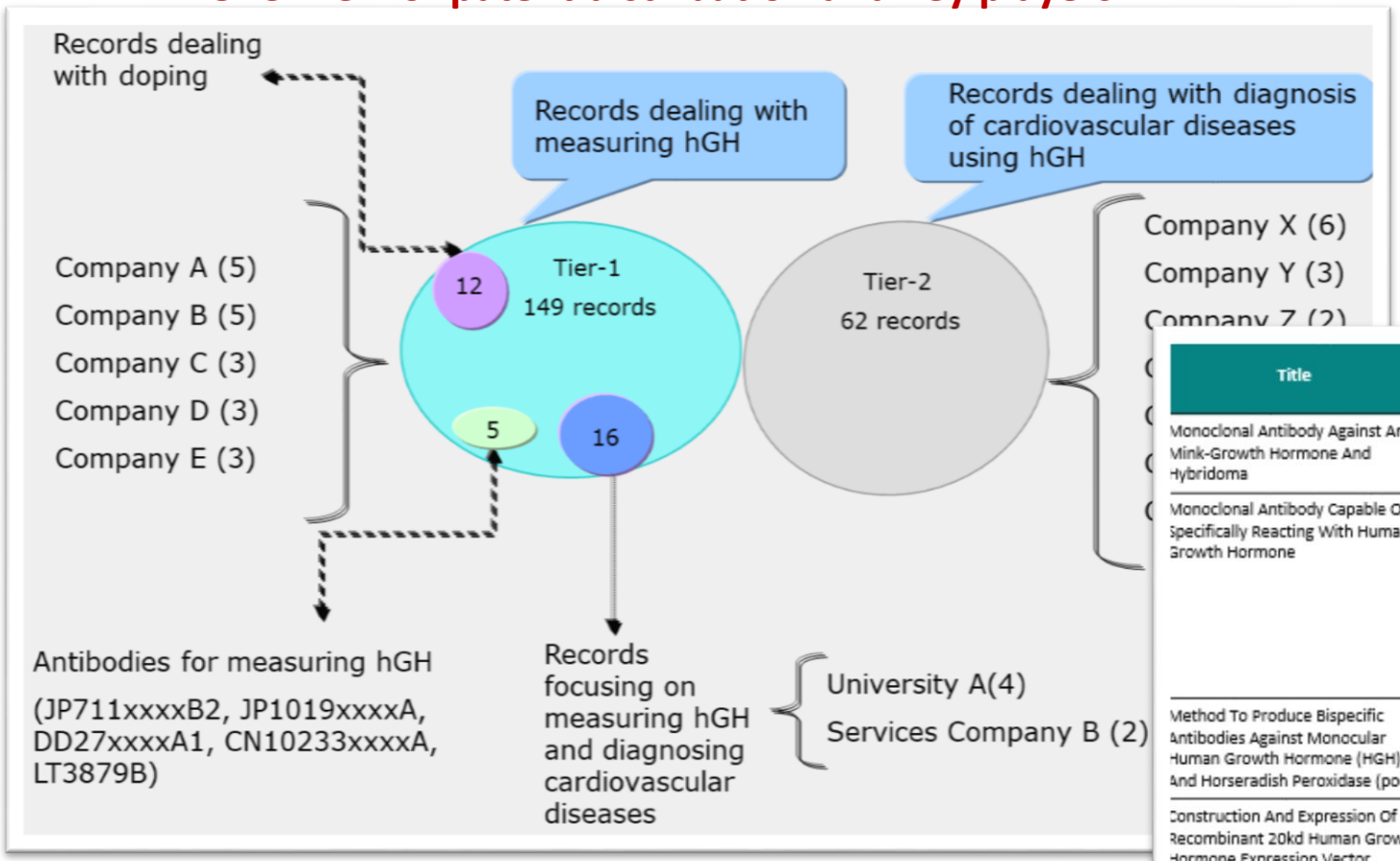
EXAMPLE: PROSECUTION TRACKING TOOL



SCITECH PATENT ART

EXAMPLE: IP ACTIVITY IN HUMAN GROWTH HORMONE

Overview of patent distribution and key players



Collaborations

Title	Collaborating Assignees	Focus
Triazine Based Ligands And Use Thereof	Novo Nordisk A/S | ProMetic Life Sciences Inc	Affinity ligand-support matrices in the separation, isolation, purification, quantification, identification and characterisation of proteinaceous materials
Strain Of Hybridous Cultured Mammalian Cells Mus Musculus L - A Producer Of Monoclonal Antibodies To The Human Somatotropin	V Endokrinologicheskij Nauchnyj Tsentr Amn Sssr | Nii Morfologii Cheloveka Amn Sssr	Cultivated hybrid musculus L. cell strain used as producer of monoclonal antibodies for human somatotropin.
Lyophilized Ligand-Receptor Complexes For Assays And Sensors	US Drug Testing Inc | US Secretary of the Navy	Lyophilized ligand-receptor complexes, which are useful for assays and sensors, and processes for preparing such lyophilized ligand-receptor complexes
		Antibodies or fragments thereof used as targeting moieties and receptor mediated transport for a controlled drug release system
		Albumin fusion protein is useful for preparing a composition for treating diabetes mellitus
		Liposome useful as drug delivery vehicle for the production of a medicament.
		Monoclonal antibody specifically recognizes and combined 20kD GH
		Method for the control of doping

Title	Type of assay/Detection method	Composition of matter	Assignee/Applicant
Monoclonal Antibody Against Anti-Mink-Growth Hormone And Hybridoma	ELISA	Monoclonal antibodies	
Monoclonal Antibody Capable Of Specifically Reacting With Human Growth Hormone	Immunoassay - enzyme immunoassay (sandwich enzyme immunoassay); radioimmunoassay, fluorescence immunoassay, luminescent immunoassay	Monoclonal antibody (hybridoma FERM P-monoclonal antibody)	
Method To Produce Bispecific Antibodies Against Monocular Human Growth Hormone (HGH) And Horseradish Peroxidase (pod)	Unspecified	Monoclonal bispecific antibodies (Ab)	
Construction And Expression Of Recombinant 20kd Human Growth Hormone Expression Vector, Preparation Of Monoclonal Antibody, And Cell Strain Secreting The Monoclonal Antibody	ELISA, surface plasma resonance (SPR) analysis	Monoclonal antibody	
Hybridoma Producing Murine Monoclonal Antibodies Against Human Growth Hormone	Unspecified	Monoclonal antibodies	

Patent analysis of key players

SCITECH PATENT ART

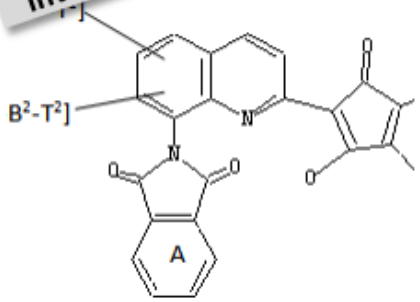
EXAMPLE: WHITE SPACE ANALYSIS - BIOMARKERS

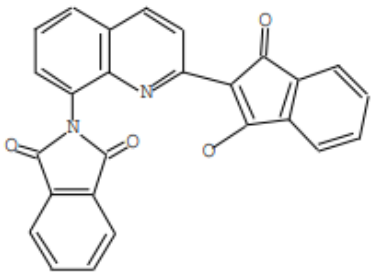
Application / Type of probe	Detection/ Diagnosis/ Bioassays	Cell tracking	Bioimaging	Biomarkers	Biosensors
Fluorescent compounds	213	3	47	2	12
Fluorescent labelling	157	1	32	3	6
Radio labelling	110		10	2	
Fluorescent nanoparticles	37		17	1	3
Fluorescent proteins	31		8		1
Quantum dots	20	4	19	1	1

Potential areas for future research and protection

EXAMPLE: STRUCTURE SEARCH OF MOLECULES

Example of an invalidity search





Objective - To search for literature disclosing the structure as show on the left

Wherein

- A and A' are identical or different rings which may each be substituted by from 1 to 4 chlorine and/or fluorine atoms ;
- T^1 and T^2 are independently a chemical bond, -$CONR^1$- or -SO_2NR^1-;
- B^1 and B^2 are independently a chemical bond, C_1-C_8-alkylene or phenylene;
- X and Y
- R^1 is hydrogen; C_1-C_6-alkyl; or C_1-C_5-alkyl-substituted naphthyl;
- R^2, R^3, R^4 and R^5 are independently hydrogen; C_1-C_{30}-alkyl; or C_2-C_{24}-alkenyl-substituted phenyl; unsubstituted or C_1-C_{10}-alkyl- or C_2-C_{24}-alkenyl-substitu
- R^6, R^7 and R^8 are independently
- x is an integer ≥ 1,

Search Methodology -

Date of search: mm dd, yyyy

Database Used: Database Used: Regi

Period of search: From 1907 till Apri

Methodology:

- A sub-structure search was perfor
- Another search was conducted in
- XX patents and YY non-patent ref
- A sub-structure search was also p
- Finally, a sub-structure search wa generically. This resulted in six ad
- A search was conducted in the na
- A citation search for highly releva

Summary of search results

The search resulted in total 6 relevant hits. Out of total 6 hits only two patent records and one non-patent record (tier 1) are disclosing a sulphonated quinophthalone including the product patent assigned to company X (WO 20020xxxxx). All identified prior art references are listed below in a table as per International Search Report

Ref #	Citation of document, with indication, where appropriate, of the relevant passages	Category*
1	WO 20020xxxxx (Assignee X), DD January YYYY, Abstract, Claim 1, 7, 8, 16, 17	X
2	JP 20040xxxxx (Assignee Y), DD May YYYY, Abstract, Claim 1, 3, 4, 5, Description	X
3	Author et al. "Title" Organic Electronics, YYYY, Vol (issue), pp (Page XXX, Fig 3(d))	Y

* Special categories of cited documents:

"X" document of particular relevance; the invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"A" document defining the general state of the art which is not considered to be of particular relevance

EXAMPLE: GENE SEQUENCE SEARCH

I. Objective

A) To find all documents containing Sequence A or sequences with more than 60% identity to Sequence A

B) To provide additional documents describing Cel61A of xxxx not already covered by the sequence search.

Sequence A (**Query** = 323 letters)

HGHINDIVINGVWYQAYDPTTFPYESNPPIV[illegible]TNAKGHASVKAGDTILFQ
WVPVPWPHPGPIVDYLANCNGDCETVDKT[illegible]VLISNNNTWVVKIPDNLAPGNYVL
RHEIIALHSAGQANGAQNYPQCFNIAVSGSGS[illegible]TDLYHATDPGVLINIYTSPLNYIIPGPTVVSGLPTSVAQGS
SAATATASATVPGGGSGPTSRTTTTARTTQASS[illegible]STPPATTSAPAGGPTQTLYGQCGGSGYSGPTRCAPPATCSTLN
PYYAQCLN

Search approach

II. Search Methodology

Date of final search: July 03, 2014

Databases used: USGENE; DGENE; PCTGEN; REGISTRY; CAPLUS; NCBI, Thomson Innovation, Pubmed and other web sources

Period of search: From 1907 onwards (Coverage of Chemical Abstract)

A protein blast search for sequence A was conducted in USGENE; DGENE; PCTGEN; REGISTRY/CAPLUS databases with percentage identity above or equal to 60%. A total of 41 records (17 families) were retrieved which had identity ranging from 90 - 100%; and are listed below.

A protein blast search was also conducted in NCBI – pblast.

A search was also conducted using keywords pertaining to Cel61A and XXXX in patent databases (Thomson Innovation, HCAPLUS) and in freely available databases for non-patent literature.

Finally a citation search was conducted for Refs 1-17 but no additional document was retrieved.

III. Search Results

Search results related to sequence A are provided in section A. T[illegible]e are 17 patent records and three non-patent records related to the given sequen[illegible]key patent filer with eight patent records in this section followed b[illegible]s.

Summary of results

Additional documents related to Ce[illegible]1A are provided in section B (page 22). There are seven patents and six non-patent refernces in this section.

Reference 11

Note: Green colour indicates "mismatch";

WO201409XXXXA2

Red colour indicates "Gap" in the sequence

Title: Methods for enhancing the degradation or conversion of cellulosic material

Applicant(S): Company A

Inventor(s): Schnorr Kirk; Shaghasi Tarana; Mcbrayer Brett

Patent Family: WO2014092832A2

Score = 612 bits (1577), Expect = e-180; Identiti[illegible]

Positives = 310/325 (95%), Gaps = 7/325 [illegible]

Excerpts from references

Abstract: The present invention relates [illegible]esses for degrading a cellulosic material and for producing substances from the cellulosic ma[illegible]rial.

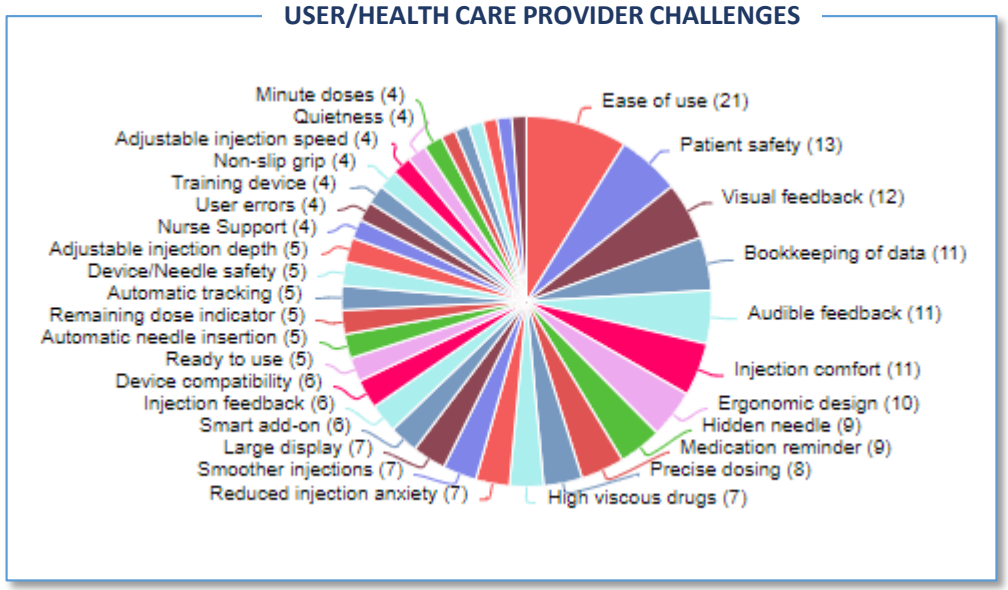
Sequence length from patent = 346

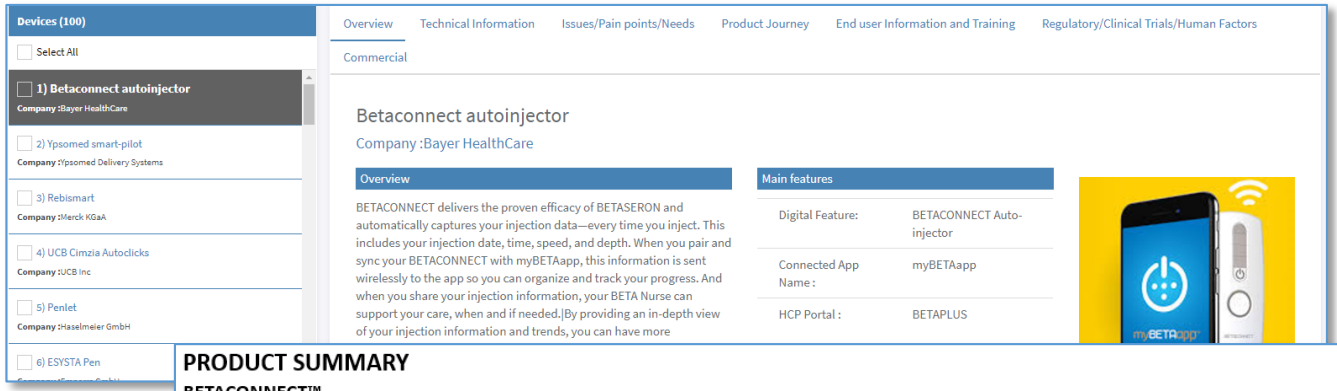
HGHINNIVINGVYYQAYDPTSFPYESNPPIVVGWTAADLDNGFVSPDAYGSPDIICHKNATNAKGHASVRAGDTVL
FQWVPLPWPHPGPIVDYLANCNGDCETVDKTSLEFFKIDGVGLISGGDPGNWASDVLIANNNTWVVKIPDDLAPG
NYVLRHEIIALHSAGQANGAQNYPQCFNLAVSGSGSLKPSGVKGTALYHATDPGVLINIYTSPLNYIIPGPTVVSGLPT
SVAQRSSAATATASATLPGGGGSPPGGPTSRPTTTARSTSQASSRPS—PPATTSAPAGGPTQTLYGQCG
GSGYSGPTRCAPPATVSTLNPYYAR

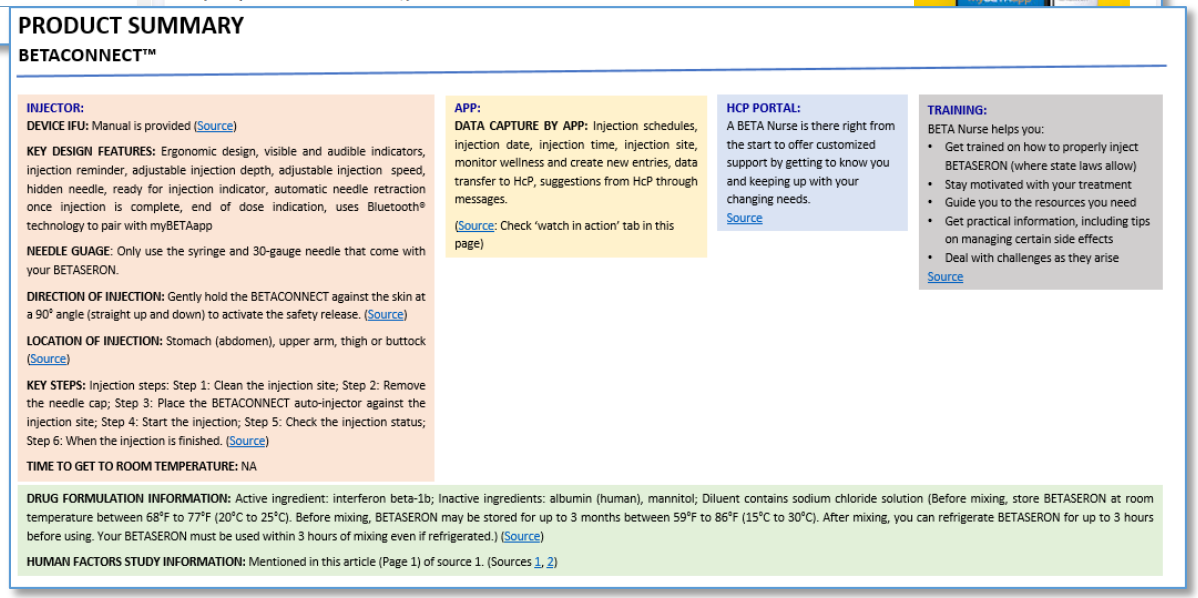
EXAMPLE: SUB-CUTANEOUS DELIVERY SYSTEMS FOR XXX

Methodology:

- Comprehensive search was conducted to identify various approaches/delivery systems for oral delivery of XXX drugs using online databases (US FDA, PubMed, ScienceDirect, clinicaltrials.gov, EMA) and news items. These delivery systems were further assessed based on product features, product journey, commercialization aspects, clinical/regulatory compliance, end user perspective, major challenges, etc.
- Created a searchable database to understand the trends for device challenges, to compare different devices to understand the unique features, etc.







EXAMPLE: TECHNOLOGY OPTIONS FOR INCREASING INJECTABLE DRUG HALF LIFE

Methodology:

- Comprehensive search was conducted to identify various technology options for increasing half life of injectable drugs (XXX drugs) using available online databases (PubMed, clinicaltrials.gov, USFDA, EMA) and company websites.
- These technologies were comprehensively assessed based on TRL details, dosing-frequency, safety, efficacy, regulatory compliance, etc.

	Company A		Company B		Company C	
Summary	Xgel and Xsol XXXX copolymer drug delivery technology platform developed through the sequential coupling of five biocompatible/biodegradable polymer blocks selected from among XXX, YYY and ZZZ		The long acting release mechanism of drugs with XXXX microspheres are based upon diffusion		XXXX is an advanced injectable gel drug depot system, offering un-paralleled retention and release of active pharmaceutical ingredients from a soft, localized drug depot.	
Technology Readiness Level (TRL)	X		X		X	
Technology Bin	XXXX HYDROGEL		XXXX HYDROGEL		XXXX HYDROGEL	
Technology Name	NAME A		NAME B		NAME C	
	Decision	**Rationale**	**Decision**	**Rationale**	**Decision**	**Rationale**
Can this technology be used for delivering XXXX	yes	Technology can be used to deliver all types of biologics (no limitation regarding the molecular	yes	Technology can be used to deliver proteins, polypeptides (molecular weight equal to or	yes	Technology can be used for delivering peptides and small molecules, for proteins (in
is YYY dosing achievable by this technology	yes	Extended release of days to weeks and months	yes	Days to months Release time can be regulated	yes	Weekly dosing achievable Release can be tailored from one week to 2-3 months and beyond
is YYY dosing achievable by this technology	yes	Extended release of days to weeks and months The active ingredient retains its	yes	Days to months Release time can be regulated	yes	Monthly dosing achievable Release can be tailored from one week to 2-3 months and beyond
is SC dosing achievable by this technology?	yes	Suitable for subcutaneous, intramuscular or intra-articular injection via a ≥27-gauge needle.	yes	Subcutaneous achievable The XXXX platform can be used	yes	SC achievable Sustained in vivo release of hydrogels loaded with celecoxib,
Are excipients GRAS?	yes	Safe excipients XXXgel and YYYsol compositions are easy to	yes	Safe excipients, individual monomers are proved for human applications	yes	Safe excipients XXX-YYY-ZZZ triblock copolymers are safe-to-use
Does technology target specific sites for action	TBD	No information available	yes	Site specific delivery is possible Sustained release technology for	yes	localized drug depot , eyes, brain, joints, muscles and in other organs**(2)**

EXAMPLE: THERAPEUTICS PIPELINE STUDY

Methodology:

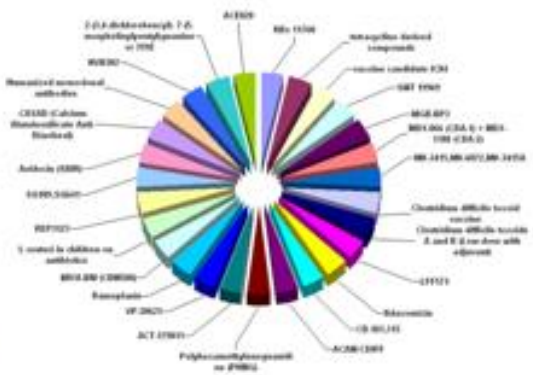
A comprehensive search was conducted for information on new chemical entities using freely available online databases (clinicaltrials.gov, www.who.int/ictrp) and news items.. Search was restricted to molecular entities pertaining to the treatment of XXXXX infection. The searches retrieved studies indicating on-going preclinical and clinical studies related to the treatment of XXXXX Infection.

List of New Chemical Entity

S. No.	Company	NCE	Mechanism of action	Phase of development	Parent/ deals/ partnerships/ alliances	Details	Reference 1	Reference 2	Reference 3
1	Daiichi Sankyo Life Science Research Centre, India (Rci)	RBx 11760, a novel biaryl oxazolidinone	A potent inhibitor of bacterial protein synthesis.The	Preclinical study	RCI is a part of Daiichi Sankyo India Pharma Pvt. Ltd.	Daiichi Sankyo Co. Ltd RCI is a part of	http://jac.oxfordjournals.org/content/64/5/1087	http://www.dsin.co.in/rci.php?cntID=3&cntSubID=1	
2	Paratek Pharmaceuticals	tetracycline derived compounds		Preclinical study		Targeted Antibiotics – a next generation application of	http://www.paratekpharm.com/pt_tet_inhib.html		
3	Summit Corporation	SMT 19969	The molecule combines potent activity against C.	Preclinical study	Wellcome Trust.	SMT 19969 is a novel antibiotic with an exceptionally	http://www.biospace.com/News/successful-completion-of-		
4	Mgb Biopharma	MGB-BP3	MGB BP-3 which is a small molecule which belongs to	Preclinical study	The company has been financed by a business angel	MGB BP-3 is already in late stage preclinical studies	http://www.mgb-biopharma.com/news.html		
5	Sequella Inc	SQ109,SQ641	which inhibit an essential enzyme present only in	Preclinical study			http://www.sequella.com/overview/therapeutics.html	http://www.euresearch.ch/index.php?id=3958&tx_tnevis[t	http://www.euresearch.ch/fileadmin/documents/PdfDocu
6	Axidbiotics	Axidocin (SBIR)	proteins represent a new class of highly targeted	Preclinical study		The company is focusing its own development	http://axidbiotics.com/2010/10/axidbiotics-receives-two-	http://www.gbsynthesis.com/news.html	
7	Progenics Pharmaceuticals, Inc	humanized monoclonal antibodies	designed to block the cytotoxic effects of C. difficile toxins	Preclinical study	National Institutes of Health (NIH)	Progenics Pharmaceuticals, Inc. (Nasdaq: PGNX)	http://www.progenics.com/releasedetail.cfm?ReleaseID=51		
8	GLsynthesis, Inc.	2-(3,4-dichlorobenzyl)- 7-(5-	Strongly inhibited the growth of a wide variety of C.	Preclinical study	Department of Health and Human Services	The compounds appear to be selective for Cdiff	http://doi.gov/doisearch/detail/4929	http://www.researchgate.net/publication/51899780_A_Now	

Overall scenario

New Molecular Entity



Player Vs Stage of development

Parent/ deals/ partnerships/ alliances/ grants

- Merck licensed NMEs MK 3415A, MK-3415A, MK-6072 for CDI treatment, from Massbio and Mederex.
- Sanofi-Aventis obtained the Clostridium difficile toxoid vaccine after the acquisition of the company Acambis.
- Helsinki University started trials for Polyhexamethylene guanidine after seeking funding from Soft Protector, The Finnish Funding Agency for Technology and Innovation (TEKES).
- With support from the National Cancer Institute (NCI), Salient Pharmaceuticals is actively conducting a Phase II clinical trial to test the safety and efficacy of CASAD™. This trial is underway at M.D. Anderson Hospital and other sites with preliminary results expected in 2012. This study is executed in collaboration with Scott and White Hospital & Clinic Texas, and A&M University.
- Progenics Pharmaceuticals Inc is funded by National Institutes of Health (NIH) to conduct clinical trials for humanized monoclonal antibodies.
- GL Synthesis Inc received grants from Department of Health and Human Services to conduct clinical trials for 2-(3,4-dichlorobenzyl)-7-(5-morpholinylpentyl) guanine.
- MGB Biopharma has been financed by a business angel syndicate led by Archangel Informal Investments Ltd in association with TriCapital Ltd, Barwell plc and the Scottish Co-investment Fund. The UK Government backed the Technology Strategy Board under its Smart scheme to conduct clinical trials.

EXAMPLE: CONNECT-THE-DOTS

CLIENT NEED & OUR SOLUTION

- **Tool for scientists to play in a well-defined sandbox…no noise**
  - Experts extract relevant information and pre-load in the database
  - Information is curated (humans assisted by machine) in a meaningful way
  - Search interface is intuitive and easy-to-use…no need for any searching expertise

- **Many information sources covered and search results linked…easy to "connect-the-dots"**
  - Patents, technical literature, websites, start-up databases, NIH grants, etc.
  - All information is linked across sources using author, affiliation and technology tags

- **Visualizations are meaningful and can be presented in management reviews seamlessly**
  - Many visualizations are available…can be further tailored to users' requirements
  - Charts can be downloaded, shared, printed, etc. easily

Connect-the-Dots Portal

to allow scientists to conduct their own secondary research quickly

BUSINESS MODELS TO ENGAGE SPA

- **Project-by-project model** *Full price*

- **Retainer model (hours consumed in a year)**
  - 1,000 hours *15% discount*
  - 2,000 hours *25% discount*
  - 4,000 hours *30% discount*

INTERESTED?

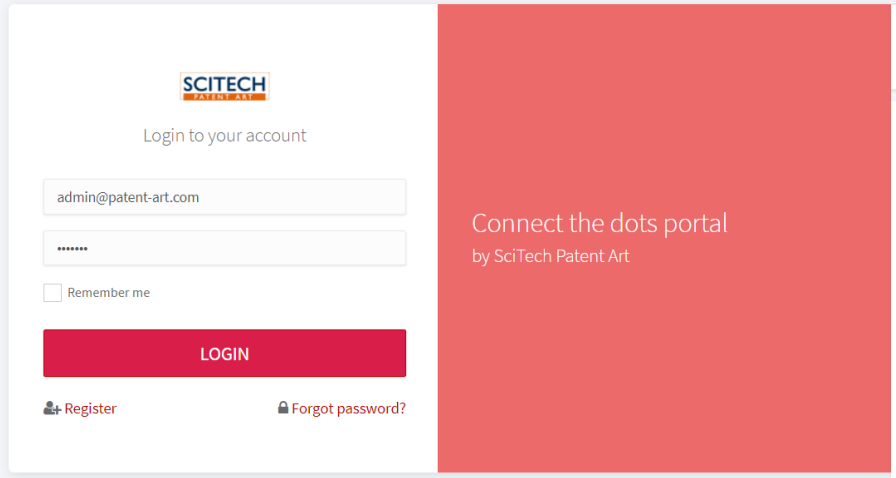
Contact: info@patent-art.com

www.patent-art.com

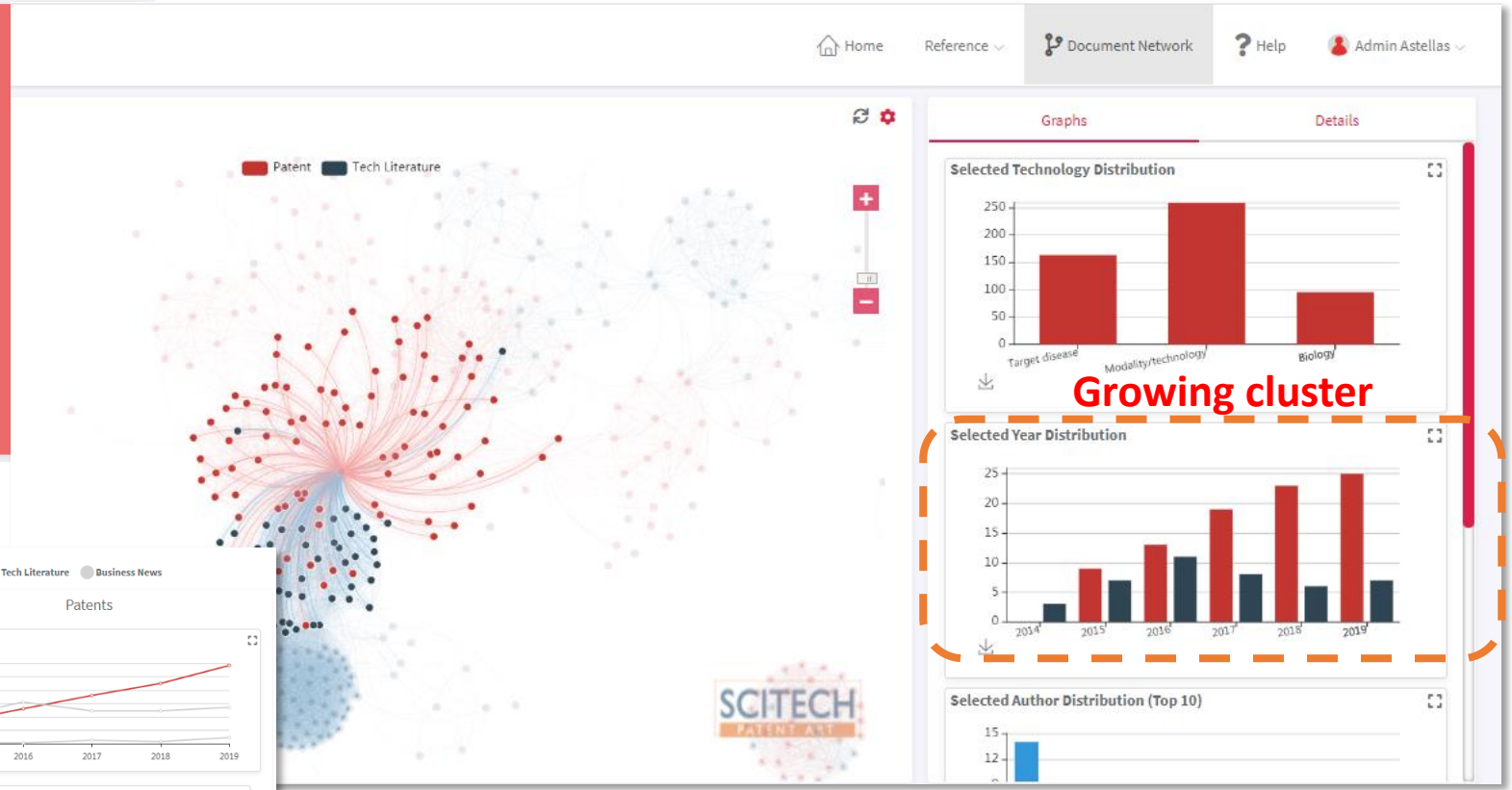
We look forward to hearing from you!

EXAMPLE SCREEN-SHOTS OF SPA'S CONNECT-THE-DOTS SOLUTION [1 OF 2]

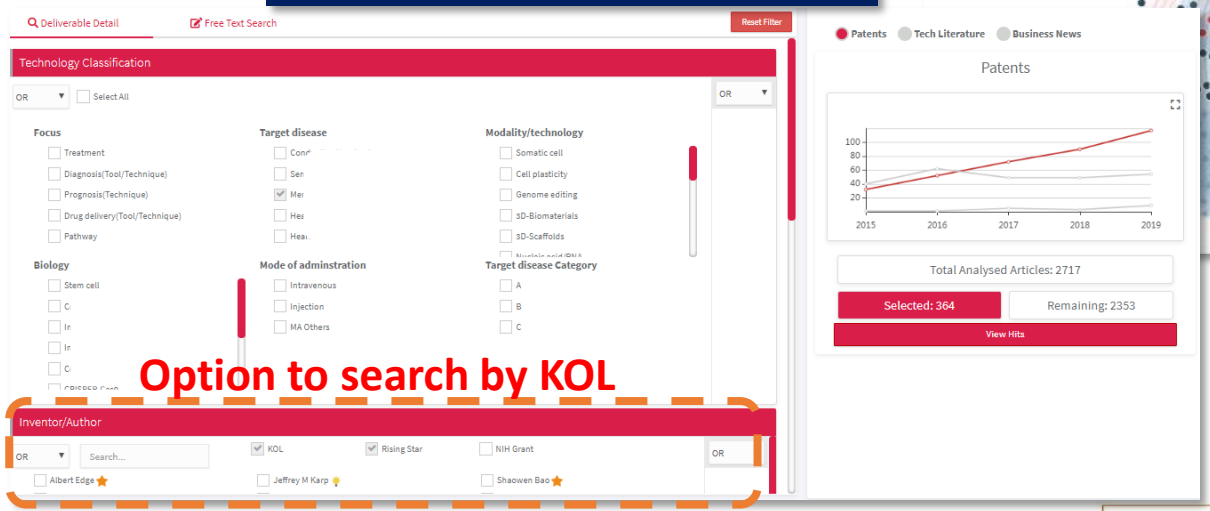
CLOUD BASED



CLUSTER VISUALIZATION



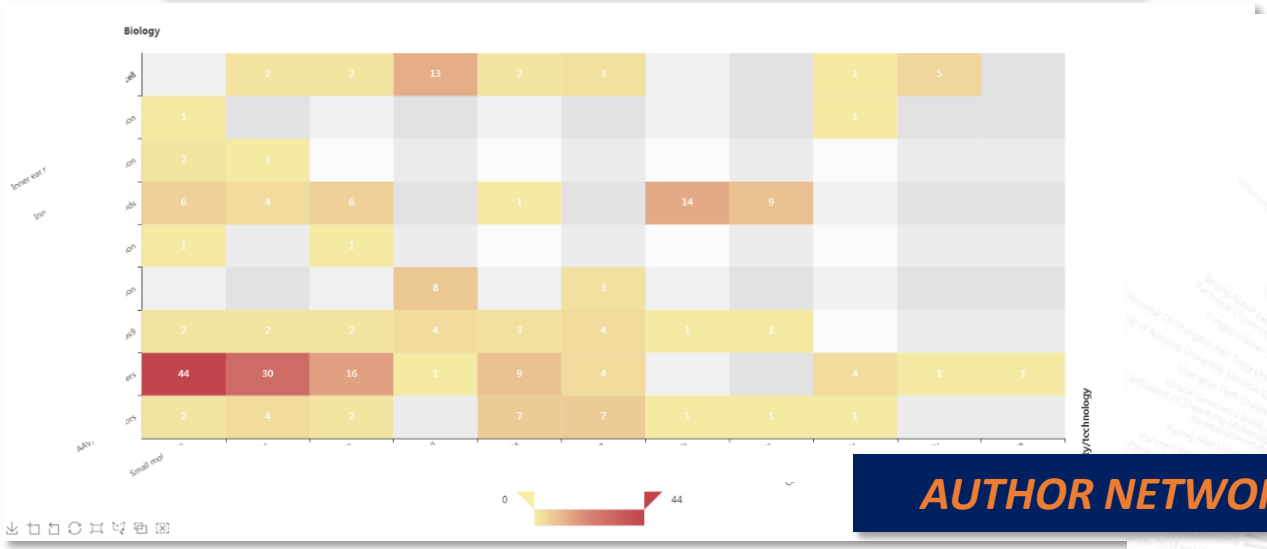
USER-DEFINED CURATION



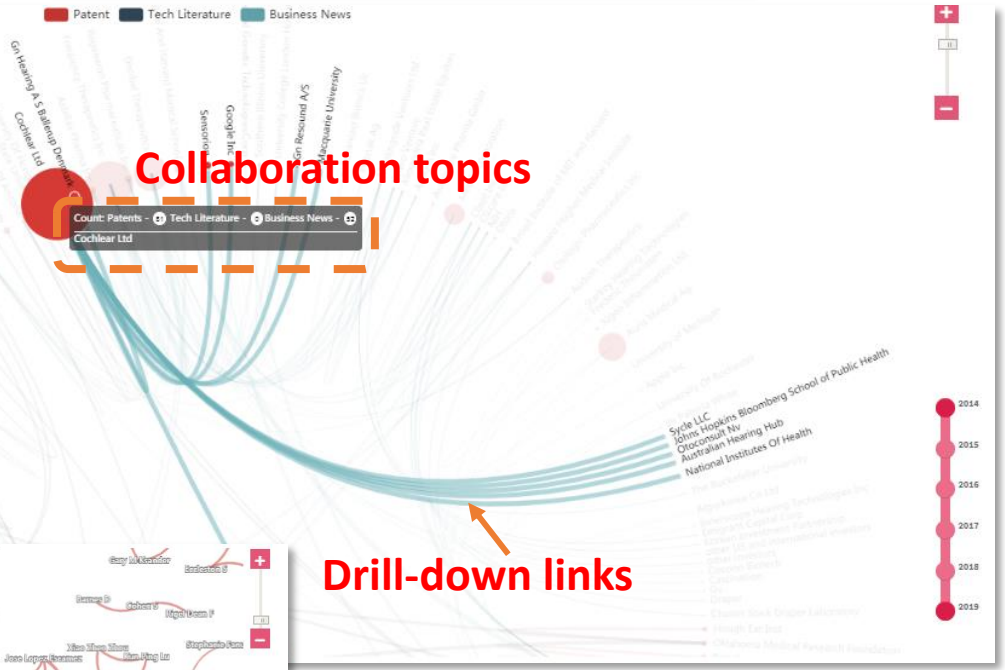
SCITECH PATENT ART

EXAMPLE SCREEN-SHOTS OF SPA'S CONNECT-THE-DOTS SOLUTION [2 OF 2]

WHITE-SPACE MAP – MODALITY VS. BIOLOGY



ORGANIZATIONAL NETWORK



AUTHOR NETWORK