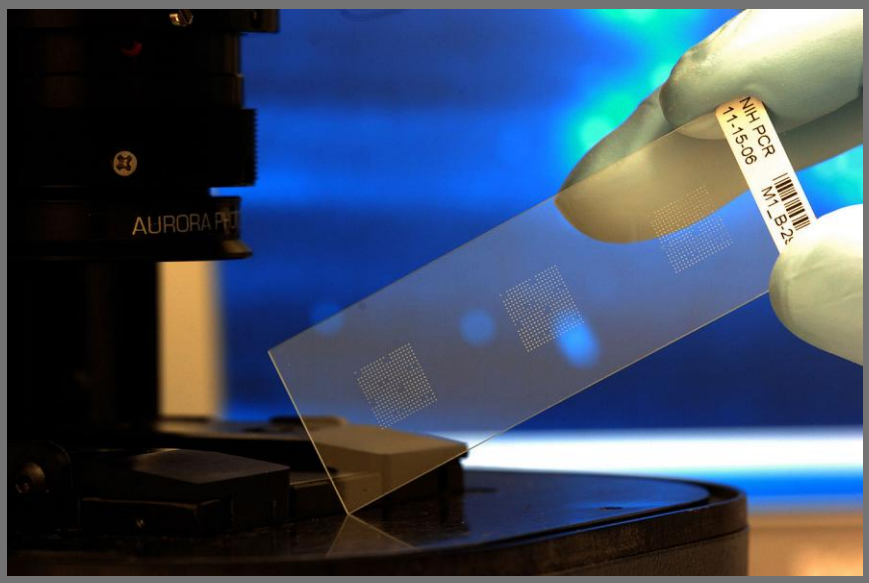
2015

Biochips

Technology Insight Report

Biochip is a collection of miniaturized test sites (microarrays) arranged on a solid substrate that allows many tests to be performed at the same time in order to achieve higher throughput and pace



Gridlogics Technologies Pvt Ltd

10/14/2015

Table of Contents

Introduction

Biochip is a collection of miniaturized test sites (microarrays) arranged on a solid substrate that allows many tests to be performed at the same time in order to achieve higher throughput and pace. Typically, a biochip's surface area is no larger than a fingernail. Like a computer chip that can perform millions of mathematical operations in one second, a biochip can perform thousands of biological reactions, such as decoding genes in few seconds.

A genetic biochip is designed to freeze into place the structures of many short strands of DNA (deoxyribonucleic acid), the basic chemical instruction that establishes the characteristics of an organism. Effectively, it is used as a test tube for real chemical samples. A specially designed microscope can determine where the sample hybridized with DNA strands in the biochip. Biochips would help dramatically in accelerating the identification of the estimated 80,000 genes in human DNA, an ongoing world-wide research collaboration known as the Human Genome Project.

When the scientists took up the challenge of the whole human genome sequencing ("Human Genome Project"), it raised a challenge even larger: It's to understand the genes functions which make our genome. For that, it was necessary to detect the gene expression levels according to various conditions, so as to accelerate the identification of the targets associated with the diseases and to develop new diagnosis and therapies.

In addition to genetic applications, the biochip is being used in toxicological, protein, and biochemical research. Biochips can also be used to rapidly detect chemical agents used in biological warfare so that defensive measures can be taken.

This report categorizes and graphically analyzes biochips from various perspectives such as the fabrication techniques, methods involved, biochip types and applications and highlights the key companies involved.

NOTE: All analysis in this report has been done on INPADOC Families (Extended Families) and so the data in the charts should be construed accordingly.

Patent Search Strategy

Using PatSeer following search query was used to create patent set.

TAC- Title, Abstract, Claims IC- International Class

CPC- Cooperative Patent Classification

```
TAC:
(
        (bio_chip or boichip or biologic_chip or biological_chip)
NOT
        (basic input output system or "basic input/output system" or "basic I/O system")
)
 NOT
(
        IC: (G06F* or H04L*)
OR
        CPC: (G06F* or H04L*)
)
```

- The query was directed to search through the title, abstract and claims. The individual results were collapsed to one publication per family which was then exported from PatSeer and imported in Patent iNSIGHT Pro.
- After reviewing few results especially from older publications, we came across some similar but irrelevant terms which we then excluded from the data set manually.
- Result set of 3879 records was analyzed using the software.

The publications included in the report are updated as of 30th September, 2015

Definitions of Classes referred to in search query

IPC:

IPC	Description
G06F	Electric Digital Data Processing (computers in which a part of the computation is effected hydraulically or pneumatically G06D, optically G06E; computer systems based on specific computational models G06N
H04L	Transmission Of Digital Information, e.g. Telegraphic Communication (arrangements common to telegraphic and telephonic communication H04M)

CPC:

CPC	Description
G06F	Electrical Digital Data Processing (computers in which a part of the computation is effected hydraulically or pneumatically G06D; optically G06E; self-contained input or output peripheral equipment G06K; impedance networks using digital techniques H03H)
H04L	Transmission Of Digital Information, e.g. Telegraphic Communication (typewriters B41J; order telegraphs, fire or police telegraphs G08B; visual telegraphy G08B, G08C; teleautographic systems G08C; ciphering or deciphering apparatus per se G09C; coding, decoding or code conversion, in general H03M; arrangements common to telegraphic and telephonic communication H04M; selecting H04Q)

Technical Segmentation (Patent Categorization)

Fabrication Technology	Types	Methods	Applications
• Microarray • Microfluidic	• DNA Chip • Enzyme • Lab-On-A-Chip • Protein Chip	• Electrical Signals • Electrophoresis • Enzyme-Linked Immunosorbent Assay (ELISA) • Gene Expression • High-Throughput Screening • Immunofluorescence • Immunohistochemical • Luminescence • Magnetism • Mass Spectrometry • Proteomics • Radioimmunoassay • SNP Genotyping • Surface Plasmon Resonance • Thin Layer Chromatography • Western Blot	• Biomarkers • Biomolecules • Blood Clot • Cancer • Food Safety • Genetic Diagnosis • Hybridization • Immunology • Inflammatory • Nucleotides • Organic Semiconductors • Phosphoprylation • Temperature Control

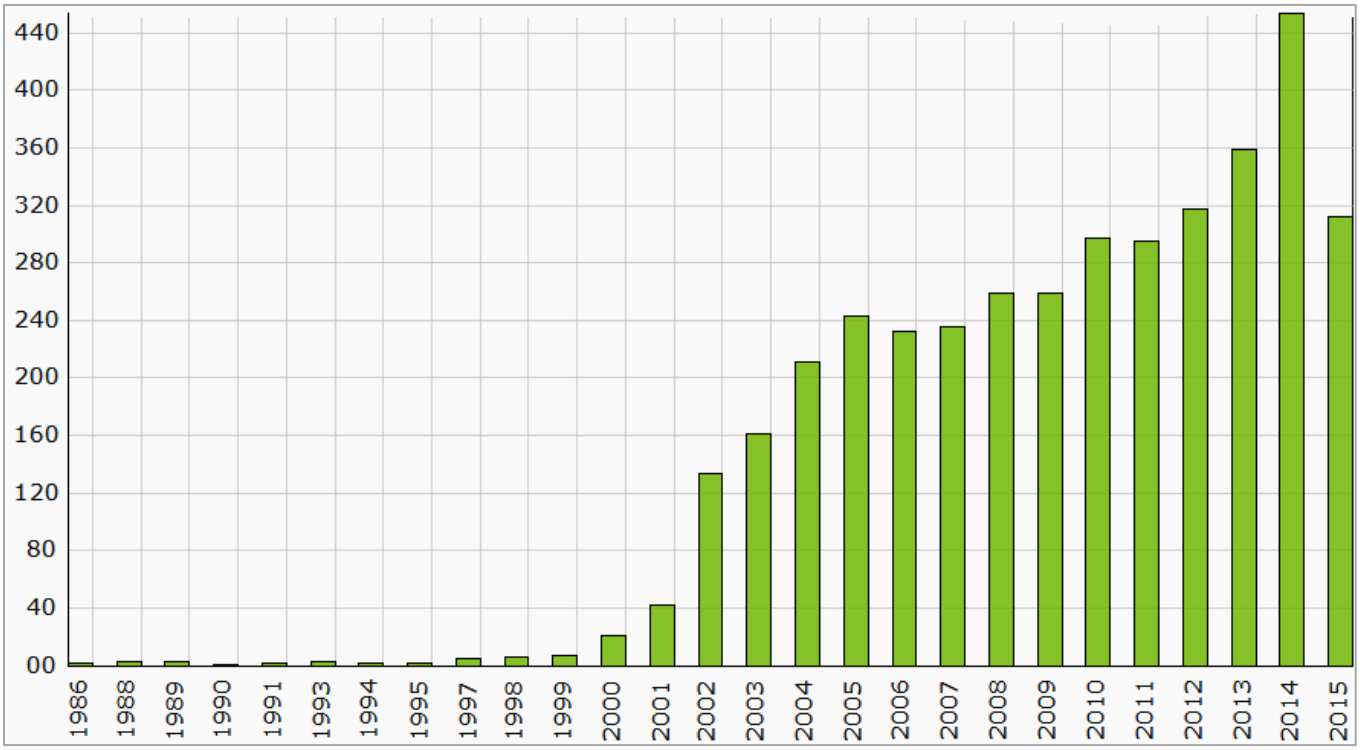
The categorization involved defining a search strategy for each topic and then conducting the search using the Advanced Searching capability in Patent iNSIGHT Pro. Details of search strings used for each category are given in Appendix.

Publication Trend

What has been the publication trend for biochips?

Innovation around biochips and resulting patent publications started to show up from 1986 with a spike in 2002.

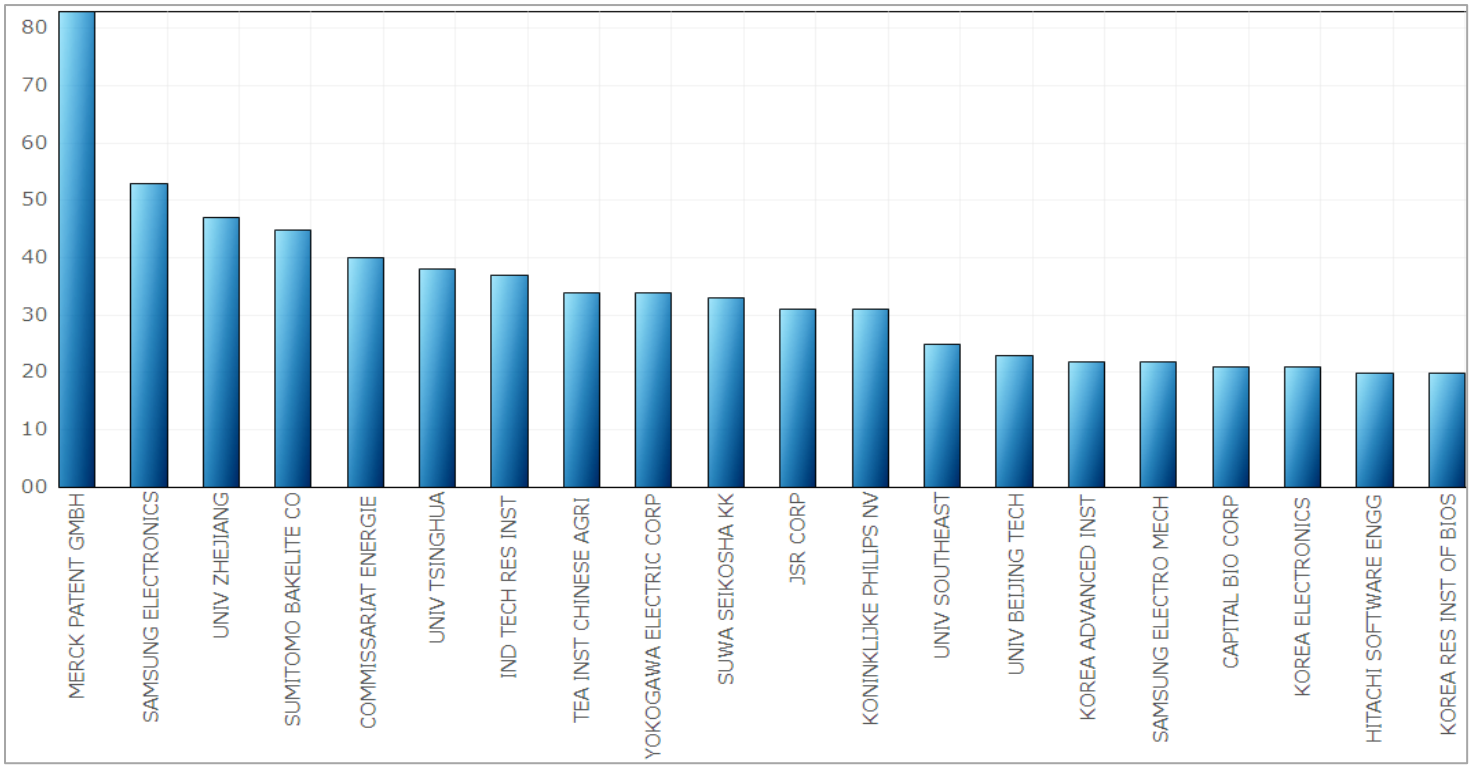
It's clear the current activity around these technologies is likely to continue seeing more innovation in the near future.



How we did it?

Once the patents were populated in Patent iNSIGHT Pro, the publication trend chart was generated on a single click using the dashboard tool.

Top Companies



The top companies in biochips are:

1. MERCK PATENT GMBH
2. SAMSUNG ELECTRONICS CO LTD
3. UNIV ZHEJIANG
4. SUMITOMO BAKELITE CO LTD
5. COMMISSARIAT ENERGIE ATOMIQUE
6. UNIV TSINGHUA
7. IND TECH RES INST
8. TEA INST CHINESE AGRICULTURAL
9. YOKOGAWA ELECTRIC CORP
10. SUWA SEIKOSHA KK
11. JSR CORP
12. KONINKLIJKE PHILIPS NV
13. UNIV SOUTHEAST
14. UNIV BEIJING TECHNOLOGY
15. KOREA ADVANCED INST SCI & TECH
16. SAMSUNG ELECTRO MECHANICS CO LTD
17. CAPITAL BIO CORP
18. KOREA ELECTRONICS TELECOMM
19. HITACHI SOFTWARE ENGG CO LTD
20. KOREA RES INST OF BIOSCIENCE

How we did it?

Once the patents were populated in Patent iNSIGHT Pro, the assignee clean- up tools were used to normalize the names. Different cleanup tools were leveraged:

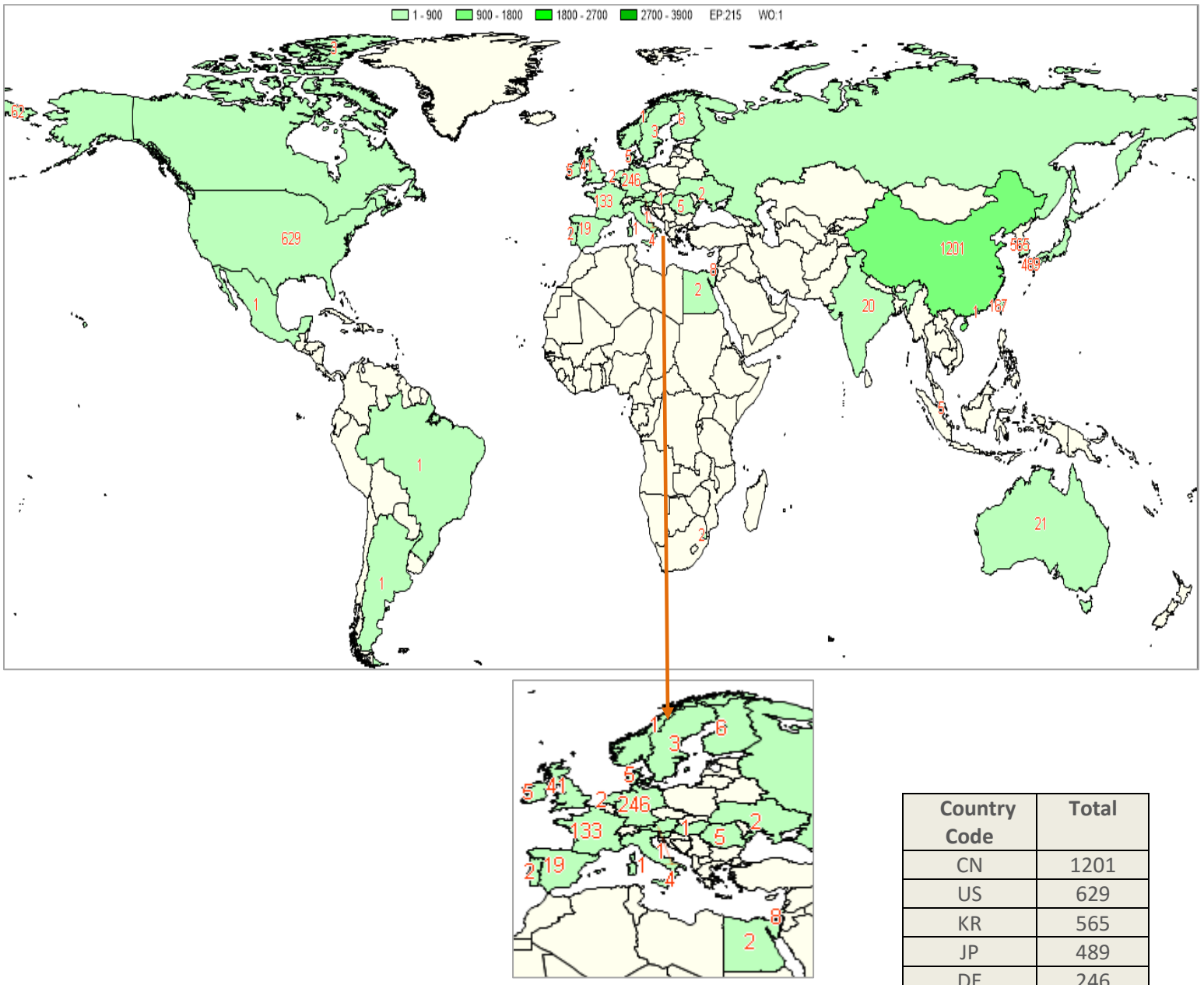
- To locate assignees for unassigned records
- To clean up records having multiple assignees
- To locate the correct assignee names for US records using the US assignments database
- To merge assignees that resulted from a merger or acquisition or name change.

The dashboard tool within Patent iNSIGHT Pro was used to find the top 20 assignees within the given patent set. A visual graph was created based on the results of the top assignees with the number of patents alongside each one.

The complete Assignee table in available in the following Excel file:
http://www.patentinsightpro.com/techreports/1015/List%20of%20Assignees.xls

Research activity around the world

The table below ranks top priority countries and helps provide an indication of where innovation in this area is originating. It shows perfect indication of where innovation is taking place. It can be seen China has 1201 filings (INPADOC Families) followed by US and Korea with 629 and 565 filings respectively. The strength of the colouring represents the proportion of patent publications.



Country Code	Total
CN	1201
US	629
KR	565
JP	489
DE	246
TW	167

How we did it?

The map was generated using the Priority country coverage map option provided in the dashboard tool within Patent iNSIGHT Pro.

Companies - Key Statistics

Here we summarize key parameters of Top 15 companies such as filing trend, Top inventors in each company and Coverage of underlying patent families

Assignee	Total No. of Records	Avg. No. of Fwd Cites per Patents	Filing Trend (Absolute)	Filing Year Range	Key Inventor (Top 5)	Co-Assignees	Coverage (Includes families)								
							US	EP	WO	JP	DE	CN	KR	IN	TW
MERCK PATENT GMBH	83 (2.1%)	0.31		2006 - 2015	TIERNEY STEVEN(41) MITCHELL WILLIAM(38) BLOUIN NICOLAS(33) WANG CHANGSHENG(24) D LAVARI MANSOOR(19)	NANO C INC(2) PROMERUS LLC(2) KONARKA TECHNOLOGIES INC(1) UNIV DARMSTADT TECH(1)	64	65	79	56	10	63	67	25	72
SAMSUNG ELECTRONICS CO LTD	53 (1.4%)	0.83		2002 - 2014	LEE DONG-HO(8) CHO SEONG-HO(7) YOO JAE CHERN(6) KIM WON-SUN(6) LEE JUNE-YOUNG(5)	APPLIED PRECISION INC(1) JSR CORP(1) SEOUL NAT UNIV IND FOUNDATION(1)	46	24	7	19	3	23	46	0	0
UNIV ZHEJIANG	47 (1.2%)	0.09		2001 - 2012	DONG HAITAO(36) LI DEBAO(36) GAO XIAOLIAN(2) SHA SHA(2) YIN YUN(2)	No Co-Assignee Present	1	1	1	1	1	47	0	0	0
SUMITOMO BAKELITE CO LTD	45 (1.2%)	1.31		2003 - 2013	OTA MASARU(7) MATSUMOTO TAKAYUKI(5) YAMAGUCHI KENJIRO(5) YOKOYAMA KANEHISA(4) FURUKAWA	SOMALOGIC INC(1)	2	2	2	45	0	0	2	0	0

					TAKESHI(4)										
COMMISSARIAT ENERGIE ATOMIQUE	40 (1%)	2.3		1998 - 2013	CHATON PATRICK(5) CHEVILLARD SYLVIE(4) UGOLIN NICOLAS(4) CAILLAT PATRICE(4) PELTIE PHILIPPE(4)	CENTRE NAT RECH SCIENT(2) BOURGOIN JEAN-PHILIPPE(1) DESAULNIERS JEAN-MARC JOSEPH(1) REVOL-CAVALIER FREDERIC(1)	28	28	33	23	8	7	5	4	2
UNIV TSINGHUA	38 (1%)	0.32		1999 - 2014	CHENG JING(10) JIA WANG(4) JING CHENG(4) LIANG ZHANG(3) ZHOU YUXIANG(3)	CAPITAL BIO CORP(16) BOAO BIOTECH CO LTD(1) CANCER HOSPITAL AND INST PEKIN(1) UNIV BEIJING(1)	14	4	9	3	0	32	0	0	6
IND TECH RES INST	37 (1%)	1.43		1999 - 2011	HUNG LUNG-YU(3) HO CHIH-WEI(3) KUO WEN-HSUN(3) TSAO JIA-HUEY(2) WU CHENG-TAO(2)	ACCENT OPTICAL TECH INC(1)	24	0	1	4	1	11	0	0	25
TEA INST CHINESE AGRICULTURAL	34 (0.9%)	0.03		2003	CHEN LIANG(34) GAO QIKANG(27) ZHAO LIPING(26) YANG YAJUN(4) MAO WEIHUA(3)	No Co-Assignee Present	0	0	0	0	0	34	0	0	0

YOKOGAWA ELECTRIC CORP	34 (0.9%)	1.5		1999 - 2011	TANAAMI TAKEO(27) SUGIYAMA YUMIKO(12) SATOU SAYA(5) KATAKURA HISAO(3) NAITO YOSHINAO(3)	No Co-Assignee Present	25	7	0	29	9	11	0	0	0
SUWA SEIKOSHA KK	33 (0.9%)	1.58		1987 - 2014	TAKAGI FUMIO(7) KOEDA HIROSHI(6) KOEDA SHUJI(5) SATO SHIGEKI(4) SAITO YUJI(3)	No Co-Assignee Present	20	3	4	31	0	15	8	0	5
JSR CORP	31 (0.8%)	0.81		2004 - 2011	NISHIKAWA KOJI(11) GOTO HIROFUMI(8) NISHIMURA YUKIO(5) OKUMURA KATSUYA(4) MIHARA MAKOTO(3)	OCTEC INC(2) CKD CORP(1) SAMSUNG ELECTRONICS CO LTD(1) TOKYO ELECTRON LTD(1)	4	2	3	28	0	0	2	1	0
KONINKLIJKE PHILIPS NV	31 (0.8%)	2.42		2001 - 2009	JOHNSON MARK THOMAS(7) PONJEE MARC WILHELMUS GIJSBERT(5) GILLIES MURRAY F(4) JOHNSON MARK T(4) KAHLMAN JOSEPHUS ARNOLDUS HENR(4)	No Co-Assignee Present	24	26	31	20	1	21	0	10	0
UNIV SOUTHEAST	25 (0.6%)	0.32		2004 - 2014	HE NONGYUE(5) ZHONGZE GU(3) HONGNA LIU(3) SONG LI(3) XIAO	No Co-Assignee Present	5	3	3	5	2	25	2	0	1

					PENGFENG LU(3)										
UNIV BEIJING TECHNOLOGY	23 (0.6%)	0.22		2005 - 2013	JIAN WU(8) CHEN TAO(7) WU JIAN(7) SHIBING LIU(5) TAO CHEN(5)	No Co-Assignee Present	0	0	0	0	0	23	0	0	0
KOREA ADVANCED INST SCI & TECH	22 (0.6%)	0.73		2004 - 2013	LEE SANG YUP(3) PARK TAE JUNG(3) KIM HAK SUNG(1) KIM YOUNG PIL(1) OH EUN KEU(1)	No Co-Assignee Present	1	0	2	0	0	0	21	0	0

How we did it?

From the Assignee 360° report options, we selected Top 15 Assignees and the different pieces of information we wanted to include in the singular display and then ran the report. The generated report was then exported to Excel using the option provided for the same.

Inventor - Key Statistics

Here we summarize key parameters of Top 15 Inventors such as filing trend, key associated companies and top 5 co-inventors.

Inventor	Total No. of Records	Avg. No. of Fwd Cites per Patents	Filing Trend (Cumulative)	Filing Year Range	Key Assignees (Top 5)	Co-Inventors
TIERNEY STEVEN	41 (1.1%)	0.22		2006 - 2015	MERCK PATENT GMBH(41)	MITCHELL WILLIAM(32) BLOUIN NICOLAS(25) WANG CHANGSHENG(18) D LAVARI MANSOOR(14) CARRASCO-OROZCO MIGUEL(6)
MITCHELL WILLIAM	38 (1%)	0.08		2009 - 2015	MERCK PATENT GMBH(38)	TIERNEY STEVEN(32) BLOUIN NICOLAS(24) WANG CHANGSHENG(20) D LAVARI MANSOOR(16) CARRASCO-OROZCO MIGUEL(5)
DONG HAITAO	36 (0.9%)	0.06		2001	UNIV ZHEJIANG(36)	LI DEBAO(36)
LI DEBAO	36 (0.9%)	0.06		2001	UNIV ZHEJIANG(36)	DONG HAITAO(36)
CHEN LIANG	34 (0.9%)	0.03		2003	TEA INST CHINESE AGRICULTURAL(34)	GAO QIKANG(27) ZHAO LIPING(26) YANG YAJUN(4) MAO WEIHUA(3) WANG XINCHAO(2)
HAIDONG MU	34 (0.9%)	0.62		2005 - 2014	SHANGHAI YULONG BIOTECH CO LTD(11) SHANGHAI YULONG BIOLOG SCIENCE(9) MU HAIDONG(6) SHANGHAI YULONG BIO TECHNOLOGY(2) SHANGHAI YULONG BIOMEDICAL CO LTD(2)	NINGMEI WANG(27) CONG LIU(13) ZHANG WEIZHONG(9) BA YUNWEI(7) WANG LEI(7)

BLOUIN NICOLAS	33 (0.9%)	0.12		2009 - 2015	MERCK PATENT GMBH(33) NANO C INC(2)	TIERNEY STEVEN(25) MITCHELL WILLIAM(24) WANG CHANGSHENG(11) D LAVARI MANSOOR(7) CARRASCO-OROZCO MIGUEL(6)
TANAAMI TAKEO	29 (0.7%)	1.97		2000 - 2009	YOKOGAWA ELECTRIC CORP(27) TANAAMI TAKEO(2) ICHIHARA AKIRA(1) SUGIYAMA YUMIKO(1) SUZUKI YASUNORI(1)	SUGIYAMA YUMIKO(13) SATOU SAYA(4) SUZUKI YASUNORI(4) KATAKURA HISAO(3) NAITO YOSHINAO(2)
GAO QIKANG	27 (0.7%)	0.04		2003	TEA INST CHINESE AGRICULTURAL(27)	CHEN LIANG(27) ZHAO LIPING(20) MAO WEIHUA(2) YANG YAJUN(2) YAO MINGZHE(2)
NINGMEI WANG	27 (0.7%)	0.59		2007 - 2014	SHANGHAI YULONG BIOTECH CO LTD(10) SHANGHAI YULONG BIOLOG SCIENCE(9) SHANGHAI YULONG BIO TECHNOLOGY(2) SHANGHAI YULONG BIOMEDICAL CO LTD(2) QUFU YULONG BIOMEDICAL CO LTD(2)	HAIDONG MU(27) CONG LIU(13) ZHANG WEIZHONG(9) BA YUNWEI(7) WANG LEI(7)
ZHAO LIPING	26 (0.7%)	0		2003	TEA INST CHINESE AGRICULTURAL(26)	CHEN LIANG(26) GAO QIKANG(20) XU YOUPING(2) YANG YAJUN(2) MAO WEIHUA(1)
WANG CHANGSHENG	24 (0.6%)	0.04		2009 - 2015	MERCK PATENT GMBH(24)	MITCHELL WILLIAM(20) D LAVARI MANSOOR(18) TIERNEY STEVEN(18) BLOUIN NICOLAS(11) SPARROWE DAVID(5)
CHENG JING	20 (0.5%)	5.75		2001 - 2014	UNIV TSINGHUA(10) CAPITAL BIO CORP(10) CHENG JING(5) YANG WEIPING(2) AVIVA BIOSCIENCES CORP(2)	YANG WEIPING(5) WANG XIAOBO(4) WU LEI(4) SUN YIMIN(3) TAO SHENGCE(3)

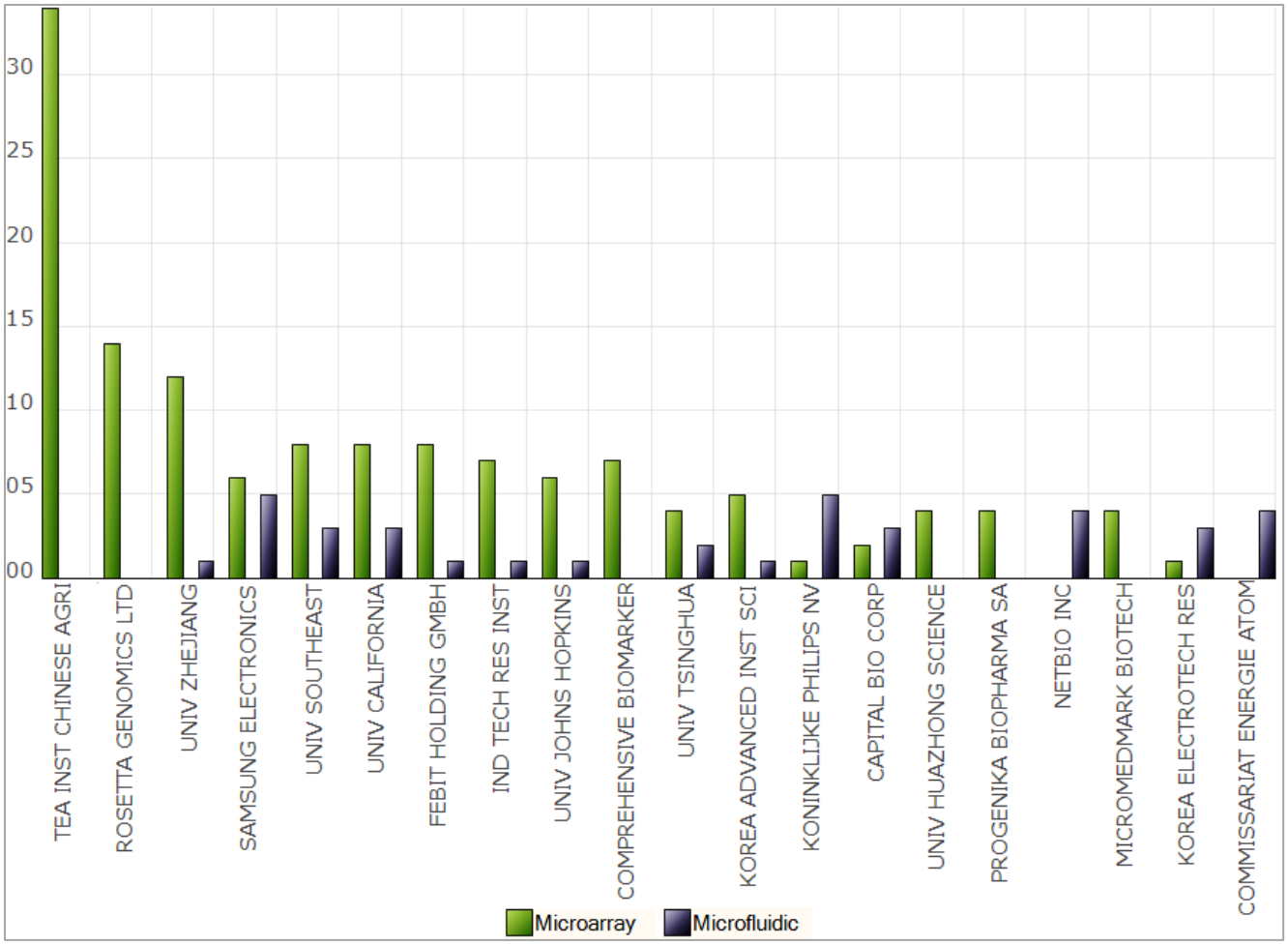
D LAVARI MANSOOR	19 (0.5%)	0		2011 - 2014	MERCK PATENT GMBH(19)	WANG CHANGSHENG(18) MITCHELL WILLIAM(16) TIERNEY STEVEN(14) BLOUIN NICOLAS(7) SPARROWE DAVID(5)
WANG TAIHU	19 (0.5%)	0		2002 - 2013	XI AN LIANER BIO TECHNOLOGICAL(15) NANJING POTOMAC BIO TECHNOLOGY CO LTD(2) LIAN ER BIOTECHNOLOGY CO LTD X(1) LIAN ER BIOLOG TECHNOLOGY CO L(1)	MA QINRONG(16) TAN WUHONG(16) QIU YIFAN(2) JIANG YANG(1) MA QINGRONG(1)

How we did it?

From the Inventor 360° report options, we selected the different pieces of information we wanted to include in the singular display and then ran the report. The generated report was then exported to Excel using the option provided for the same.

Company activity across Fabrication Technology

- The chart below shows research activity of companies across different fabrication technologies
- Tea Inst Chinese Agriculture, Rosetta Genomics, Comprehensive Biomarkers and Progenica Biopharma focus only on microarrays
- Samsung has nearly equal number of records in both the types of fabrication techniques

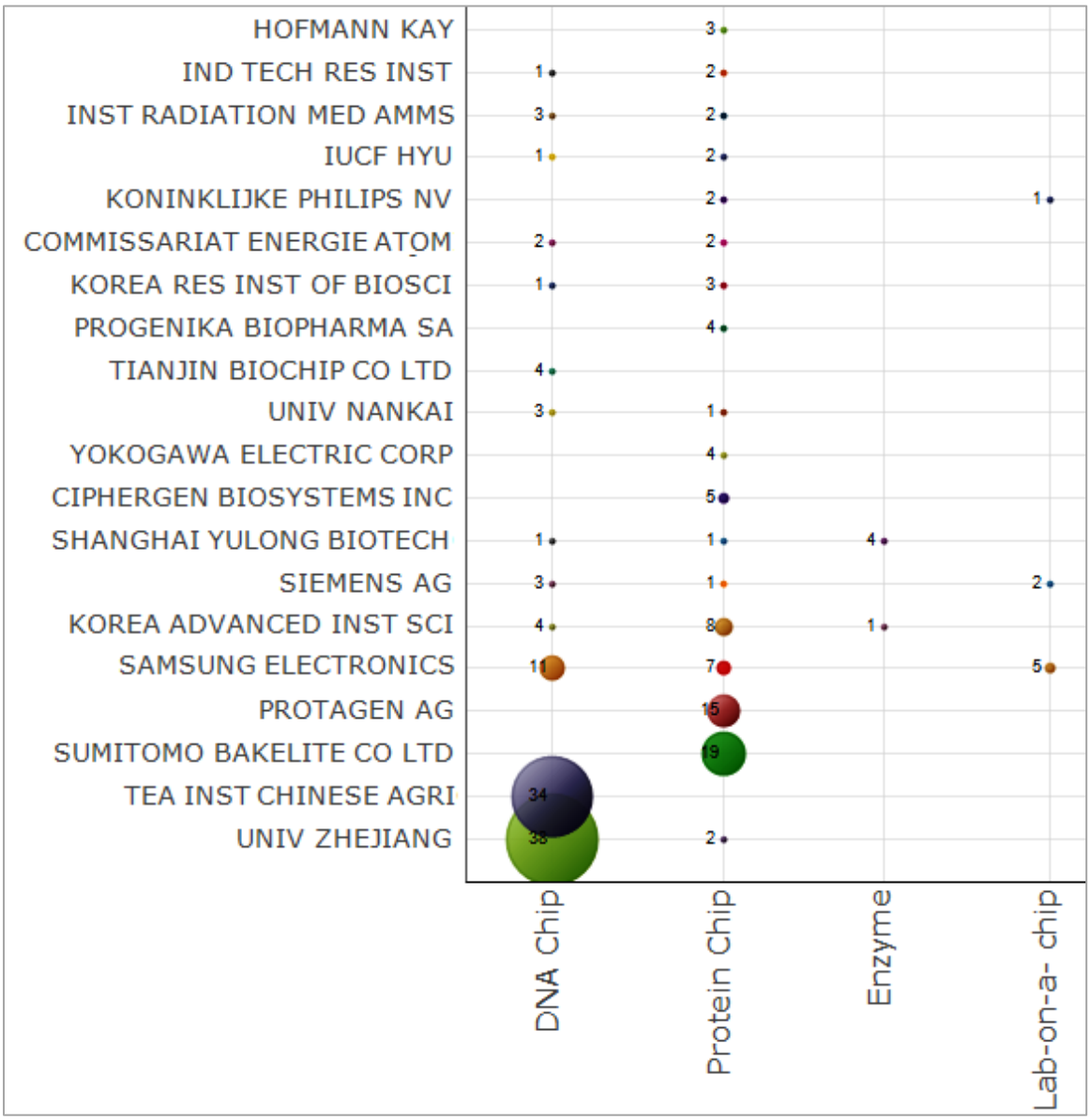


How we did it?

First various fabrication technologies were identified by manual research. Then by using a combination of semantic analysis tools such as clustering tools and searching tools available in Patent iNSIGHT Pro, records were categorized under different fabrication technologies. A co-occurrence matrix was generated using the co-occurrence analyzer to map the different fabrication technologies with assignees. The matrix was filtered for the top 20 assignees and was converted into clustered column chart using the option provided in software for the same.

Company activity across Types

- The chart below shows research activity of companies across different types of biochips
- Univ Zhejiang is the most active in DNA chip
- Sumitomo Bakelite leads the research in Protein Biochip followed by Protagen
- Tea institute Chinese Agriculture focuses only on DNA chip

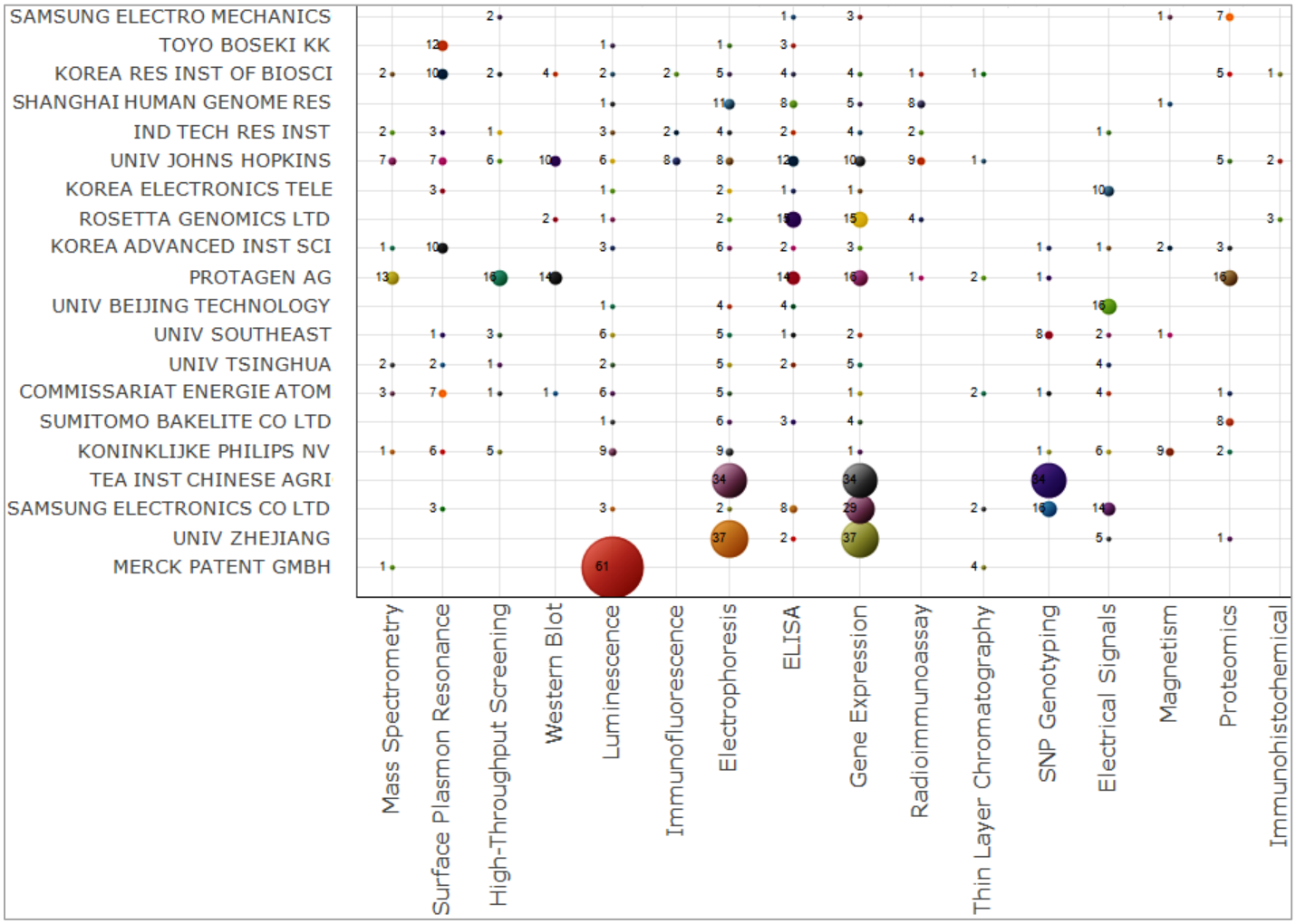


How we did it?

First various types were identified by manual research. Then by using a combination of semantic analysis tools such as clustering tools and searching tools available in Patent iNSIGHT Pro, records were categorized under different types. A co-occurrence matrix was generated using the co-occurrence analyzer to map the different types with assignees. The matrix was filtered for the top 20 assignees and types and converted into bubble chart using the option provided in software for the same.

Company activity across Methods

- The chart below shows research activity of companies across different methods in which biochips are used
- Gene Expression is the most researched method focused by most of the companies
- Merck leads the record count for Luminescence
- Univ Zhejiang and Tea Inst have major research interest in Electrophoresis and Gene Expression

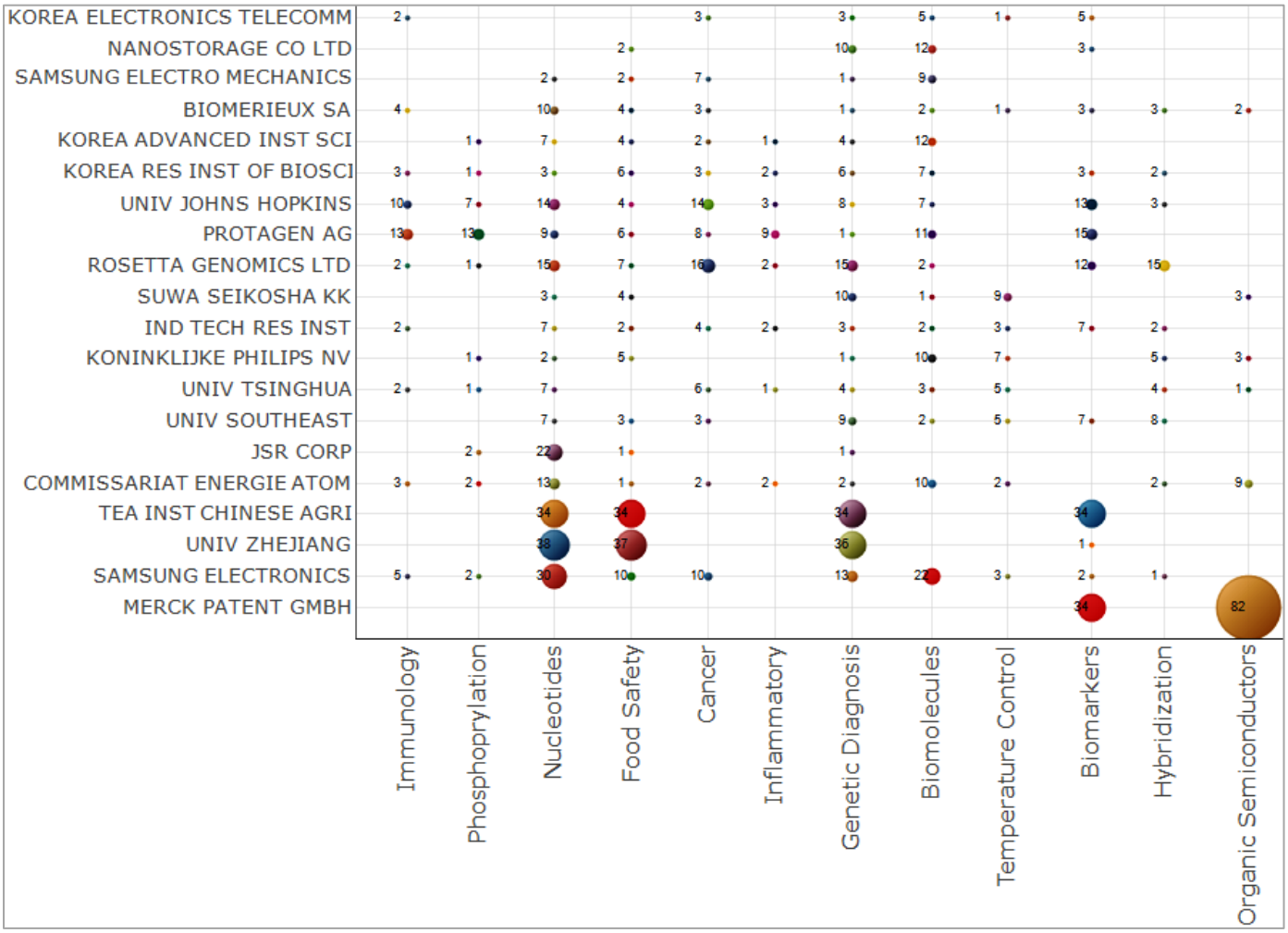


How we did it?

First various methods were identified by manual research. Then by using a combination of semantic analysis tools such as clustering tools and searching tools available in Patent iNSIGHT Pro, records were categorized under different methods. A co-occurrence matrix was generated using the co-occurrence analyzer to map the different methods with assignees. The matrix was filtered for the top 20 assignees and was converted into bubble chart using the option provided in software for the same.

Company activity across Applications

- The chart below shows research activity of companies across different applications
- Merck leads the research around Biomarkers and Organic Semiconductors
- Rosetta Genomics leads the research for diagnosis of cancer using biochips, it also leads the record count for Hybridization
- Nucleotides and Gene Diagnosis are the application areas wherein most of the companies are present

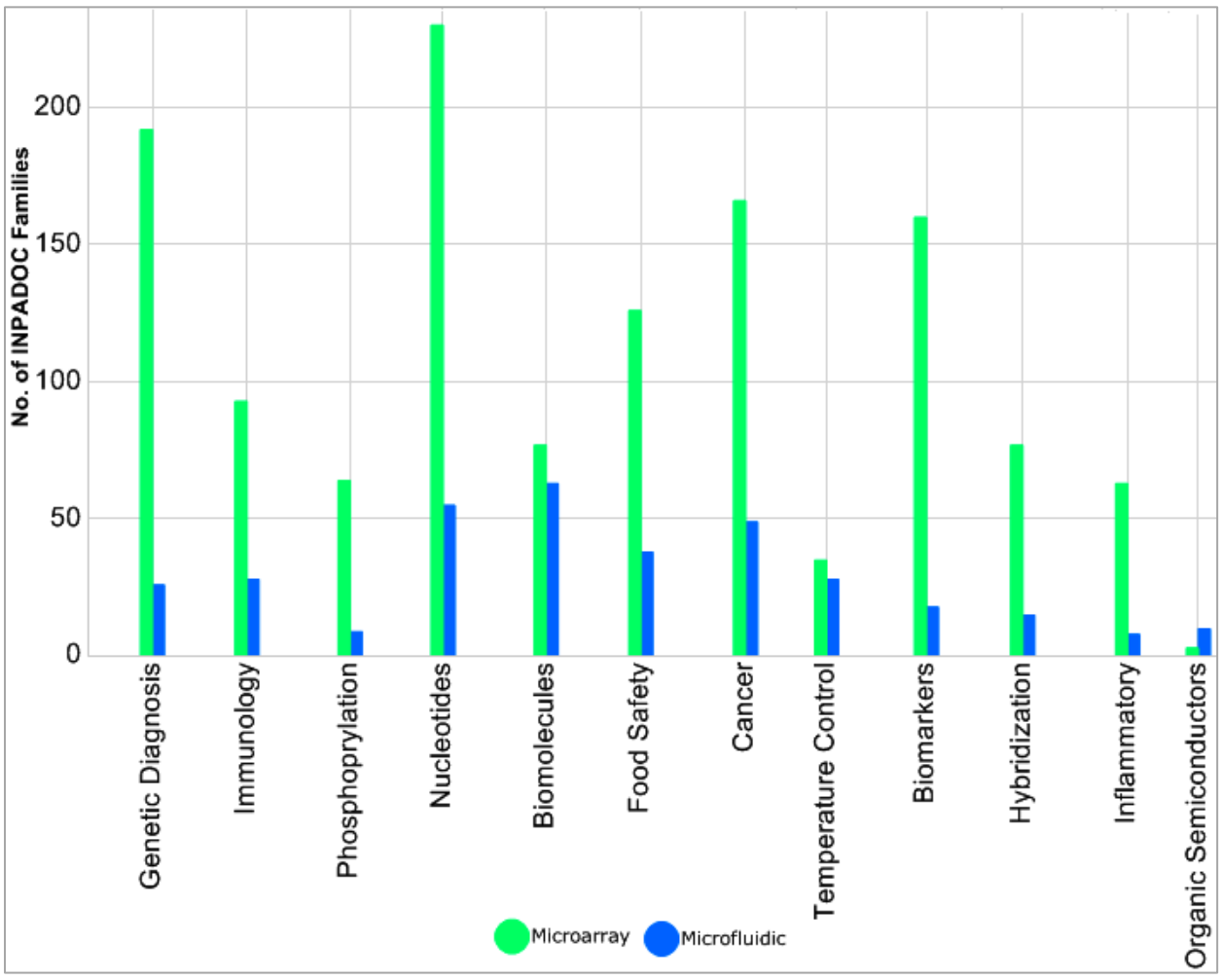


How we did it?

First various applications were identified by manual research. Then by using a combination of semantic analysis tools such as clustering tools and searching tools available in Patent iNSIGHT Pro, records were categorized under different applications. A co-occurrence matrix was generated using the co-occurrence analyzer to map the different applications with assignees. The matrix was filtered for the top 20 assignees and was converted into bubble chart using the option provided in software for the same.

Biochip – Fabrication Technology vs Applications

- The chart below shows research activity of different fabrication technologies with respect to various applications
- Microarrays are widely used in Nucleotides and Genetic Diagnosis
- Organic Semiconductors use microfluidic technology more as compared to microarray

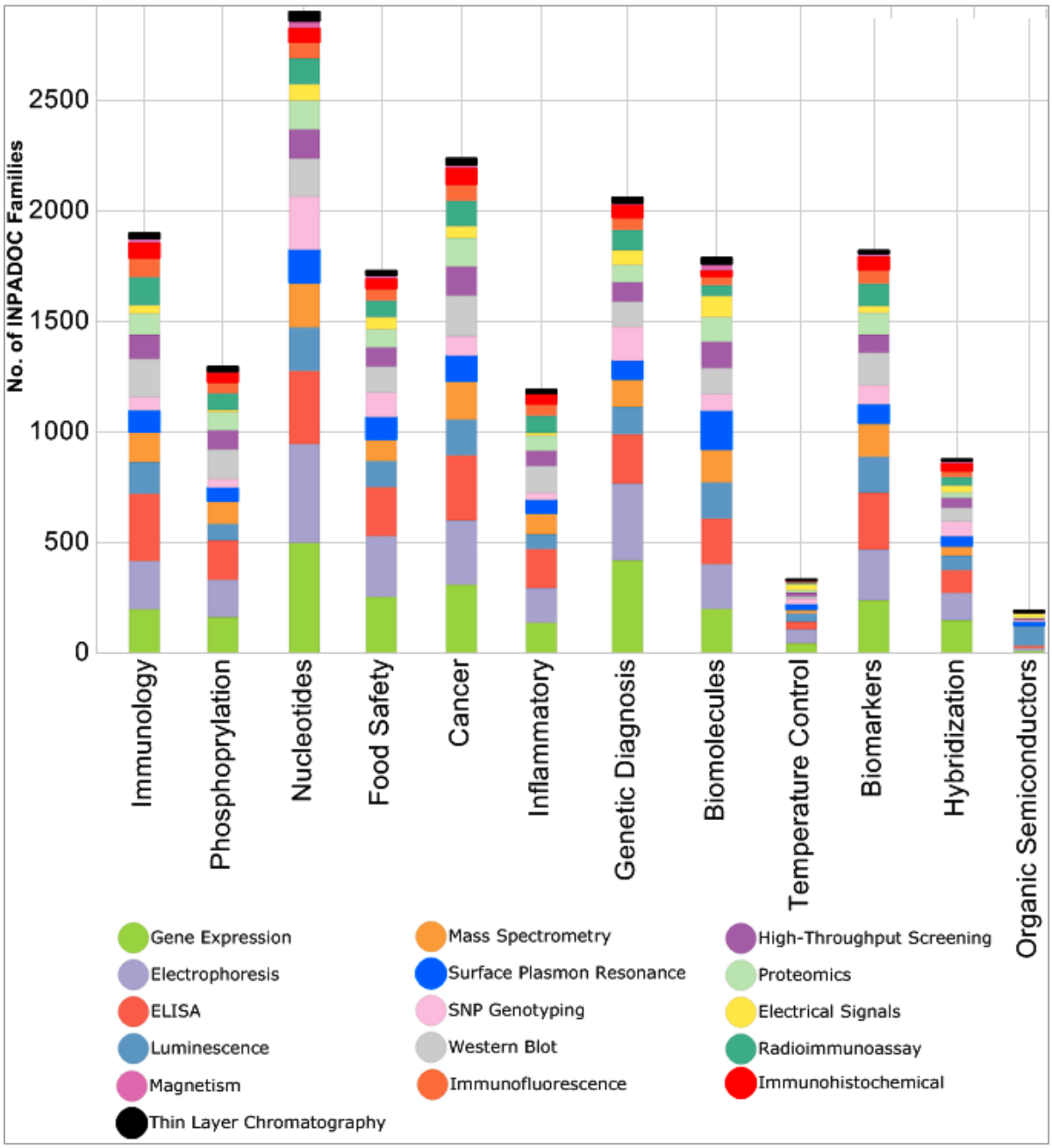


How we did it?

A co-occurrence matrix was generated using the co-occurrence analyzer to map the different fabrication technologies with the different types of applications. The resulting matrix was converted into a clustered column chart using the option provided in software for the same.

Biochip – Methods vs Applications

- The below chart shows different methods used across different application areas
- Electrophoresis and Gene Expression methods are used across all the applications
- SNP Genotyping is used more across Nucleotides as compared to other applications

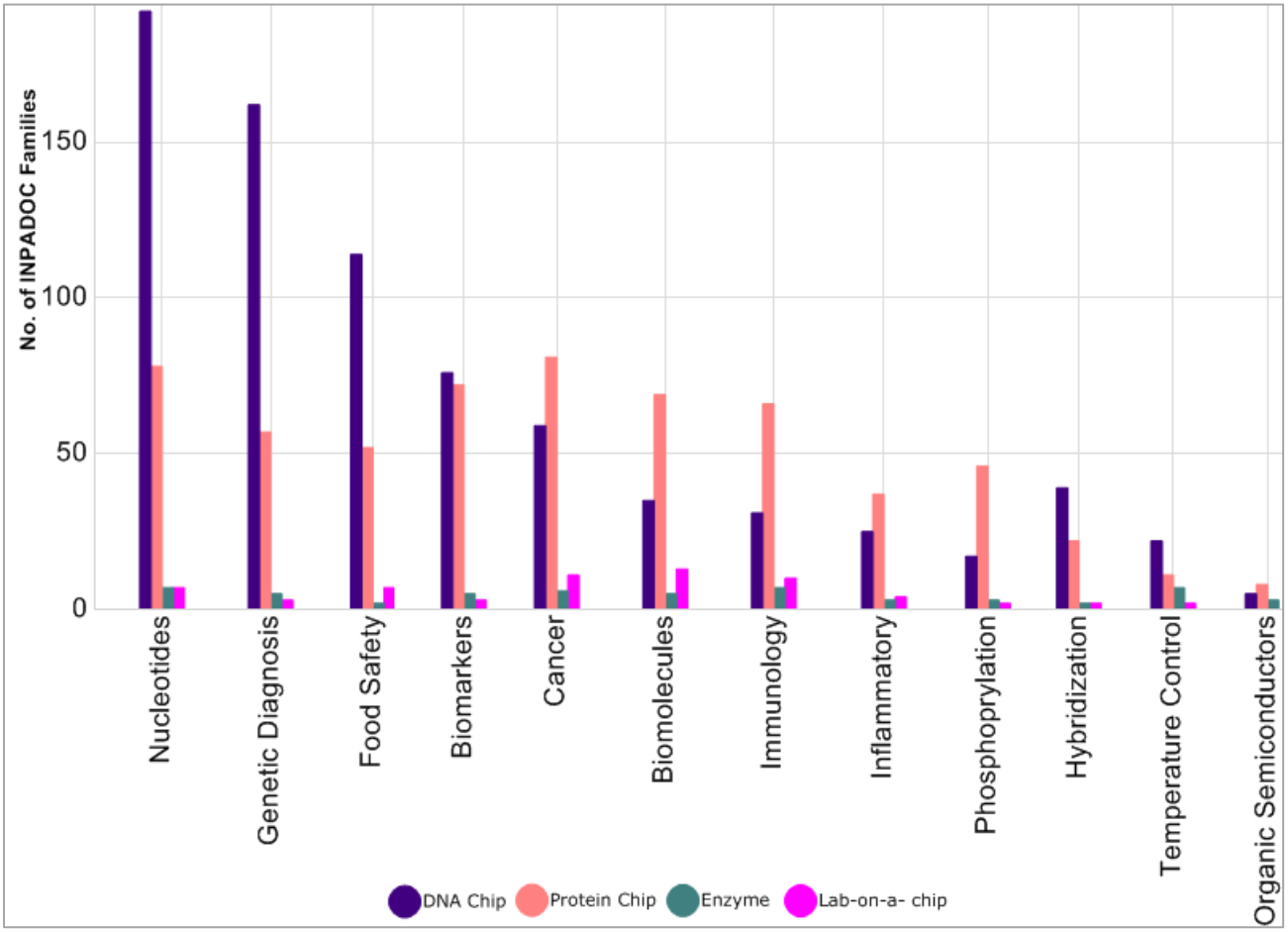


How we did it?

A co-occurrence matrix was generated using the co-occurrence analyzer to map the different methods with the various types of applications. The resulting matrix was converted into a stacked column chart using the option provided in software for the same.

Biochip– Types vs Applications

- The chart below shows different types of biochips used in various applications
- DNA chips are used across almost all the applications
- Protein chips are used more as compared to DNA chips in Immunology, Cancer Detection and Biomolecules, Inflammatory Diseases and Phosphorylation



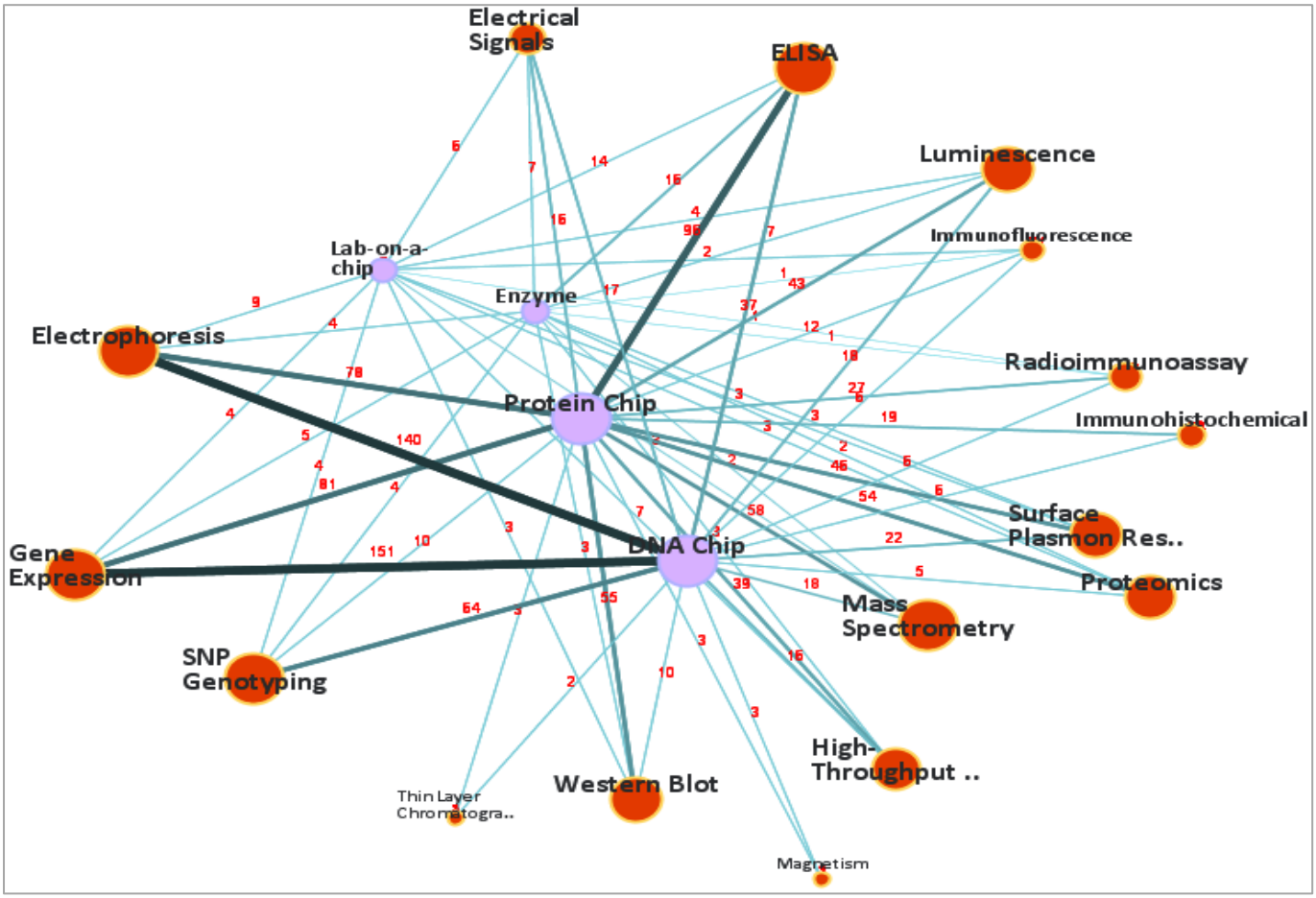
How we did it?

A co-occurrence matrix was generated using the co-occurrence analyzer to map the different types of biochips with its applications. The resulting matrix was converted into a clustered column chart using the option provided in software for the same.

Biochip – Types vs Methods

In the map, different types and methods are connected through links whose thickness and color intensity is directly proportional to the number of records relating them. The number (in red) next to each line represents the number of records present in the respective category. It can be that Gene Expression and Electrophoresis are the methods where DNA chips are used the most.

Also, ELISA followed by Gene Expression is more often used by Protein Chip for diagnostic purposes. Similarly, Thin Layer Chromatography and Magnetism are exclusive to Protein Chip and DNA Chip.



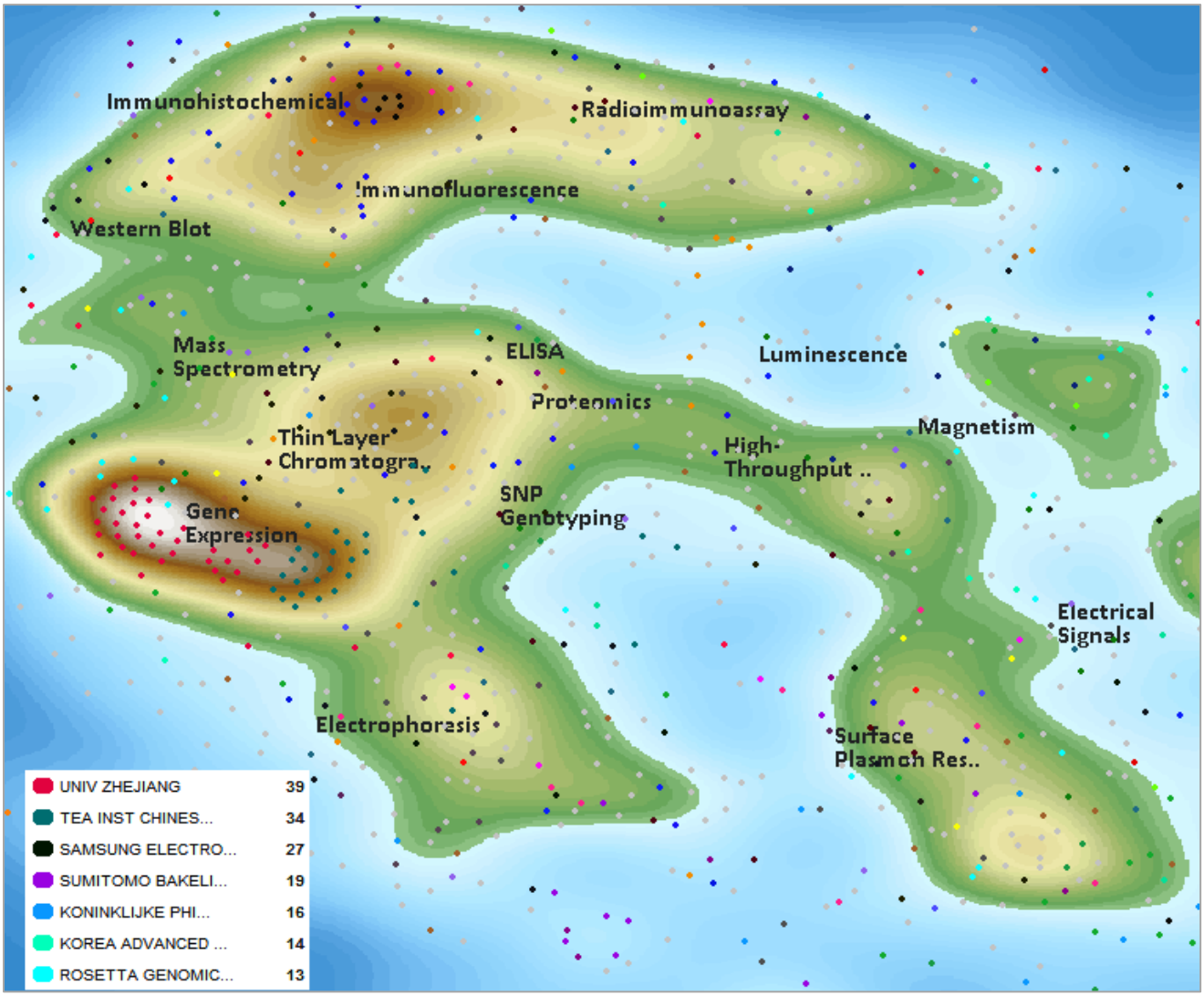
How we did it?

The clusters that were created for previous analysis were correlated using the co-occurrence analyzer and the resulting matrix was represented as Correlation map. Also, links between same field types were removed using the option provided.

Technology Landscape for Methods

The contour map below represents key concepts for different companies across various methods where biochips are used.

Clusters for Internal Radioimmunoassay, Immunohistochemical and Immunofluorescence are close to each other as there is high degree of relevance between the records present in those types of methods. The patents represented by dots were coloured by company.



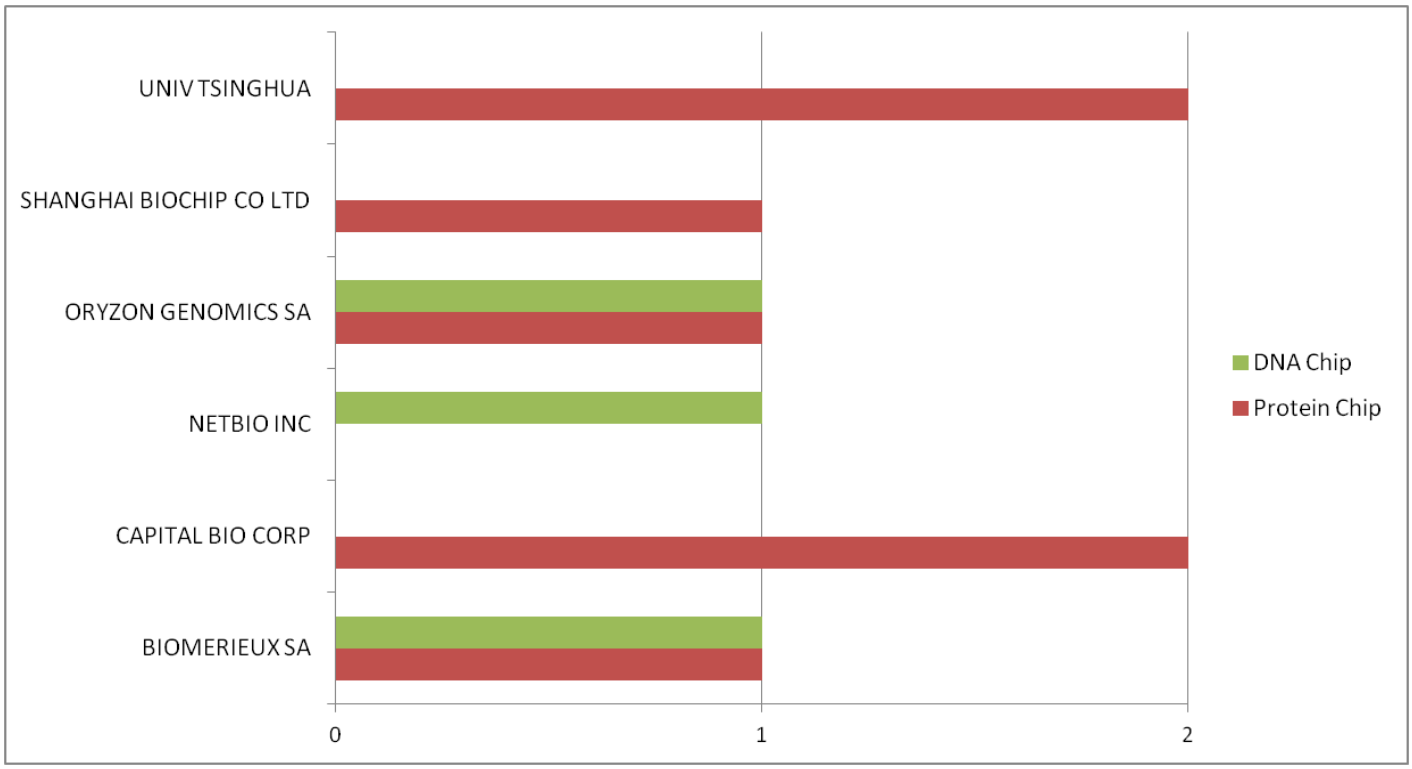
How we did it?

The VizMAP tool in Patent iNSIGHT Pro was used for this analysis. First the clusters for different methods were loaded on the map. They were analyzed on basis of their contextual similarity using title, abstract and claims as Text and technology as UDC from the 'Context mode' option. We removed unrelated patents using the "Hide Unrelated records" option and one patent assignee using the options available in VizMAP.

Analysis for companies primarily focusing on biochips for diagnostic purposes

Biochip - Companies vs Types

The chart shows different types of biochips used with respect to different companies involved. It can be seen that Oryzon and Biomerieux focus on both types of chips and Netbio focuses only on DNA type of biochip.



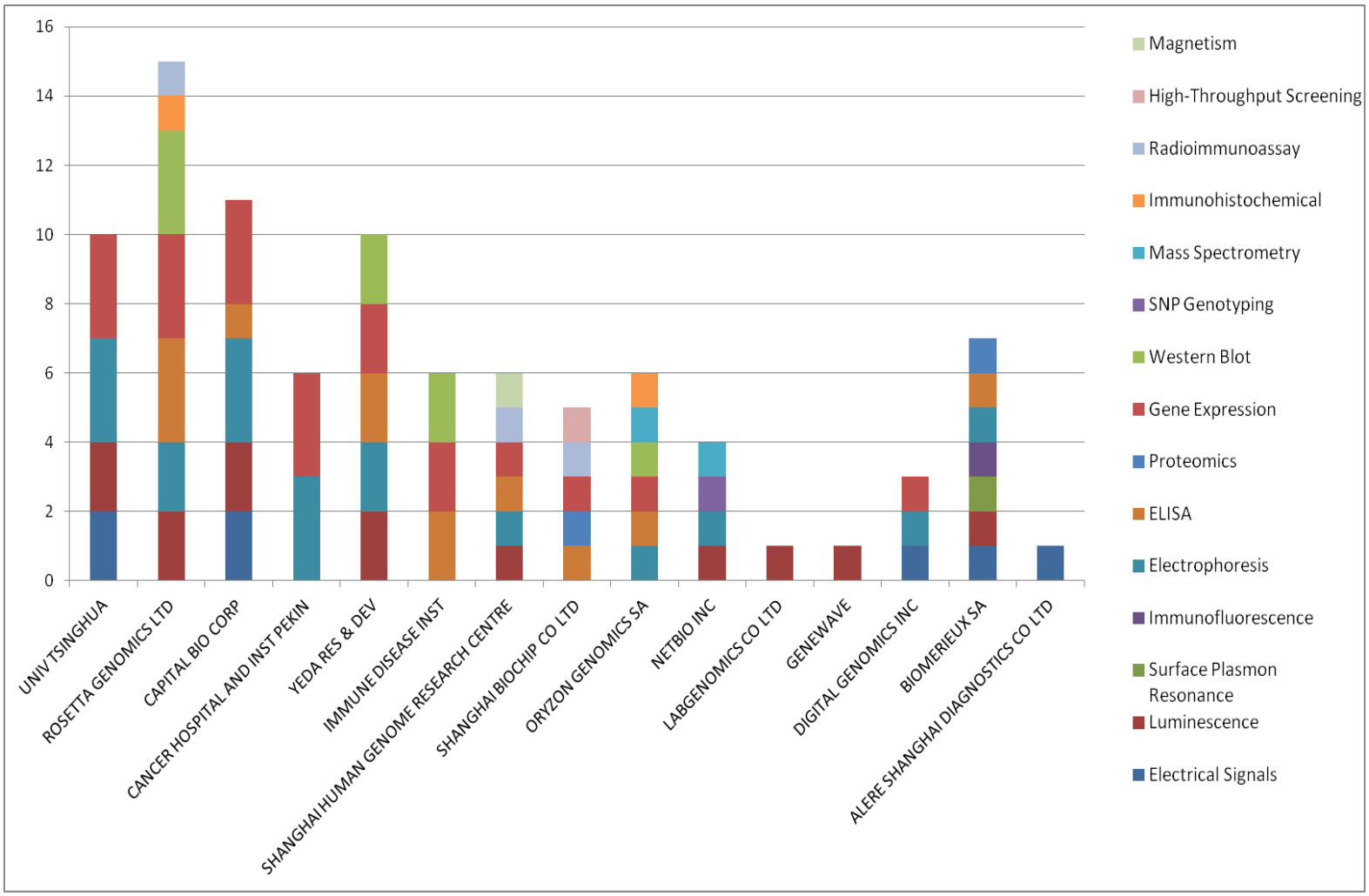
How we did it?

We filtered companies primarily focusing on biochips using the Data filter option present in co-occurrence analyzer. A co-occurrence matrix was generated to map the different types with assignees. The resulting matrix was exported to Excel using the option present and a bar chart for same was generated.

Biochip - Companies vs Methods

The chart shows different methods used with respect to different companies involved. It can be seen that almost all the companies have research interest around Electrophoresis, Gene Expression, ELISA and Luminescence.

Also, it can be seen that Genewave and Labgenomics focus only on Luminescence.



How we did it?

We filtered companies primarily focusing on biochips using the Data filter option present in co-occurrence analyzer. A co-occurrence matrix was generated to map the different methods with assignees. The resulting matrix was exported to Excel using the option present and a stacked column chart for same was generated.

Filings for companies primarily focusing on biochips for diagnostic purposes

The following tables show records for companies focusing on biochip for diagnostic purposes with respect to their earliest filing dates.

I. ROSETTA GENOMICS LTD

Patent Number	Title	Abstract	Filing Date; Publication Date
WO2006126040	BACTERIAL AND BACTERIAL ASSOCIATED MIRNAS AND USES THEREOF	The present invention relates to a first group of novel bacterial and human associated oligonucleotides, here identified as "Genomic Address Messenger" or "GAM" oligonucleotide, and a second group of novel operon-like bacterial and human polynucleotides, here identified as "Genomic Record" or "GR" polynucleotide. GAM oligonucleotides selectively inhibit translation of known "target" genes, many of which are known to be involved in various bacterial infections. Nucleic acid molecules are provided respectively encoding 21,916 bacterial and 6,100 human GAM precursor oligonucleotides, and 6,056 bacterial and 430 human GR polynucleotides, as are vectors and probes both comprising the nucleic acid molecules, and methods and systems for detecting GAM oligonucleotides and GR polynucleotides and specific functions and utilities thereof, for detecting expression of GAM oligonucleotides and GR polynucleotides, and for selectively enhancing and selectively inhibiting translation of the respective target genes thereof.	25/May/2005;15/Feb/2007
US20100323903	DIAGNOSIS AND PROGNOSIS OF SPECIFIC CANCERS	The present invention provides nucleic acid sequences that are used for identification and diagnosis of specific cancers. The nucleic acid sequences can also be used for prognosis evaluation of a subject based on the expression profile of a biological sample.	29/Oct/2008;23/Dec/2010
US20110105596	COMPOSITIONS AND METHODS FOR PROGNOSIS OF OVARIAN CANCER	Described herein are compositions and methods for the prediction of the prognosis of ovarian cancer subjects. The present invention further provides methods for distinguishing between histological subtypes of ovarian cancer tumors, and also methods and compositions for the treatment or prevention of ovarian cancer. Specifically the invention relates to microRNA molecules associated with said methods and compositions, as well as various nucleic acid molecules relating thereto or derived therefrom.	19/May/2009;05/May/2011
US20110177965	COMPOSITIONS AND METHODS FOR PROGNOSIS OF GASTRIC CANCER	Described herein are compositions and methods for survival prediction in gastric cancer patients after surgical operation. The compositions are microRNA molecules associated with the prognosis of gastric cancer, as well as various nucleic acid molecules relating thereto or derived therefrom.	19/May/2009;21/Jul/2011

US20110143959	COMPOSITIONS AND METHODS FOR DETERMINING THE PROGNOSIS OF BLADDER UROTHELIAL CANCER	Described herein are compositions and methods for the prediction of bladder cancer risk of invasiveness. The compositions are microRNA molecules associated with the prognosis of bladder cancer, as well as various nucleic acid molecules relating thereto or derived therefrom.	05/Aug/2009;16/Jun/2011
WO2010018563	COMPOSITIONS AND METHODS FOR THE PROGNOSIS OF LYMPHOMA	Described herein are compositions and methods for prognosis of malignant lymphoma. The compositions are microRNA molecules associated with the prognosis of lymphoma, as well as various nucleic acid molecules relating thereto or derived thereof.	05/Aug/2009;15/Apr/2010
WO2010058393	COMPOSITIONS AND METHODS FOR THE PROGNOSIS OF COLON CANCER	Described herein are compositions and methods for prognosis of colon cancer. The compositions are microRNA molecules associated with the prognosis of colon cancer, as well as various nucleic acid molecules relating thereto or derived thereof.	15/Nov/2009;12/Aug/2010
WO2010070637	METHOD FOR DISTINGUISHING BETWEEN ADRENAL TUMORS	The present invention provides nucleic acid sequences that are used for identification, classification and diagnosis of specific types of adrenal tumors. The nucleic acid sequences can also be used for evaluation of a subject based on the expression pattern of a biological sample.	13/Dec/2009;12/Aug/2010
WO2011024157	NUCLEIC ACID SEQUENCES RELATED TO CANCER	Disclosed are microRNA molecules, as well as various nucleic acid molecules relating thereto or derived therefrom Further disclosed are methods and compositions that can be used for diagnosis of cancer.	10/Jun/2010;03/Mar/2011
WO2011039757	COMPOSITIONS AND METHODS FOR PROGNOSIS OF RENAL CANCER	Described herein are compositions and methods for the prognosis of renal cancer patients after surgical operation. Specifically the invention relates to microRNA molecules associated with the prognosis of renal cancer, as well as various nucleic acid molecules relating thereto or derived therefrom.	04/Oct/2010;29/Dec/2011
US9068232	GENE EXPRESSION SIGNATURE FOR CLASSIFICATION OF KIDNEY TUMORS	The present invention provides a method for classification of kidney tumors through the analysis of the expression patterns of specific microRNAs and nucleic acid molecules relating thereto. Classification according to a microRNA expression framework allows optimization of treatment, and determination of specific therapy.	05/Mar/2012;30/Jun/2015

US20140309123	METHODS FOR LUNG CANCER CLASSIFICATION	The present invention provides specific nucleic acid sequences for use in the identification, classification and diagnosis of various sub-types of lung cancers. The present invention permits one to accurately classify lung cancers based on their miR expression profile without further manipulation. Using microRNA microarray data generated from over two hundred formalin-fixed paraffin-embedded (FFPE) resection samples, fine needle aspiration (FNA) samples and fine needle biopsy (FNB) samples of primary lung cancer, microRNA expression profiles were identified that differ significantly for various sub-types of lung cancer.	26/Mar/2012;16/Oct/2014
US9096906	GENE EXPRESSION SIGNATURE FOR CLASSIFICATION OF TISSUE OF ORIGIN OF TUMOR SAMPLES	The present invention provides a process for classification of cancers and tissues of origin through the analysis of the expression patterns of specific microRNAs and nucleic acid molecules relating thereto. Classification according to a microRNA tree-based expression framework allows optimization of treatment, and determination of specific therapy.	03/Apr/2013;04/Aug/2015
US20140179757	NUCLEIC ACIDS INVOLVED IN VIRAL INFECTION	Provided herein are isolated viral and human nucleic acids associated with viral infection and various nucleic acid molecules relating thereto or derived therefrom. The nucleic acids may be useful for the prevention, treatment and diagnosis of viral infections.	06/Jun/2013;26/Jun/2014
US20140087967	METHODS AND COMPOSITIONS FOR DIAGNOSING COMPLICATIONS OF PREGNANCY	The present invention provides methods and compositions for identifying subjects at risk of developing a complication of pregnancy, such as preeclampsia or preterm labor. The compositions are microRNAs and associated nucleic acids.	25/Oct/2013;27/Mar/2014
US9006206	COMPOSITION AND METHODS FOR MODULATING CELL PROLIFERATION AND CELL DEATH	Described herein are compositions and methods for modulation of p53-dependent cell death and cell proliferation. The compositions are microRNAs and associated nucleic acids.	19/May/2014;14/Apr/2015
US20140336241	COMPOSITIONS AND METHODS FOR PROGNOSIS AND TREATMENT OF PROSTATE CANCER	Described herein are compositions and methods for prognosis and treatment of prostate cancer patients. Specifically the invention relates to microRNA molecules associated with the prognosis of prostate cancer, as well as various nucleic acid molecules relating thereto or derived therefrom.	30/Jul/2014;13/Nov/2014

US20150099665	METHODS FOR DISTINGUISHING BETWEEN SPECIFIC TYPES OF LUNG CANCERS	The present invention provides nucleic acid sequences that are used for identification, classification and diagnosis of lung cancers. The present invention further provides microRNA molecules, as well as various nucleic acid molecules relating thereto or derived therefrom, associated with specific types of lung cancers.	16/Dec/2014;09/Apr/2015
US20150126399	DIAGNOSIS AND PROGNOSIS OF VARIOUS TYPES OF CANCERS	The present invention provides nucleic acid sequences that are used for identification, classification and diagnosis of specific types of cancers. The nucleic acid sequences can also be used for prognosis evaluation of a subject based on the expression pattern of a biological sample.	08/Jan/2015;07/May/2015

II. BIOMERIEUX SA

Patent Number	Title	Abstract	Filing Date; Publication Date
US20090123924	METHOD FOR BREAST CANCER DIAGNOSIS	The invention relates to a method for the in vitro diagnosis of breast cancer in a patient who may be suffering from a breast cancer, characterized in that it comprises the following steps: a) biological material is extracted from a biological sample taken from the patient, b) the biological material is brought into contact with at least 8 specific reagents chosen from the specific reagents for the target genes with a nucleic sequence having any one of SEQ ID Nos. 1 to 8, c) the expression of said target genes is determined.	05/Jul/2006;14/May/2009
AU2007201547	METHOD FOR CONTROLLING THE MICROBIOLOGICAL QUALITY OF AN AQUEOUS MEDIUM AND KIT THEREFOR	None	05/Apr/2007;03/May/2007

III. CAPITAL BIO CORP

Patent Number	Title	Abstract	Filing Date; Publication Date
CN100464877	A CHIP WASHING DEVICE	The invention claims a chip washing device wherein the: Washing device comprises: An outer cylinder; A base plate which is fixed on the bottom of outer barrel; A fixed plate fixed on the said outer tube inner; A motor which is fixed on the fixing board; A slide plate the fixed on the outer cylinder and inner; A transmission device the sliding is set in said sliding channel plate and the input end is connected with the output end of electric machine; A set of the chip of the frame which is connected on said transmission device the output end of the; A washing container is set in the immersion is set on the frame of the chip of the washing liquid. The invention can conveniently realize large batch cleaning chip the purpose of the washing efficiency is high it can be widely used in various electric biologic chip of a large amount of washing in.	23/Feb/2006;04/Mar/2009
CN100578222	AGAROSE GEL PLASTIC SUBSTRATE, ITS PRODUCTION AND USE	A method for preparing Ago-Gel plastic substrate includes forming surface of plastic substrate to be groove by injection molding means, washing plastic substrate by plasma, injecting agarose solution into groove of plastic substrate for forming film after it is dried, oxidizing plastic substrate with agarose film on groove by sodium preiodate solution, washing oxidized agarose plastic substrate by water, drying it then obtaining Ago-Gel plastic substrate.	15/Mar/2006;06/Jan/2010
CN100578223	AGAROSE GEL FILM SUBSTRATE, ITS PRODUCTION AND USE	An Ago-Gel film substrate is featured as forming Ago-Gel film on substrate and isolating said film to be at least two independent regions .The Ago-Gel film substrate with multiple independent isolated regions of samples can be used to prepare chip for realizing simultaneous detection on sample of multiple index and on multiple shares of the same sample as well as on different biological samples to raise detection efficiency of chip.	17/Mar/2006;06/Jan/2010
CN100480385	BIOCHIP HYBRIDIZING BOX	The invention claims a biologic chip crossbreed box it comprises a pedestal an upper cover a clamping groove and a bracket; Wherein the bracket is set on said pedestal and the upper cover which is formed by the sealed cavity of the clamping groove is set on said base seat and outside of the upper cover two sides of the bottom of. In this invention chip hybridization of the box the upper cover and bottom base adopts a subsidiary opening matching with the periphery of the positioning way of matched with the upper cover and pedestal to form an enclosed cavity: The invention claims a chip reaction front of the water on the water absorbing material on the surface of chip reaction time water can from the water absorption substance volatilizing the chip hybridization box to form a certain temperature and humidity so as to prevent the chip hybridization in the process of reaction liquid is volatilized.	09/Nov/2006;22/Apr/2009

WO2008064519	METHODS AND COMPOSITIONS FOR DIAGNOSIS OF ESOPHAGEAL CANCER AND PROGNOSIS AND IMPROVEMENT OF PATIENT SURVIVAL	The present invention provides methods and compositions for diagnosing and classifying esophageal cancer and prognosis for survival of individuals having esophageal cancer based on levels or gene status of certain microRNAs. The invention also provides compositions comprising agents that decrease the levels of miRNAs and uses thereof for improvement of survival.	28/Nov/2006;05/Jun/2008
US20090000948	METHODS FOR IMPROVING EFFICIENCY OF CELL ELECTROPORATION USING DIELECTROPHORESES	The present invention provides methods for enhancing the efficiency of cell electroporation using dielectrophoresis-assisted cell localization and uses thereof in a microfluidic biochip system. Cells are first subject to dielectrophoresis and localized to regions where the electric field intensity is high enough to render cells electroporated. The invention enhances the efficiency of in situ cell electroporation on a traditional microfluidic biochip.	04/Jan/2007;01/Jan/2009
CN100577816	FLUORESCENCE LABELING OLIGONUCLEOTIDE PROBE AND USES THEREOF	The invention discloses a fluorescence marked obligonucleotide probe and an application of the probe. The probe of the invention changes the designing method of traditional Taqman probe that a fluorescence reporting group and a fluorescence quenching group are put at the two ends of the probe. The invention designs the fluorescence quenching group at the middle of the probe and meanwhile decorates two ends of the fluorescence quenching group with a fluorescence reporting group. Thereby, not only the distance between the fluorescence reporting group and the fluorescence quenching group is shortened, but the quenching effect is enhanced. And a molecular probe of the invention can release two molecular of fluorescence when being hydrolyzed, which can increase the strength of the fluorescence signal and enhance the detecting sensitivity. The invention can be widely applied to a real-time fluorescence PRC reaction and used for biological ship detecting.	24/Sep/2007;06/Jan/2010
CN101196447	WASHING METHOD AND DEVICE FOR BIOLOGICAL CHIP	The invention relates to a cleaning method of biochip and device, which comprises the following procedures: firstly, a plurality of fixing grooves fixed with a biochip are arranged in a cleaning chamber; secondly, at least a pipeline to a liquid cleaning bottle and a pipeline to a waste liquid bottle are connected under the cleaning chamber, a liquid pump and a valve are arranged on the pipeline;thirdly, the valve to the waste liquid bottle is closed, the valve to the cleaning liquid is opened, through liquid pump, make the cleaning liquid pump in the cleaning chamber; fourthly, the valve tothe cleaning liquid is closed and the valve to the waste liquid bottle is opened. Starts the liquid pump for/backward frequently, and makes the cleaning liquid pump in the cleaning chamber enter intothe waste liquid bottle by pump. The invention has simple structure and lower cost, which realizes the automatic cleaning to biochip, avoids the error caused by manual operation, and is easier to realize automatic controlling and integrating.	21/Dec/2007;29/Sep/2010

CN101633742	AMINO PLASTIC SUBSTRATE, AND PREPARATION METHOD AND APPLICATION THEREOF	The invention discloses an amino plastic substrate, and a preparation method and application thereof. The preparation method of a biochip substrate comprises the following steps: connecting an amino group with the surface of the plastic substrate and obtaining the substrate. The surface of the substrate is connected with the amino group. Proved by tests, a biochip with excellent performance is prepared on plastic material by the preparation method. The plastic material has strong plasticity and convenient forming, and processing and various micro-structures and functional units can be designed; therefore, the preparation method can be applied to the field of the biochip, such as micro-fluidic control, and the like.	01/Sep/2009;23/May/2012
CN101643321	HIGH-POLYMER THREE-DIMENSIONAL AMINO-GROUP SUBSTRATE AS WELL AS PREPARATION METHOD AND APPLICATION THEREOF	The invention discloses a high-polymer three-dimensional amino-group substrate as well as a preparation method and the application thereof. The method for preparing the biochip substrate comprises the following step: connecting amino-enriching polymer on the surface of a slide substrate to obtain a substrate with the amino-enriching polymer being connected on the surface. Experiments prove that the substrate has greatly-improved bimolecular fixing sensitivity, satiated sample points and more stable surface property, and ensures that the shapes of the sample points in the process of long-time sample pointing always keep uniform, and the non-specific adsorption and the self-fluorescence background of the sample points are both very low. The substrate is suitable for the pointing high-density chips which are pointed for a long time, and solves the problem that a major of samples of the high-density chips pointed for a long time can not be fixed in the common amino substrate. The substrate is a biochip substrate material with excellent performance and can be widely applied on the preparation of various biochips.	01/Sep/2009;18/Jul/2012
CN102276863	AMINO PLASTIC SUBSTRATE AND PREPARATION METHOD AND APPLICATION THEREOF	The invention claims the amino plastic substrate and its preparation method and application thereof. The preparation of biological chip substrate the method comprises the following steps: Of the plastic substrate is connected with the surface of the amino and obtain surface is connected to the amino chip. The experiment proves that this invention realizes the plastic material the preparation has good performance of biological chip. Because the plastic of high plasticity it is convenient for forming processing and design of various minute structure function unit so it can be used for micro-fluidic biochip and so on in the field of.	01/Sep/2009;20/Mar/2013
US20130210675	COMPOSITIONS AND METHODS FOR CONTROLLED RELEASE OF BIOMOLECULES	Provided are compositions for controlled release of biomolecules, which comprise conjugates of polymers and biomolecules conjugated through non-covalent interactions. Also provided are methods for controlled release of biomolecules and their use in biochips.	13/Jul/2011;15/Aug/2013

US20140011707	BIOLOGICAL CHIP HYBRIDIZATION SYSTEM	A hybridization system is provided, which comprises a biological chip having a substrate (1) with a probe dot matrix (3) and a cover plate (2) with at least two through-holes (4), where a hybrid chamber (5) is formed between the substrate (1) and the cover plate (2), at least two fluid channels (6) are interconnected respectively with the hybrid chamber (5) by the two through-holes (4), and a fluid control device is interconnected with the fluid channels (6). The biological chip hybridization system integrates hybridizing, cleaning and drying functions, uses power provided by the fluid control device as the drive force for promoting the liquid flow for automatically reciprocation flow in the fluid channels (6) and the chamber (5) to achieve a dynamic hybridization, thus improving the hybrid efficiency and uniformity, and achieving automatic control.	10/Feb/2012;09/Jan/2014
US9101924	INTERFACE DEVICE FOR BIO-CHIP	An interface device for bio-chip at least comprises an interface unit, said interface unit consisting of instrument interface layer, fluid channel layer and sample interface layer. The instrument interface layer has at least one instrument interface. The fluid channel layer has one hollow-out fluid channel. The sample interface layer has at least one sample interface, and both ends of said fluid channel connect to the sample interface and the instrument interface respectively. The interface device separates sample solutions from the instrument interface by gas or liquid in the fluid channel, thus to avoid direct contacts between sample solutions and instrument interface which will cause pollution, and omitting cleaning processes after using instruments. With simple structure, easy operation and low cost, it applies to chemistry field, biology field and medical analysis field.	10/Feb/2012;11/Aug/2015
CN103424365	MICROCARRIER BIOCHIP AND ITS APPLICATION	The invention discloses a microcarrier chip and its application. The microcarrier chip comprises a substrate (11), and the substrate (11) is provided with a surface structure capable of generating specific color reflection light under the action of a low-coherence light source. The microcarrier chip is concretely composed of the substrate (11), a transparent film (12) covering the substrate (11), a chemical modification layer (13) of the surface of the transparent film, and a molecular probe (14) fixed on the chemical modification layer in a covalent bond mode or a physical adsorption mode. The microcarrier chip is designed through adopting a low-coherence light based color coding technology to realize the highly sensitive and specific detection of a plurality of biologic molecules. The technology overcomes the periodicity disadvantage of a laser coding technology. The color of the surface of a microcarrier can specifically correspond to the thickness of the film within 1mum. The thickness change resolution of the microcarrier film can reach 5nm through utilizing the color coding/decoding analysis technology.	25/May/2012;04/Dec/2013

CN104237544	BIOLOGICAL CHIP DETECTOR	The invention discloses a biological chip detector. The biological chip detector comprises a first shell and a second shell which are connected with each other, as well as a biological chip supporting rack, a light source, a detector and a detection result output device, wherein the first shell is provided with an accommodating cavity; an upper plate of the accommodating cavity is opposite to the second shell; the biological chip supporting rack is rotatably arranged on the upper plate of the first shell, and is provided with a detection zone for placing a biological chip; the upper plate is provided with a through hole corresponding to the detection zone; the light source is positioned on one of the first shell and the second shell and used for providing light for the biological chip; the detector is mounted on the other of the first shell and the second shell and is used for detecting a detection part of the biological chip; the detector and the light source are arranged on the two sides of the biological chip supporting rack. The biological chip is put on the biological chip supporting rack, the detection part of the biological chip can be corresponding to the through hole, the light source is turned on as required, and the detector detects the detection part of the biological chip so as to complete detection on a biological substance. The biological chip detector is simple structure, small in space occupation and convenient to carry, and facilitates detection works outdoors and in remote regions, so that the application range of the biological chip detector is widened.	28/Sep/2014;24/Dec/2014

IV. DIGITAL GENOMICS INC

Patent Number	Title	Abstract	Filing Date; Publication Date
JP2011517769	BIOCHIPS FOR METHODS AND WHICH ELECTRICALLY DETECTING A PHYSIOLOGICALLY ACTIVE SUBSTANCE	The present invention relates to biological physiologically active substances, and precisely detect the electrical property changes due to a biochemical or chemical reactions, for the method and which detects the presence whether and / or the reaction propriety of the physiologically active substance on bio-chip that is provided. In the present invention, the reaction of the target sample can be subjected under general reaction solution, however, meet the high re-reference fluid dielectric constant such as water in the reaction chamber prior to the reaction, the impedance value or the capacitance Measure the value, after completion of the reaction to remove the reaction solution, the filled again high reference fluid dielectric constant, after measuring the impedance value or the capacitance value, and comparing the impedance value or the capacitance value of the before and after the reaction By, adopt a method to confirm the presence whether and / or the reaction whether the physiologically active	20/Jan/2009;16/Jun/2011

		substance in the target sample. .BACKGROUND 5	
US20110017593	HIGHLY SENSITIVE BIOSENSOR, BIOCHIP COMPRISING THE SAME AND METHOD FOR MANUFACTURING THE SAME	The present invention has a feature to form a biocompatible dielectric thin film on the surface of a metal electrode in a biosensor constructing a biochip. When using such a biocompatible dielectric thin film, this non-specific adsorption between a protein such as enzyme and a metal electrode can be prevented. Therefore, the present invention can escape a phenomenon that inhibits the reaction of a biomolecule due to the non-specific adsorption on the surface of a metal electrode. In addition, when the dielectric thin film having a high dielectric constant, as a biocompatible dielectric thin film, is made on the surface of a metal electrode, the sensitivity of an electrical detection according to the reaction of a biomolecule can be improved.	20/Jan/2009;27/Jan/2011
KR20130022967	METHOD FOR ANALYZING MICROSCOPIC IMAGE OF BIOMOLECULES USING DYEING THE BIOMOLECULES BY MATERIALS HAVING HIGH ATOMIC NUMBER	PURPOSE: A method for analyzing a microscopic image of a physiologically active substance by dyeing is provided to improve the analytic ability of a surface image, and to manufacture a biochip. CONSTITUTION: A method for analyzing a microscopic image of a physiologically active substance by dyeing with a high atomic number material comprises: a step of fixing a physiologically active substance on a flat substrate; a step of dyeing the physiologically active substance with a high atomic number material; and a step of observing and analyzing a surface image of the physiologically active substance using a microscope.	26/Aug/2011;07/Mar/2013
US9005545	METHOD FOR DETECTING BIOMOLECULES ELECTRICALLY AND BIOCHIP THEREFOR	The present invention relates to a method for detecting the presence and/or the reaction of a biomolecule by monitoring changes of electrical property accurately according to the biological, biochemical or chemical reaction of the biomolecule, and a biochip provided for this purpose.	07/Dec/2012;14/Apr/2015
WO2014058172	DEVICE FOR SELECTIVELY INJECTING LIQUID INTO REACTION VESSEL AND BIOSENSOR INCLUDING SAME	The device for selectively injecting a liquid into a reaction vessel, according to the present invention, comprises: a housing which is connected to the reaction vessel and which has a plurality of inflow passages, through which the liquid is injected, and a plurality of flow paths, which correspond to and communicate with the plurality of inflow passages, respectively; a connection passage which is connected to the plurality of flow paths and which is formed through the inner portion of the housing along the lengthwise direction from the central axis which is separated by a predetermined distance from the plurality of inflow passages; and a flow path selection means including a connection groove, which is incorporated inside the connection passage and connected to the housing in a rotatable manner, and which communicates with one of the plurality of flow paths selected in response to a rotation with respect to the central axis, and an outlet which communicates with the connection groove and the reaction vessel and which discharges the liquid flowing in through the selected flow path and the connection groove into the reaction vessel.	02/Oct/2013;17/Apr/2014

V. GENEWAVE

Patent Number	Title	Abstract	Filing Date; Publication Date
WO2008132325	FLUORESCENCE READING DEVICE	The invention relates to a device for reading the fluorescence emitted by chromophorous members associated with biological or chemical components at the surface of an object (10), that comprises means (12) for lighting the chromophorous members with an excitation light supplied by a laser source (16) and flowing into a wave guide formed by a spoke (18) of a transparent material, and means (14) for collecting and picking up the fluorescence from the chromophorous members, said means (14) including a large field optical system (34).	07/Mar/2008;08/Jan/2009
US20130230906	MICROFLUID CARTRIDGE FOR MOLECULAR DIAGNOSTICS	A cartridge for carrying out a method of analyzing the nucleic acids contained in a sample, includes a main body (1) produced in a substrate, in which there are formed at least one reaction chamber (6) and one detection chamber (10) for at least one nucleic acid likely to be contained in the sample, a microfluid circuit including a sample-injection member (7), elements (4 and 13) for respectively injecting fluids into and removing fluids from the cartridge, cavities, fluidic passages (2) and valves capable of closing them. The cartridge further includes (a) a first face known as the actuation face (16), from which the valves of the cartridge are actuated, and (b) a second face, opposite to the actuating face, including the detection chamber (10) for at least one nucleic acid likely to be contained in the sample, this face being known as the detection face (15).	16/Nov/2011;05/Sep/2013
US20140017128	BIOCHIP DEVICE	A biochip device comprising a substrate constituted by at least one plate of material forming a multimode planar waveguide and carrying chromophore elements suitable for emitting fluorescence in response to excitation by guided waves having an evanescent portion, the device being characterized in that it includes coupling means for coupling excitation light with the waveguide in the form of guided waves, the coupling means being substantially non-directional.	28/Dec/2011;16/Jan/2014

VI. NETBIO INC

Patent Number	Title	Abstract	Filing Date; Publication Date
US20110008785	METHODS FOR FORENSIC DNA QUANTITATION	Described herein are methods and devices for nucleic acid quantification and, in particular, to microfluidic methods and devices for nucleic acid quantification. In certain embodiments methods of quantifying a target nucleic acid without the need for amplification are provided. The methods involve, in some embodiments, allowing a binding agent to become immobilized with respect to the target nucleic acid. In some cases, the binding agent comprises a signaling moiety that can be used to quantify the amount of target nucleic acid. In another aspect, the quantification can be carried out rapidly. For example, in certain embodiments, the quantification can be completed within 5 minutes. In yet another aspect, samples containing a low amount of target nucleic acid can be quantified. For instance, in some	15/Jun/2010;13/Jan/2011

		cases, samples containing less than 100 nanograms per microliter may be quantified. Also described are devices and kits for performing such methods, or the like.	
US8961765	PLASTIC MICROFLUIDIC SEPARATION AND DETECTION PLATFORMS	Plastic electrophoresis separation chips are provided comprising a plurality of microfluidic channels and a detection window, where the detection window comprises a thin plastic; and the detection window comprises a detection region of each microfluidic channel. Such chips can be bonded to a support provided an aperture is provided in the support to allow detection of samples in the electrophoresis chip at the thin plastic detection window. Further, methods for electrophoretically separating and detecting a plurality of samples on the plastic electrophoresis separation chip are described.	08/Aug/2012;24/Feb/2015
US20130184176	METHODS AND COMPOSITIONS FOR RAPID MULTIPLEX AMPLIFICATION OF STR LOCI	Provided are methods for multiplex polymerase chain reaction (PCR) amplification of short tandem repeat (STR) loci that can be used to rapidly generate a highly specific STR profile from target nucleic acids. The resulting STR profiles are useful for human identification purposes in law enforcement, homeland security, military, intelligence, and paternity testing applications.	14/Mar/2013;18/Jul/2013
US20140370580	UNITARY BIOCHIP PROVIDING SAMPLE-IN TO RESULTS-OUT PROCESSING AND METHODS OF MANUFACTURE	A biochip for the integration of all steps in a complex process from the insertion of a sample to the generation of a result, performed without operator intervention includes microfluidic and macrofluidic features that are acted on by instrument subsystems in a series of scripted processing steps. Methods for fabricating these complex biochips of high feature density by injection molding are also provided.	14/Mar/2013;18/Dec/2014
AU2013204367	UNITARY BIOCHIP PROVIDING SAMPLE-IN TO RESULTS-OUT PROCESSING AND METHODS OF MANUFACTURE	A stationary, and unitary biochip, which upon insertion into an electrophoresis instrument having pneumatic, thermal, high voltage, and optical subsystems, and a process controller, generates a nucleic acid sequencing or sizing profile from at least one sample, said biochip comprising: a macro-fluidic processing subassembly in connection with a fluidic subassembly and a pneumatic subassembly, comprising at least one chamber adapted to receive a sample; the fluidic subassembly, comprising a fluidic plate, and at least one fluid transport channel and an amplification chamber adapted to connecting to the thermal subsystem; the pneumatic subassembly which is adapted to connecting to the pneumatic subsystem of said instrument, and to the subassemblies of said biochip, comprising, a pneumatic plate and one or a plurality of drive lines to pneumatically drive fluids on instructions from said process controller; a separation and detection subassembly adapted for connecting to the high voltage and optical subsystems and process controller on said instrument, said separation and detection subassembly comprising a separation channel, and further comprising a detection region positioned to send signals from each of said channels to said optical subsystem on said instrument.	12/Apr/2013;16/May/2013

VII. LABGENOMICS CO LTD

Patent Number	Title	Abstract	Filing Date; Publication Date
KR20110128056	MICROORGANISM FOR QUANTIFYING HOMOCYSTEINE AND USE THEREOF	PURPOSE: A microorganism for quantitation of homocysteine and methionine is provided to ensure accurate and quick quantitation of homocysteine in several samples. CONSTITUTION: A method for quantiation of homocysteine in a sample using auxotrophic mutant E.coli comprises: a step of culturing mutant E.coli strain of homocysteine and methionine auxotrophy in the sample to measure the content of homocysteine and methionine in the sample; a step of culturing mutant E.coli strain of methionine auxotrophy in the sample to measure the methionine content in the sample; and a step of subtracting the methionine content from the content of homocysteine and methionine in the sample. The E.coli strain of methionine auxotrophy is E.coli Met5-(KCCM11070P). The content is measured by expression level of luciferase or fluorescent protein. The quantitation is used for diagnosing cardiac disease, pregnancy complications, osteoporosis, or Alzheimers disease.	20/May/2010;28/Nov/2011
US8759021	MICROORGANISM FOR QUANTIFYING HOMOCYSTEINE, AND USE THEREOF	Provided are a microorganism for use in quantification of homocysteine and methionine and a method of quantifying homocysteine and methionine in a sample by using the microorganism.	20/May/2010;24/Jun/2014

VIII. SHANGHAI BIOCHIP CO LTD

Patent Number	Title	Abstract	Filing Date; Publication Date
CN1880447	PROCESS FOR PREPARING HIGH-FLUX MONOCLONAL ANTIBODY	The invention discloses a monoclonal antibody preparing method of high-flux, which comprises the following steps: (a) proceeding immune inoculation for non-human mammal animal through multiple immunogen; (b) compounding splenocyte of immune inoculation animal and bone marrow oncocyte to fuse into cross oncocyte; (c) collecting the cross oncocyte; culturing; preparing cross oncocyte suspension; (d) screening cross oncocyte through biological chip to produce cross oncocyte system of immunogen monoclonal antibody.	17/Jun/2005;20/Dec/2006

CN1948505	MIRNA BIOCHIP AND ITS APPLICATION	The invention discloses MiRNA biological slugs including solid-phase hosts and MiRNA probes point-loaded on the hosts. A testing method using MiRNA biological slugs is also disclosed. Steps of the method are as follows: MiRNA probes are point-loaded on the surface of solid-phase hosts. Samples RNA are marked and then cross with MiRNA probes. After washing, samples are stained and tested for their signal points by scanning. Finally, the records are analyzed. MiRNA biological slugs and its testing method have great significance for various diseases including cancer, diabetes and coronary disease etc. They also offer efficient tool for fields such as new drug screening and molecular biology etc.	13/Oct/2005;18/Apr/2007

IX. SHANGHAI HUMAN GENOME RESEARCH CENTRE

Patent Number	Title	Abstract	Filing Date; Publication Date
CN1951963	MARKER GENE CTCFL FOR LIVER CANCER EARLY STAGE DIAGNOSIS AND ITS USES	The invention discloses a utility of human gene CTCFL (CCCTC-BINDING FACTOR-LIKE) as mark of early stage diagnosis of early stage, which is composed of 3493 nucleotides to code 664 amino acids, wherein the CTCFL gene in the liver cancer patient displays 75% obvious difference, which prompts the mark in the diagnosis of liver cancer.	20/Oct/2005;25/Apr/2007
CN101200719	LIVER CANCER RELATED GENE DLK1 AND USES THEREOF	The present invention discloses an application of DLK1 gene for preparing a RNA interference medicine for remedying the primary liver cancer and provides a siRNA sequence which considers the DLK1 gene as a target point. The present invention comprises the carrier of the siRNA sequence which considers the DLK1 gene as the target point and a host cell and also provides a biological chip and a kit for remedying and diagnosing the liver cancer. The DLK1 is considered as the target point for preparing the medicine for remedying the primary liver cancer, which ensures that the liver cancer is likely to be conquered.	11/Dec/2006;18/Jun/2008

X. ALERE SHANGHAI DIAGNOSTICS CO LTD

Patent Number	Title	Abstract	Filing Date; Publication Date
CN202383069	FLU DETECTION ELECTRONIC PEN	The utility model relates to a flu detection electronic pen, which comprises a sampling device, a biological chip, a detecting unit and a displaying unit. The sampling device is used for importing samples to be detected into the electronic pen; the biological chip is arranged in the electronic pen and is contacted with the imported samples to be detected to react; the detecting unit is used for performing optical detection on the biological chip to judge whether the biological chip is infected by the flu virus or not; and the display unit is used for displaying detection results.	22/Dec/2011;15/Aug/2012

XI. ORYZON GENOMICS SA

Patent Number	Title	Abstract	Filing Date; Publication Date
US20080318220	METHOD FOR THE DIAGNOSIS AND/OR PROGNOSIS OF ALZHEIMERS DISEASE	The present invention relates to a method for the diagnosis and/or prognosis of Alzheimers disease by means of determining the ZMIZ1 gene expression level in a biological sample and comparing said level with a reference value, in which the alteration of said level is indicative of Alzheimers disease.	20/Jun/2007;25/Dec/2008
US20080318221	METHOD FOR THE DIAGNOSIS AND/OR PROGNOSIS OF ALZHEIMERS DISEASE	The present invention relates to a method for the diagnosis and/or prognosis of Alzheimers disease by means of determining the DARC gene expression level in a biological sample and comparing said level with a reference value, in which the disturbance of said level is indicative of Alzheimers disease.	20/Jun/2007;25/Dec/2008

Appendix: Search Strings Used for Categorization

Fabrication Technology:

Fabrication Technologies	Search Query	Results
Microarray	(TAC) contains (microarray* or "micro-array*" or (micro w/2 array*) or MMChip* or (interferometric* w/2 sensor*) or "microRNA" or "miRNA*" or "Immune response in silico" or IRIS or ((DNA or protein* or peptide* or tissue* or cellular* or chemical* or antibod* or phenotype* or "deoxyribonucleic acid*") w/3 array*))	468
Microfluidic	(TAC) contains ((microfluidic*) or ((digital* or continuous) w/3 array*) or ((lab w/3 chip*) or "lab-on-a-chip" or LOC))	218

Types:

Types	Search Query	Results
DNA Chip	(TAC) contains (((DNA* or "Deoxyribonucleic acid") w/3 (chip* or array* or microarray* or micro-array* or (micro w/2 array*) or biochip* or "bio-chip*" or "bio chip*" or boichip*)) or genechip* or (gene* w/2 chip*) or "gene-chip*" or DNAchip* or "DNA-chip*" or "Deoxyribonucleic acid")	353
Enzyme	(TAC) contains (enzyme* w/3 (biochip* or biochip* or "bio-chip*" or "bio chip*" or boichip* or chip* or microarray* or "micro array*" or micro-array* or (micro w/2 array*)))	31
Lab-On-A-Chip	(TAC) contains ((lab* w/3 chip*) or "lab-on-a-chip" or LOC)	37
Protein Chip	(TAC) contains (protein* w/3 (biochip* or "bio-chip*" or "bio chip*" or boichip* or chip* or microarray* or "micro array*" or micro-array* or (micro w/2 array*)) or proteinchip* or "protein-chip*")	255

Methods:

Methods	Search Query	Results
Electrical Signals	(FT) contains (electric* w/2 signal*)	327
Electrophoresis	(FT) contains (electrophoresis* or cataphoresis* or anaphoresis* or "electro* phoresis*")	715
ELISA	(FT) contains (((enzyme* w/5 assay*) or ELISA) or "Enzyme-Linked ImmunoSorbent" or (enzyme w/1 chip*))	625
Gene Expression	(FT) contains ("Gene* expression*")	698
High Throughput Screening	(FT) contains ((High* w/2 Screen*) or HTS or "highthroughput screen*")	251
Immunofluorescence	(FT) contains (Immunofluorescence* or (immuno* w/2 fluorescence*) or immuno-fluorescence* or "Immuno* fluorescence*")	124
Immunohistochemical	(FT) contains contains (immunohistochemical* or IHC)	91
Luminescence	(FT) contains (luminescence* or chemiluminescence* or Bioluminescence* or electrochemiluminescence* or crystalloluminescence* or electroluminescence* or triboluminescence* or fractoluminescence* or sonoluminescence* or phosphorescence* or thermoluminescence* or	516

	cathodoluminescence* or mechanoluminescence* or piezoluminescence* or photoluminescence* or radioluminescence* or cryoluminescence*)	
Magnetism	(FT) contains (magnetism* or magnetoresist*)	84
Mass Spectrometry	(FT) contains ((mass* w/2 spectromet*) or "plural spectra")	349
Proteomics	(FT) contains (proteomic*)	247
Radioimmunoassay	(FT) contains (radioimmunoassay* or RIA or RAST or radioallergosorbent*)	166
SNP Genotyping	(FT) contains ((single w/2 polymorphism*) or (SNP w/2 (genotyp* or biochip* or microarray* or array*)))	268
Surface Plasmon Resonance	(FT) contains ((surface* w/2 resonance*) or SPR)	371
Thin Layer Chromatography	(FT) contains ((thin* w/2 chromatograph*) or TLC or HPTLC)	58
Western Blot	(FT) contains ((western* w/2 blot*) or (protein* w/2 immunoblot*) or immunoblot* or "immuno-blot*" or "immuno blot")	260

Applications:

Materials	Search Query	Results
Biomarkers	(FT) contains (biomarker* or (bio* w/2 mark*) or "P53 gene" or MMPs or "serum LDL" or "matrix metalloproteinases")	599
Biomolecules	(FT) contains (biomolecule*)	680
Cancer	(FT) contains ((bladder* or breast* or cervical* or colorectal* or "unknown primary" or kidney* or leukemia* or liver* or lymphoma* or lung* or melanoma* or ovarian* or pancreatic* or prostate* or thyroid*) w/3 cancer*)	714
Food Safety	(FT) contains (((test* or analy* or monitor* or safety) w/5 (food* or beverage* or confectionar* or meat* or poultry or seafood* or sea food* or snack* or egg* or seasoning* or dough* or doughnut* or softdrink* or dryfruit* or fruit or fruits or vegetable* or sausage* or milk or ice cream or icecream or bakery or crisp* or bread or juice* or comestible or biscuit* or snack* or cookie* or tea or coffee or sauce* or fish or pork or beef or bacon or ham or poultry or pulses or ketchup or beer or wine or whiskey or whisky or petfood* or pet food* or salad* or cola or sandwich* or burger or nut* or cheese or yoghurt* or yogurt* or yogourt* or curd or cereal* or pickle* or grain* or foodgrain*or rice or wheat or maize or barley or jam or jellies or soup or cake* or noodle* or pastr* or spirit* or bean* or dairy or gelato or gelatin* or cheese or butter* or grape* or noodle* or soy or flour or chocolate* or toffee or candy or candies or ((potato or banana or baked or roasted or fried) wd1 chip*) or chewing gum or peppermint or sweetener* or tofu or spice* or condiment* or pasta* or margarine* or vinegar or dessert*)) or (food w/2 safe*) or (Microbial w/2 Biosens*) or "rapid assay" or "E. coli" or "Listeria monocytogenes" or "Enterobacter sakazakii")	571
Genetic Diagnosis	(FT) contains ((gene or genetic*) w/3 (discovery or engineer* or diagnosis or diagnostic* or analysis*))	773
Hybridization	(FT) contains ((hybridiz* or hybridis*) w/4 molecule*)	310
Immunology	(FT) contains (immunolog* or "autoimmune disease*" or hypersensitivitie* or "immune deficiency" or "transplant reject*" or immunodefici* or autoimmunit*)	478
Inflammatory	(FT) contains (inflammat* or "hay fever" or periodontitis or atherosclerosis	295

	or "rheumatoid arthritis")	
Nucleotides	(FT) contains (nucleotide* or radionuclide* or radionucleotide* or nucleoside*)	1033
Organic Semiconductors	(FT) contains ((mass* w/2 spectromet*) or "plural spectra")	166
Phosphoprylation	(FT) contains ((organic w/2 semiconductor*) or "poly(3-hexylthiophene)" or "poly(p-phenylene vinylene)" or polyacetylene* or polypyrrole* or polyaniline*)	265
Temperature Control	(FT) contains (temperature* w/2 control*)	295

Summary

This report categorizes and graphically analyzes research trends around biochips and the methods involved and its applications from various perspectives and highlights the key companies involved.

Biochips promise to bring genomics, the study of all the genes in existing organisms, out of the research laboratory and into the everyday practice of medicine. If genomics delivers on its promise, health care will shift from a focus on detection and treatment to a process of prediction and prevention. The biochip space lies at the intersection between high technology chip manufacturing, signal processing, software skills and more traditional molecular biology and genomics. The market for biosensors and biochips is interdisciplinary and growing and has applications in a number of core research areas. Variety of test panels are in early development for biochip application that include, tumour markers, specific proteins, infectious diseases, autoimmune markers, and allergy tests. A dedicated team of molecular biologists has developed DNA technology for biochip applications.

Biochip technology can be adapted and utilised for almost any laboratory application and covers all scientific disciplines including immunology, clinical chemistry and even DNA profiling.

Early biochip test panels at the final trial stage include those for fertility markers, drugs of abuse and antibiotic residues. Biochip results have shown excellent agreement with existing analytical methods and standard curves have been generated for selected test panels.

About Patent iNSIGHT Pro

Patent iNSIGHT Pro™ is a comprehensive patent analysis platform that allows you to accelerate your time-to-decision from patent analysis activities. Designed from inputs by experienced patent researchers, Patent iNSIGHT Pro easily blends into your existing Research workflow. Patent iNSIGHT Pro is used by leading legal services, Pharmaceutical & biotech, electronics companies and research organization across US, Europe, South America and India with more than 400 end users. Patent iNSIGHT Pro is developed and marketed by Gridlogics, a research driven IT Company specializing in providing intellectual property analysis and visualization solutions to aid R&D and corporate strategy.

Gridlogics is headquartered in Pune, India and has a sales presence in Delhi, Mumbai and USA.
For more information:
Visit us at: www.patentinsightpro.com
Or call us at: 1-408-786-5524
Or mail us at: contact@patentinsightpro.com

About PatSeer

PatSeer is a global patent database that includes many advanced analysis, project management and collaboration capabilities making it unique from competitive solutions. With a clean and intuitive interface, PatSeer makes it very easy to conduct powerful analysis and deliver analyzed data. PatSeer creates a centralized work environment for a team to manage to search patent databases, work on patent data projects, carry out analysis and deliver insights. Coupled with powerful workflow management features, the platform can be customized to operate according to internal processes and requirements.

PatSeer includes full text data of 21 most notable countries and bibliographic data for 103+ countries as part of INPADOC collection. PatSeer also has enhanced content such as normalized assignees for top 3000 companies, corporate tree for top 3000 corporate groups and a semantic index that helps you refine your search by giving meaningful suggestions. Patent PDFs, image mosaics, legal status and family of the document are integrated with rest of the content.

Have a comment on this report? Mail us at feedback_tr@patentinsightpro.com

Sources & References

http://www.thestreet.com/story/10669900/1/biochips--a-global-update-of-market-trends-opportunities.html
https://www.alliedmarketresearch.com/biochips-market
http://www.prweb.com/releases/2015/02/prweb12487830.htm
http://www.giiresearch.com/report/arm275350-analysis-global-biochips-industry.html
http://jla.sagepub.com/content/4/4/86.short?rss=1&ssource=mfr
http://www.a-star.edu.sg/simtech/Research/Research-Projects/tid/26/Development-of-Polymer-Microfluidic-Biochips-for-Diagnostic-Applications.aspx