



Technology Insight Report

Anti- Aging Skin Care Compositions



Finding solutions against aging or the signs of aging has been a quest for centuries according to history. However, the signs around us from advertisements on TV, the general media to the skin care shelves in retail stores all point to this demand for anti-aging skin care compounds being higher than ever before with 'staying young' on every consumers mind. What does patent data reveal about the quest for newer and better anti-aging skin care compounds? Is there really an increase in research around this? What are the key problems and solutions when it comes to aging skin? Who are leading the quest to provide consumers with the means to keep their appearances from falling victim to the aging process? We look into patent filings and data to uncover some insights.

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Overview

Introduction to Anti- Aging Skin Care

Although the aging process encompasses a wear and deterioration on the various organ systems of the body, changes within the body and overall fitness levels, among the most visible signs on the exterior are signs of aging on the skin. Wrinkles, lines, frown lines, blemishes and pigmentation changes all point out to aging and the human need to prevent or slow down these signs as far as possible has given rise to a multi-billion dollar market for products that can offer this. While the personal care and skin care industry on its own is a massive one, research and development activity around anti-aging skin care compounds has played a large role in determining which of the large players in this market can grab a larger share since the demand for anti-aging skincare products is growing rapidly.

To understand the research around solutions for aging skin, we need to take a look at the problems associated with it.

Problems Associated With Aging Skin

According to Wikipedia as a source on the topic of anti-aging creams: Anti-aging creams are predominantly moisturiser based cosmeceutical skin care products marketed with the promise of making the consumer look younger by reducing visible wrinkles, expression lines, blemishes, pigmentation changes, discolourations and other environmentally (especially from the sun) related conditions of the skin. A comprehensive grading scale for anti-aging of the skin has been validated and categorizes skin aging as: laxity (sagging), rhytids (wrinkles), and the various categories of photoaging, including erythema (redness), dyspigmentation (brown discolorations), solar elastosis (yellowing), keratoses (abnormal growths), and poor texture

Source: http://en.wikipedia.org/wiki/Anti-aging_cream

Ingredients & Compounds Commonly Associated With Anti Aging Skin Care Products

As well as more conventional moisturizing ingredients, anti-aging creams usually contain anti-aging ingredients such as:

- Retinol (for instance, in the form of retinyl palmitate). In various formulations it has been shown to reduce fine lines and pores.
- Epidermal Growth Factor, made of 53 amino acids to stimulate cell renewal and Collagen production in the skin and strengthen elasticity and structure. The discovery of Epidermal Growth Factor won Dr. Stanley Cohen a Nobel Prize in Physiology and Medicine in 1986. In various research Epidermal Growth Factor has been shown to reduce fine lines, wrinkles and sagging.[8]It also has healing (wounds and burns) and anti-inflammatory properties when applied to skin.
- Alpha hydroxy acids (AHAs) and beta hydroxy acids or other chemical peels. These help to dissolve the intracellular "glue" that holds the dead cells together on the skin. The use of this type of product on a daily basis gradually enhances the exfoliation of the epidermis. This exposes newer skin cells and can help improve appearance. AHAs may irritate some skin, causing redness and flaking.
- Peptides, such as Argireline (acetyl hexapeptide-3), Matryxil, and copper peptides.
- Coenzyme Q10
- Anti-oxidants are substances that may protect cells from the damage caused by unstable molecules known as free radicals.
- Sunscreens. A high level of UVA protection is recommended as UVA radiation is associated with aging effects such as wrinkles.

The effects of these ingredients depend on their concentration and mode of application. Many skin care companies recommend using a treatment program which may combine these ingredients. For example, AHAs can make the skin more vulnerable to damage from the sun, so the increased use of sunscreens is often recommended.



Retinol



Anti Oxidants



Alpha Hydroxyl Acids

Characteristics of Ingredients & Anti Aging Skin Care Compounds

Retinol – Skin care professionals consider this form of Vitamin A the gold standard of effective topical treatments. Also available as prescription strength Retin-A, retinol is an ingredient in myriad over-the-counter products. It ramps up cell turnover in the top layers of the skin, decreasing wrinkles and improving skin tone.

Source: <http://www.myhealthnewsdaily.com/skin-care-anti-aging-creams-100929-0464/>

Peptides – These chains of amino acids act as signaling molecules in cells, telling them to heal, renew and slough away. One of the better-known peptides is argireline, also known as Matrixyl, which softens crow's feet by slowing the contraction of tiny muscles around the eyes.

Source: <http://www.myhealthnewsdaily.com/skin-care-anti-aging-creams-100929-0464/>

Antioxidants – Fighting cell damage from free radicals, which are produced when skin is exposed to sunlight and some chemicals, antioxidants can make skin firmer and more radiant, according to Neronha. Wear them, eat them and drink them, experts say. They are available in topical creams with extracts of ingredients such as green tea and pomegranate. Many foods, especially fresh produce and beverages such as fruit juice and various varieties of tea, also contain antioxidants.

Source: <http://www.myhealthnewsdaily.com/skin-care-anti-aging-creams-100929-0464/>

Alpha hydroxyl acids (AHAs) – These compounds, which include glycolic, lactic, citric and mandelic acids, can help peel away the top layers of the skin to erase fine lines. AHAs are available in both OTC and prescription strengths.

Source: <http://www.myhealthnewsdaily.com/skin-care-anti-aging-creams-100929-0464/>

Exfoliants – These help remove the uppermost layer of dead cells on the skin in order to keep the skin clean and pores open. While these can be associated with mechanical means of scrubbing the outer most layer of skin, Chemical exfoliants include scrubs containing salicylic acid, glycolic acid, fruit enzymes, citric acid, or malic acid which may be applied in high concentrations by a medical professional, or in lower concentrations in over-the-counter products

Source: [http://en.wikipedia.org/wiki/Exfoliation_\(cosmetology\)](http://en.wikipedia.org/wiki/Exfoliation_(cosmetology))



Sunscreen



Exfoliant



Peptides

Global Market For Anti Aging Skin Care Products

According to a report by Global Industry Analysts published in a press release by Worldhealth.net, the global market for anti-aging products (which includes pharmaceutical products for age related health issues, supplements and appearance based products which include skin care) will be a estimated \$291.9 billion by the year 2015. According to findings in this report, "The propensity to spend on skincare is not hugely impacted by a slowdown, rather consumer preferences during these periods tend to shift towards lower priced mass-market products."

Source: http://www.worldhealth.net/news/global_anti-aging_products_market_to_rea/

Most research and reports point out to anti-aging skin care treatments being a major driving factor in the overall growth of the anti aging products market. Marketing studies by various sources point to anti-aging being a key motivator in the purchase of any skin care product clearly showing this is a very large and lucrative market for healthcare, personal care and cosmetic businesses globally. IP related to new anti-aging skin care compounds can be extremely valuable.



Anti Aging Skin Care Compounds – Insights from Patents

Overview

Patent filings around the compounds and compositions used for Anti Aging Skin Care hold great insights into the innovation, research and development within the space. With the help of Patent iNSIGHT Pro, we will analyze the full Anti Aging Skin Care Compounds patent data to find answers to the following:

- What does the IP publication trend for “Anti Aging Skin Care Compounds” look like and how has activity around filings evolved?
- Who are the top assignees in Anti aging compositions?
- How is Assignee Portfolio spread across different Ingredient Categories?
- How is Assignee Portfolio spread across various skin problems related to aging?
- What properties are used across different types of key ingredient categories?
- How do the key ingredients compare across various aging skin problems areas?

These are just some of the insights that can be uncovered by looking through related patents filed around this space over the previous years.

The Search Strategy

Using the commercial patent database PatBase as our data source we used the following search query to create our patent set.

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((TAC=((aging or ageing or "expression lines" or blemishes or "pigmentation change" or pigmentation-change* or "discolouration" or dis-colouration or "discoloration" or discoloration" or laxity or sagging or rhytids or rhytid or wrinkle* or photoaging or erythema or dyspigmentation or "solar elastosis" or keratoses or "poor texture" or "photo-aging" or "photo-ageing") and (soap or cleanser or moisturizer or moisturiser or detergent or shampoo or cologne or oil or paste or cream or ointment* or lotion* or gel* or balm or emollient))) and (UC=(424 or 514)))
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UC- US Class
TAC- Title Abstract Claim

Class Description:

US Class 424: DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS

US Class 514: DRUG, BIO-AFFECTING AND BODY TREATING COMPOSITIONS

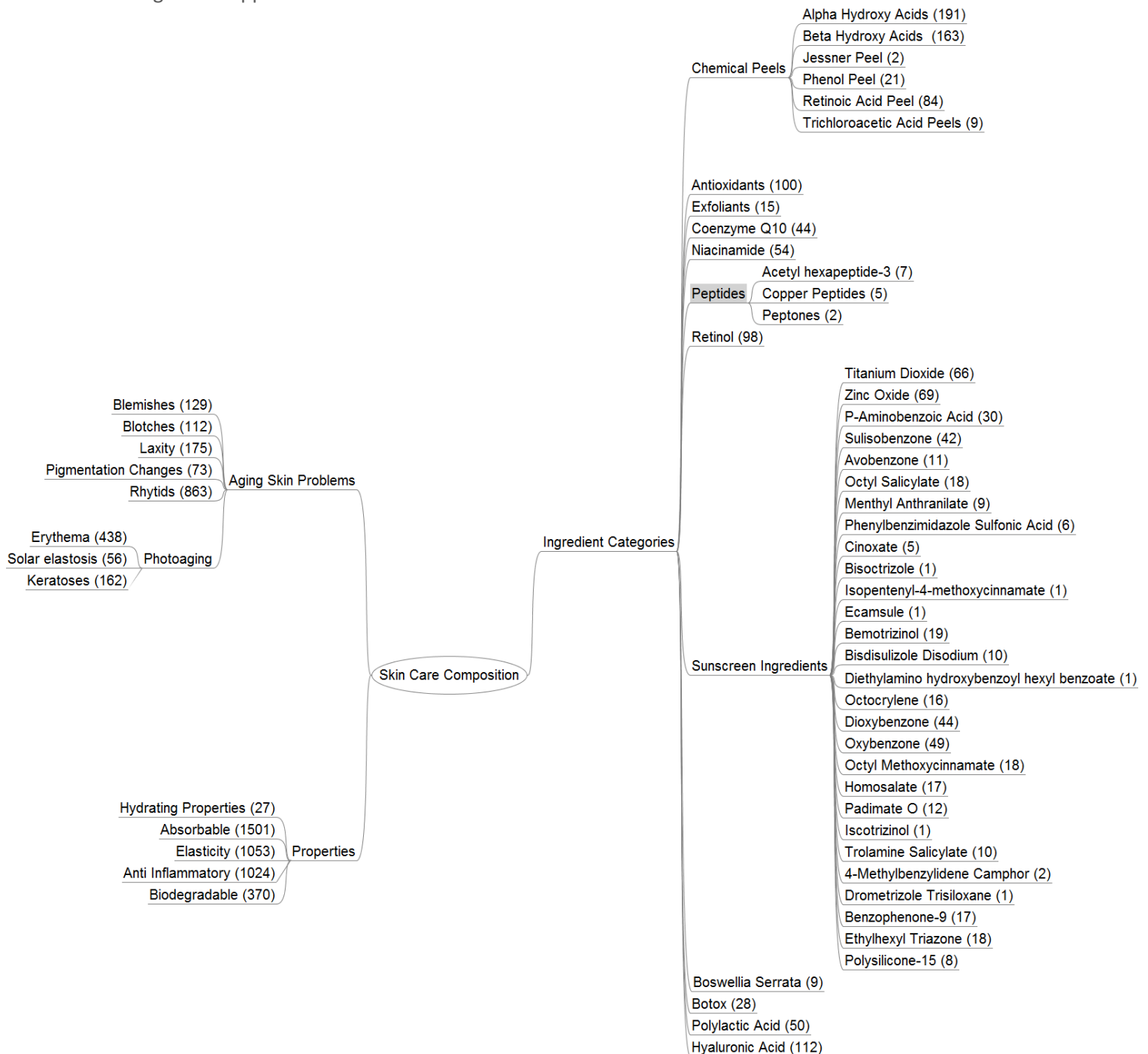
The query was directed to search with the assumption that all related patents would be filed in US and the search was limited to US publications. The result was a patent set of 2561 records which would form the basis of our research.

Categories of Skin Care Compositions

We categorized Skin Care Compositions along the following lines:

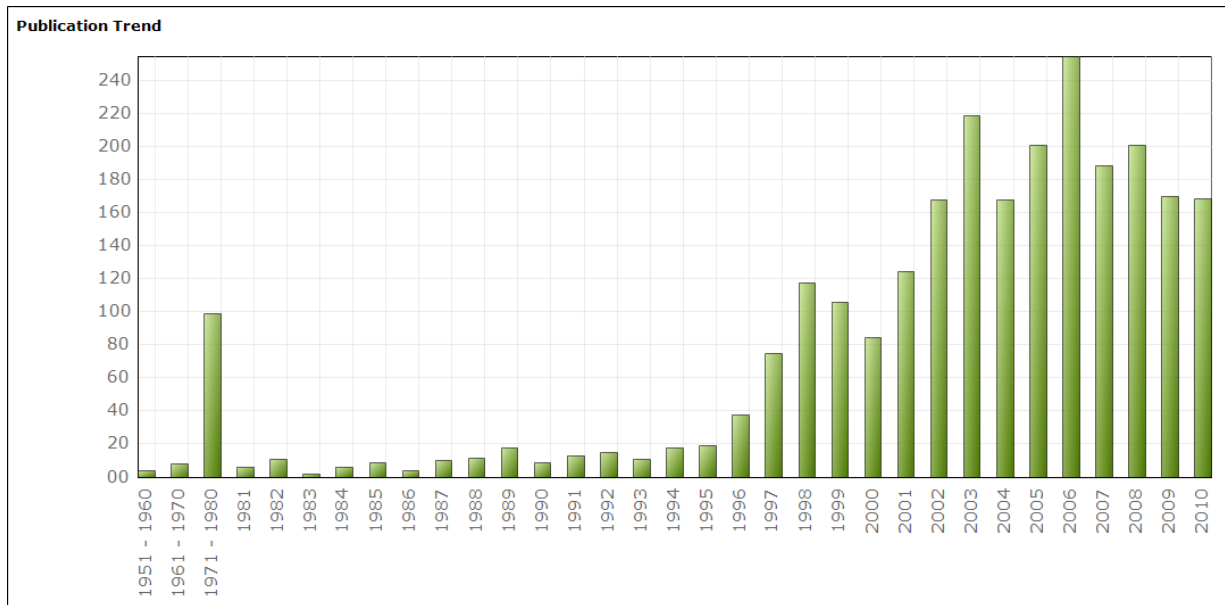
- Ingredient Categories
- Properties of Skin Care Compositions
- Aging Skin Problems

The illustration below shows the different categories prepared and the number of records in each. The categorization involved defining a search strategy for each topic and then conducting the search using the Advanced Search capability in Patent iNSIGHT Pro. Details of search strings used for each category are given in Appendix B.



Publication Trend

What has been the IP publication trend for Anti- Aging related Skin Care ingredients and compounds?



Patents related to Skin Care Compositions can be traced back to before 1950 and the real surge in the activity around this technology has happened in the last decade. Noticeably there was a very large spike in publications for 2006 and although the overall trend continues to show growth, the more recent years don't show the same level of filings as that year.

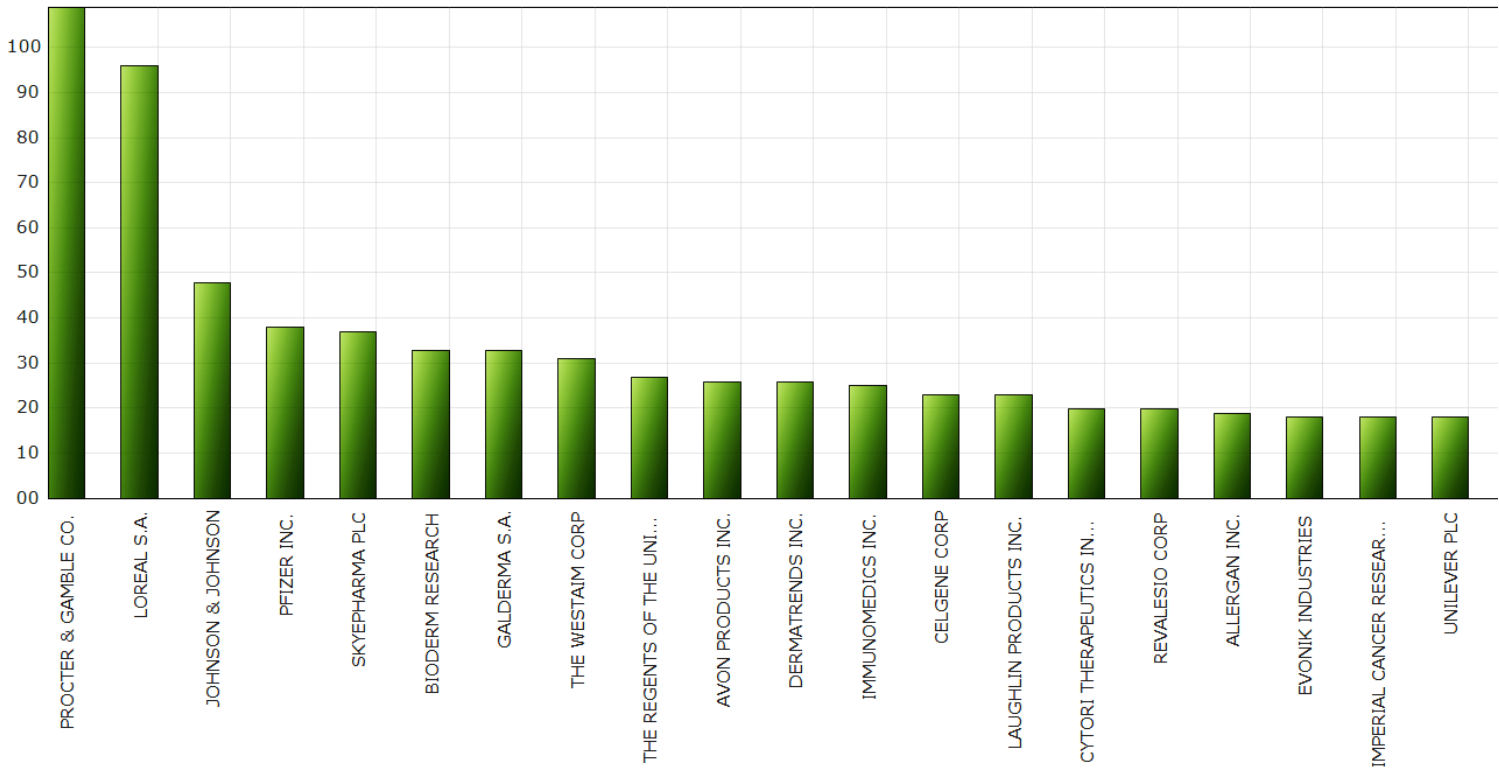
How we did it?

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

Top Assignees

Who have been the top assignees or the key players within this industry?

Top Assignees



- | | |
|------------------------------------------------|------------------------------|
| 1. Procter & Gamble Co | 11. Dermatrends Inc. |
| 2. L'Oreal S.A. | 12. Immunomedics Inc. |
| 3. Johnson & Johnson | 13. Cellgene Corp |
| 4. Pfizer | 14. Laughlin Products Inc. |
| 5. Skye Pharma PLC | 15. Cytori Therapeutics Inc. |
| 6. Bioderm Research | 16. Revalesio Corp |
| 7. Galderma S.A. | 17. Allergan Inc. |
| 8. The Westaim Corp | 18. Evonik Industries |
| 9. The Regents of the University Of California | 19. Imperial Cancer Research |
| 10. Avon Products Inc. | 20. Unilever PLC |

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.

Please refer Appendix A for more details on Assignee merging.

Once the Assignee names were cleaned up, 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 full Assignee table is available here:

<http://www.patentinsightpro.com/techreports/1110/List%20of%20Assignees.xls>

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Assignee - Key Statistics

Here we summarize key parameters of Top 15 Assignees such as filing trend, Avg. number of Forward citations per record, Top inventors in each Assignee, Top Co-Assignees and Coverage of underlying patent families

Assignee	Total No. of Records	Average No. of Fwd Cites per Patents	Filing Trend (Absolute)	Filing Year Range	Key Inventor (Top 5)	Co-Assignees	Coverage (Includes families)					
							US	EP	WO	J.P.	DE	GB
PROCTER & GAMBLE CO.	109 (4.3%)	9.22		1987-2006	BLANK ROY LONNIE(22) BISSETT DONALD LYNN(10) DOUGHTY DARRELL GENE(9) LINARES CARLOS GABRIEL(9) BLANK ROY L(9)		91	42	41	43	16	12
LOREAL S.A.	96 (3.7%)	4.76		1985-2010	BRETON LIONEL(23) DE LACHARRIERE OLIVIER(9) DALKO MARIA(8) BOUSSOUIRA BOUDIAF(6) BOULLE CHRISTOPHE(5)		108	45	15	79	32	2
JOHNSON & JOHNSON	48 (1.9%)	3.62		1995-2008	SEIBERG MIRI(11) SKOVER GREGORY(7) LUKENBACH ELVIN R(7) COLE CURTIS(5) LUKENBACH ELVIN(5)		38	13	8	10	1	0
PFIZER INC.	38 (1.5%)	12.53		1982-2004	WILLIAMS KEVIN JON(10) VENKATESAN ARANAPAKAM MUDUMBAI(7) BAKER JANNIE LEA(5) GROSU GEORGE THEODORE(5)	BASF AG(2)	32	5	3	8	3	0
SKYEPHARMA PLC	37 (1.4%)	4.19		1991-1997	FALK RUDOLF EDGAR(24) ASCULAI SAMUEL SIMON(15) ASCULAI SAMUEL S(14) HOCHMAN DAVID(6) PURSCHKE DON(6)		11	2	2	3	1	0
BIODERM RESEARCH	33 (1.3%)	3.33		2002-2009	GUPTA SHYAM K(33)		44	0	0	0	0	0
GALDERMA S.A.	33 (1.3%)	3.18		1994-2009	BERNARDON JEAN MICHEL(14) DEJOVIN JACK A(5) DEJOVIN ISABELLE JEAN(3) FESUS LASZLO(3) REICHERT UWE(3)		22	9	2	15	8	0
THE WESTAIM CORP	31 (1.2%)	1.87		2001-2007	GILLIS SCOTT H(17) SCHECHTER PAUL(16) BURRELL ROBERT E(13) LAM KAN(11) WRIGHT JOHN B(8)		4	1	1	0	0	0
THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	27 (1.1%)	5.85		1975-2010	FOGELMAN ALAN M(12) NAVAB MOHAMAD(12) ANANTHARAMAIAH GATTADAHALLI M(9) VOORHEES JOHN J(6) SHAY JERRY(4)	BOARD OF REGENTS UNIVERSITY OF TEXAS SYSTEM(4) THE UNIVERSITY OF ALABAMA RESEARCH FOUNDATION(3) GERON CORP(2) THE UAB RESEARCH FOUNDATION(2)	22	5	5	11	0	0
AVON PRODUCTS INC.	26 (1%)	5.69		1995-2009	PTCHELINTSEV DMITRI(13) MENON GOPINATHAN K(9) KALAFSKY ROBERT(6) SCANCARELLA NEIL(5) ANDERSON GLEN T(4)		39	16	12	18	8	0
DERMATRENDS INC.	26 (1%)	3.35		2000-2008	HSU TSUNG MIN(26) LUO ERIC C(26) JACOBSON ERIC C(11) LOBELLO ROSE C(7) HICKEY ALAN T J(6)		0	0	0	0	0	0
IMMUNOMEDICS INC.	25 (1%)	2.48		1998-2010	GOLDENBERG DAVID M(24) HANSEN HANS J(17) QU ZHENGXING(10) LEUNG SHUI ON(4) CHANG CHIEN HSING(3)		25	10	7	9	3	0
CELGENE CORP	23 (0.9%)	5.52		1996-2008	MULLER GEORGE W(19) STIRLING DAVID I(11) CHEN ROGER SHEN CHU(10) SCHAFER PETER H(8) GE CHUANSHENG(7)		2	1	1	1	0	0
LAUGHLIN PRODUCTS INC.	23 (0.9%)	2.04		1999-2005	LAUGHLIN THOMAS J(23)		0	0	0	0	0	0
CYTORI THERAPEUTICS INC.	20 (0.8%)	2.1		2002-2006	FRASER JOHN K(20) HEDRICK MARC H(20) DANIELS ERIC(6) STREM BRIAN M(4) WULUR ISABELLA(3)		35	7	6	7	0	0

How we did it?

In order to compress all the information into a single report, we used the 360 ° series of reports available in the software. From the Assignee 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.

Inventor - Key Statistics

Here we summarize key parameters of Top 15 Inventors such as filing trend, average number of forward citations per record, key associated companies and top 5 co-inventors.

Inventor	Total No. of Records	Average No. of Fwd Cites per Patents	Filing Trend (Absolute)	Filing Year Range	Key Assignees (Top 5)	Co-Inventors
HSU TSUNG MIN	39 (1.5%)	2.64		2000-2008	DERMATRENDS INC.(26) HSU TSUNG MIN(13) LUO ERIC C(13) MAIBACH HOWARD I(4) JACOBSON ERIC C(4)	LUO ERIC C(39) JACOBSON ERIC C(15) LOBELLO ROSE C(8) MAIBACH HOWARD I(8) GRICENKO NICOLE T(7)
LUO ERIC C	39 (1.5%)	2.64		2000-2008	DERMATRENDS INC.(26) HSU TSUNG MIN(13) LUO ERIC C(13) MAIBACH HOWARD I(4) JACOBSON ERIC C(4)	HSU TSUNG MIN(39) JACOBSON ERIC C(15) LOBELLO ROSE C(8) MAIBACH HOWARD I(8) GRICENKO NICOLE T(7)
FALK RUDOLF EDGAR	35 (1.4%)	4.31		1991-1997	SKYEPHARMA PLC(35)	ASCULAI SAMUEL SIMON(21) ASCULAI SAMUEL S(14) HARPER DAVID WILLIAM(9) HOCHMAN DAVID(9) KLEIN EHUD SHMUEL(9)
GUPTA SHYAM K	33 (1.3%)	3.33		2002-2009	BIODERM RESEARCH(33)	
BLANK ROY LONNIE	31 (1.2%)	3.1		1994-1997	PROCTER & GAMBLE CO.(31)	DOUGHTY DARRELL GENE(10) LINARES CARLOS GABRIEL(10)
BRETON LIONEL	26 (1%)	5.12		1995-2005	LOREAL S.A.(25) BRETON LIONEL(1) DE LA CHARRIERE OLIVIER(1)	DE LACHARRIERE OLIVIER(13) COHEN CATHERINE(3) DALKO MARIA(3) MAHE YANN(3) NONOTTE ISABELLE(3)
GOLDENBERG DAVID M	26 (1%)	2.38		1998-2010	IMMUNOMEDICS INC.(25) GOLDENBERG DAVID M(1)	HANSEN HANS J(18) QU ZHENGXING(10) CHANG CHIEN HSING(4) LEUNG SHUI ON(4) MCBRIDE WILLIAM J(2)
FRASER JOHN K	24 (0.9%)	1.75		2002-2009	CYTORI THERAPEUTICS INC.(20) FRASER JOHN K(4) HEDRICK MARC H(4) DANIELS ERIC(2) WULUR ISABELLA(2)	HEDRICK MARC H(24) DANIELS ERIC(8) STREM BRIAN M(5) WULUR ISABELLA(5) RILEY SUSAN LYNN(4)
HEDRICK MARC H	24 (0.9%)	1.75		2002-2009	CYTORI THERAPEUTICS INC.(20) FRASER JOHN K(4) HEDRICK MARC H(4) DANIELS ERIC(2) WULUR ISABELLA(2)	FRASER JOHN K(24) DANIELS ERIC(8) STREM BRIAN M(5) WULUR ISABELLA(5) RILEY SUSAN LYNN(4)
LAUGHLIN THOMAS J	23 (0.9%)	0		1999-2005	LAUGHLIN PRODUCTS INC.(23)	
MULLER GEORGE W	23 (0.9%)	0		1996-2009	CELGENE CORP(21) MULLER GEORGE W(2) STIRLING DAVID I(2) CHEN ROGER SHEN CHU(1)	STIRLING DAVID I(15) CHEN ROGER SHEN CHU(12) SCHAFFER PETER H(8) GE CHUANSHENG(7) MAN HON WAH(7)
WEST MICHAEL D	23 (0.9%)	0		1993-2005	BOARD OF REGENTS UNIVERSITY OF TEXAS SYSTEM(17) GERON CORP(6) THE REGENTS OF THE UNIVERSITY OF CALIFORNIA(4) BLACKBURN ELIZABETH H(2) SHAY JERRY(2)	SHAY JERRY W(22) WRIGHT WOODRING(22) BLACKBURN ELIZABETH H(8) HARLEY CALVIN B(6) KIM NAM WOO(5)
SHAY JERRY W	22 (0.9%)	0		1993-2005	BOARD OF REGENTS UNIVERSITY OF TEXAS SYSTEM(17) GERON CORP(5) THE REGENTS OF THE UNIVERSITY OF CALIFORNIA(4) BLACKBURN ELIZABETH H(2) SHAY JERRY(2)	WEST MICHAEL D(22) WRIGHT WOODRING(22) BLACKBURN ELIZABETH H(8) HARLEY CALVIN B(6) KIM NAM WOO(5)
WRIGHT WOODRING	22 (0.9%)	0		1993-2005	BOARD OF REGENTS UNIVERSITY OF TEXAS SYSTEM(17) GERON CORP(5) THE REGENTS OF THE UNIVERSITY OF CALIFORNIA(4) BLACKBURN ELIZABETH H(2) SHAY JERRY(2)	SHAY JERRY W(22) WEST MICHAEL D(22) BLACKBURN ELIZABETH H(8) HARLEY CALVIN B(6) KIM NAM WOO(5)
ASCULAI SAMUEL SIMON	21 (0.8%)	0		1992-1997	SKYEPHARMA PLC(21)	FALK RUDOLF EDGAR(21) HARPER DAVID WILLIAM(7) HOCHMAN DAVID(7) KLEIN EHUD SHMUEL(7) PURSCHKE DON(7)

How we did it?

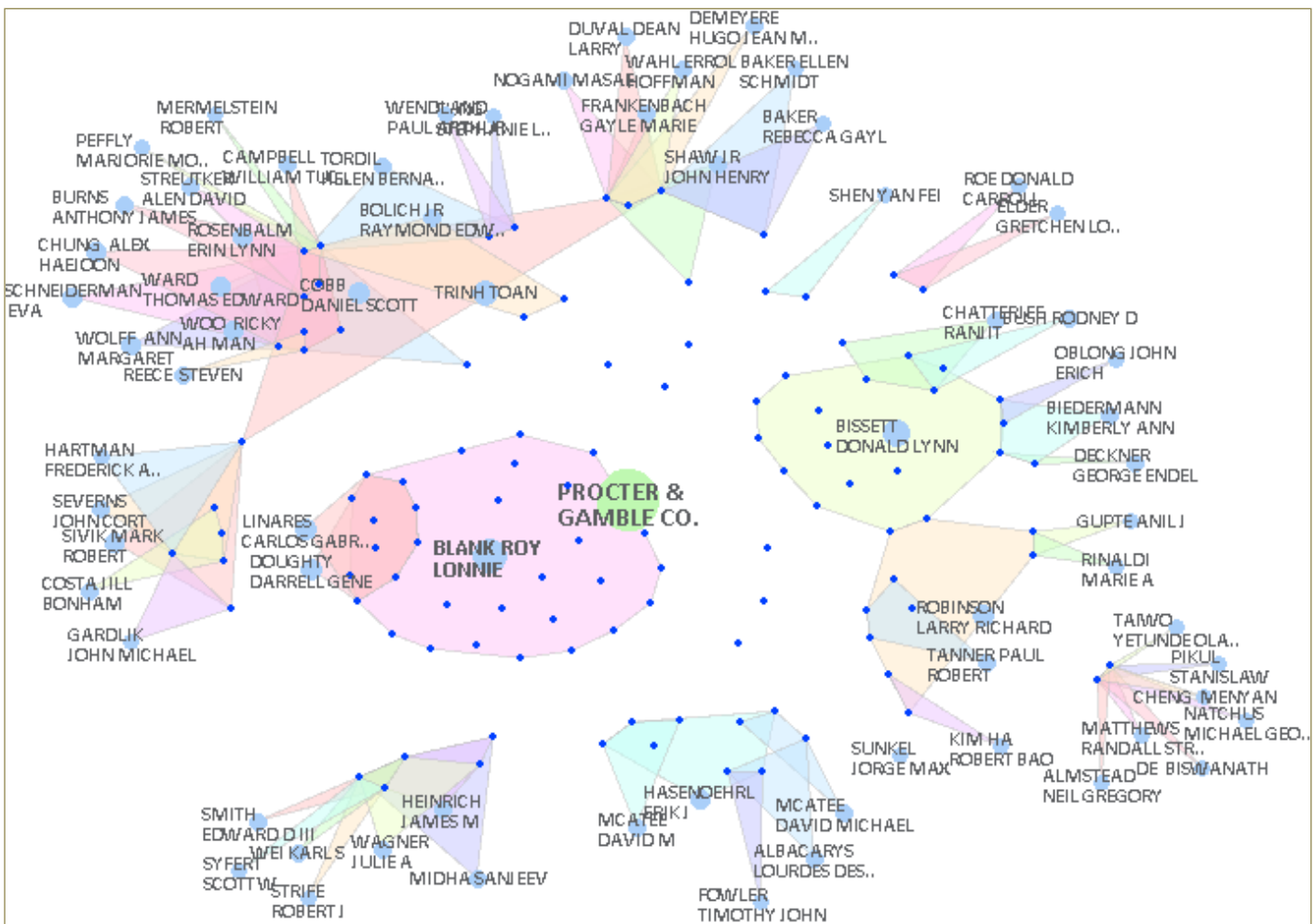
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Detailed analysis of key inventor groups of top three assignees

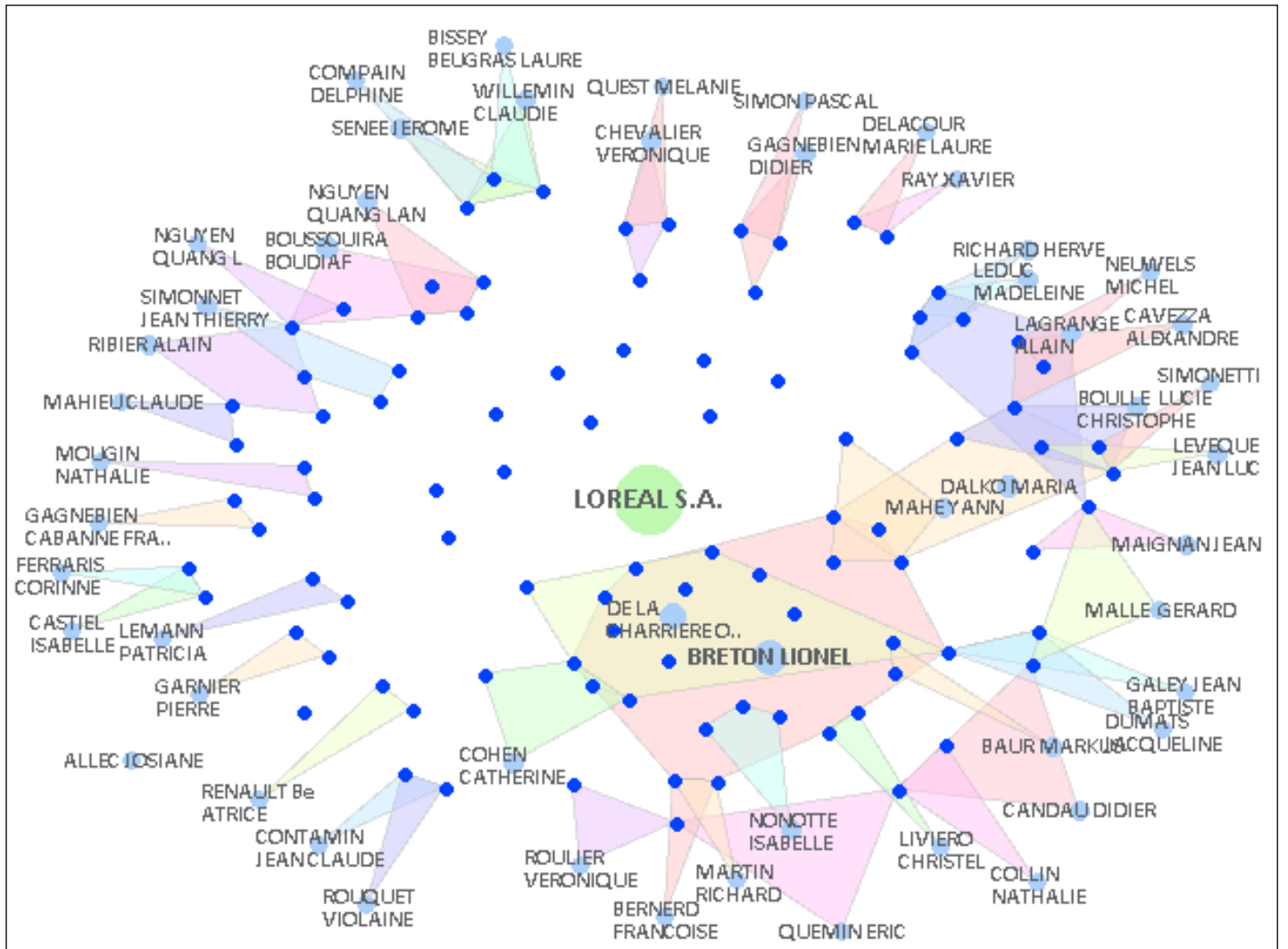
The generated maps below highlight the key inventor groups of top three assignees. These have been generated using VizMAP. The mapping technology employs computer algorithms to group and display patent documents based on either network relationships, contextual or co-citation relationships. In maps below the groups are created using network relationships and the records (blue dots) are positioned on the map based on their relationship to the Assignee and to the inventors listed on the graph.

Key inventors present in the map, for instance, Blank Roy Lonnie in case of Procter & Gamble Co appear in the middle of the graph. Also groups of inventors who file together will appear clustered together. Finally, only those inventors with 2 or more records are shown in the map.

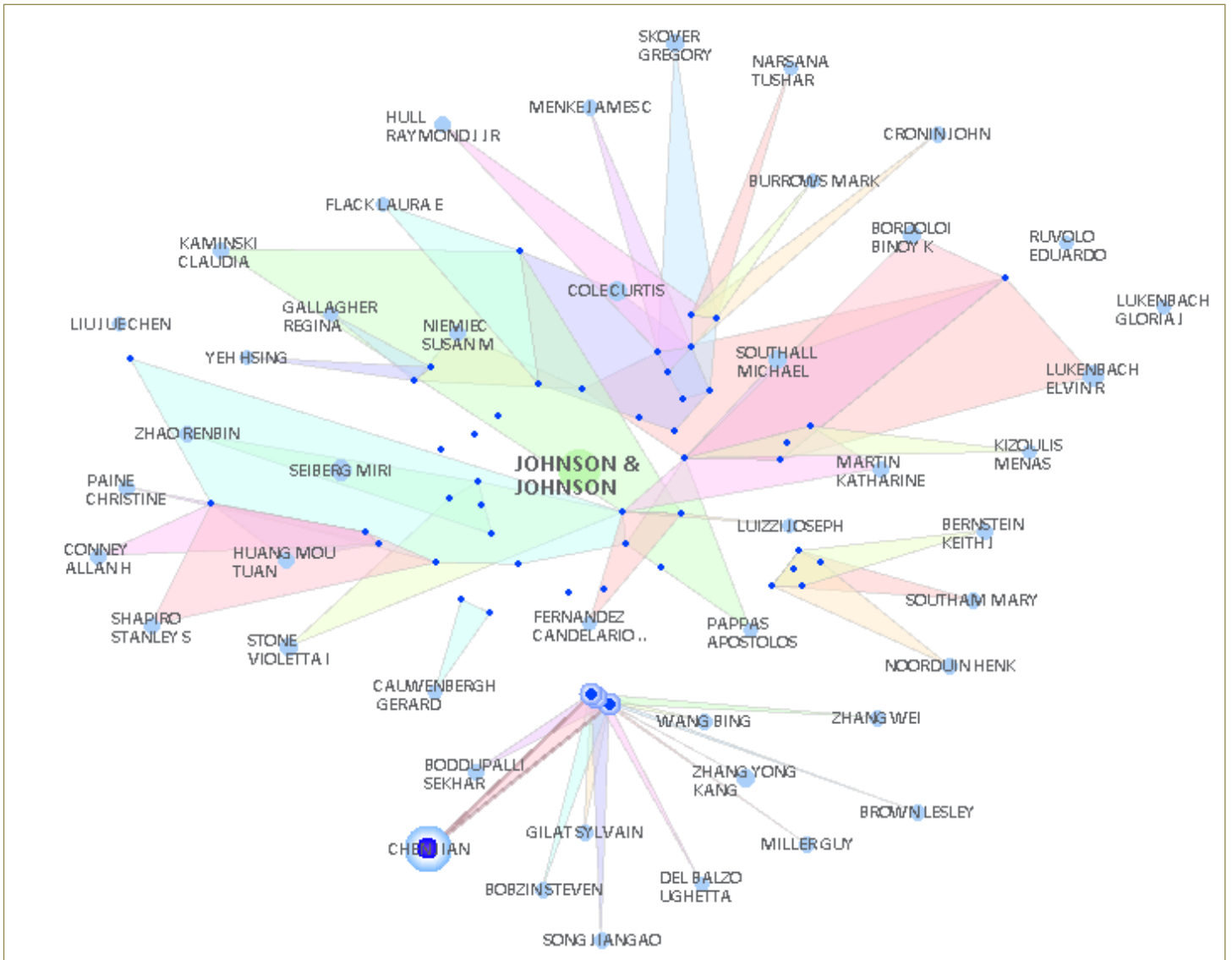
Key inventor Groups: Procter & Gamble Co.



Key inventor Groups: L'oreal



Key inventor Groups: **Johnson & Johnson**



How we did it?

Using the VizMAP tool, patents of top three assignees, namely, Procter & Gamble Co., L'oreal S.A., and Johnson & Johnson were loaded on the map. These were then expanded by their respective inventor names. The VizShade option was used to shade the inventors with potential overlapping patents between them.

Assignee Portfolios spread across different Ingredient Categories

Here we have correlated key Ingredients used across anti-aging skin care compositions along with a listing of the key assignees in each category. The matrix highlights the focus areas within anti aging skin care ingredients being pursued by key companies.

This comparison chart reveals which of the key players hold patents assigned for which of the main ingredients or compounds within the patent set. For example, Proctor & Gamble as well as L’Oreal lead the assignees for patents in Sunscreen ingredients. It’s also visible that although L’Oreal has more Zinc Oxide related patents, P&G has more related to P-Aminobenzoic Acid. When it comes to innovations around developing Botox, Allergan Inc. leads the way with 16 out of a total 425 patents for this category.

Company (Columns)	Total	ALLERGAN INC.	AVON PRODUCTS INC.	BIODERM RESEARCH	DERMATRENDS INC.	GALDERMA S.A.	IMPERIAL CANCER RESEARCH TECHNOLOGY LTD.	JOHNSON & JOHNSON	JRX BIO-TECHNOLOGY INC.	LOREAL S.A.	PERRICONE MD	PROCTER & GAMBLE CO.	SKYEPHARMA PLC	THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	THE WESTAIM CORP	UNILEVER PLC
Ingredient Categories (Rows)																
Total	425	16	22	28	15	20	18	33	14	76	14	78	37	17	22	15
Chemical Peels	323		19	25	13	16	18	30	13	60	14	74	1	5	21	14
Beta Hydroxy Acids	98		4	8	4	2		6	6	16	2	48	1			1
Alpha Hydroxy Acids	72		4	8	2	3		5		26	9	10	1			4
Retinoic Acid Peel	34		3	2		1		6		8		12		2		
Trichloroacetic Acid Peels	1				1											
Phenol Peels	1									1						
Sunscreen Ingredients	66		4	7		2		3		25	1	22		2		
Zinc Oxide	29		1	5				2		11	1	9				
Titanium Dioxide	24		1	4		2		2		7	1	6		1		
Oxybenzone	18		2	4				1		2	1	7		1		
Bemotrizinol	16		2	3						11						
P-Aminobenzoic Acid	14			4						1	1	8				
Ethylhexyl Triazone	14			1						12		1				
Dioxybenzone	14		2	4						2	1	5				
Sulisobenzene	12		2	4						2	1	3				
Octocrylene	10			4								6				
Benzophenone-9	10			1						8		1				
Polysilicone-15	5									4		1				
Octyl Salicylate	5			4								1				
Avobenzone	5		1	4												
Trolamine Salicylate	4			4												
Octyl Methoxycinnamate	4		1	1				1		1						

Menthyl Anthranilate	4			3							1				
Homosalate	4			4											
Cinoxate	4			4											
Bisdiluzole Disodium	2								1		1				
4-Methylbenzylidene Camphor	2			1							1				
Phenylbenzimidazole Sulfonic Acid	1			1											
Padimate O	1								1						
Isopentenyl-4- methoxycinnamate	1			1											
Iscotrizinol	1			1											
Ecamsule	1			1											
Drometrizole Trisiloxane	1			1											
Diethylamino hydroxybenzoyl hexyl benzoate	1			1											
Bisotrizole	1			1											
Peptides	66			10	4	8	5	5	4	7	11		12		
Copper Peptides	1			1											
Anti Oxidants	52		2	3				6		3	31	5	1		1
Hyaluronic Acid	47			5				2		3		36		1	
Retinol	38		7	1				11		6	10		2		1
Niacinamide	28			11				1			16				
Botox	16	16													
Boswellia Serrata	9			7					2						
Exfoliants	6		4								1		1		
Polylactic Acid	5												5		
Coenzyme Q10	3									3					

How we did it?

We used the categories created and using the co-occurrence analyzer, we selected the categories and the assignees to be included and then ran the report. The generated report was then exported to Excel using the option provided.

Assignee Portfolios spread across various skin problems related to aging

What are the key problem areas explored by top assignees? For example most of The Westaim Corp patents are in the area of compounds related to Erythema Photo Aging in particular. Procter and Gamble on the other hand has patents across the board but specifically more within research around Rhytids and Laxity related problems.

Aging Skin Problems (Columns)	Total	Rhytids	Blemishes	Photoaging			Pigmentation Changes	Blotches	Laxity	
				Total	Erythema	Keratoses				Solar Elastosis
Assignee (Rows)										
Total	511	355	46	236	173	74	21	33	71	80
PROCTER & GAMBLE CO.	96	87	5	26	18	15	8	4	20	26
LOREAL S.A.	81	70	14	20	17	1	2	10	8	1
JOHNSON & JOHNSON	47	35	7	25	23	4	5	3	9	22
BIODERM RESEARCH	32	29	3	13	4	9	6	11	4	6
GALDERMA S.A.	30	3		27	10	21		1		
THE WESTAIM CORP	29	18		29	29					
LAUGHLIN PRODUCTS INC.	23	23							23	
IMMUNOMEDICS INC.	21			21	21					
AVON PRODUCTS INC.	21	18	12	9	1	8		2	5	8
SKYEPHARMA PLC	17	1		17	1	16				
JRX BIOTECHNOLOGY INC.	15	11								7
WISCONSIN ALUMNI RESEARCH FOUNDATION	13	13								
PERRICONE MD	13	7	4	11	11					1
HESKA CORP	13			13	13					
EVERA MEDICAL INC.	11	11								
MARY KAY INC.	10	10		6	6			1	2	9
DERMATRENDS INC.	10		1	9	9			1		
CYTORI THERAPEUTICS INC.	10	10								
CELGENE CORP	10			10	10					
MCDANIEL C STEVEN	9	9								

How we did it?

We used the categories created and using the Co-occurrence Analyzer option, we selected the categories 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.

What properties are used across different types of key ingredient categories?

The matrix below shows the properties of different types of key ingredient categories.

Properties (Columns)	Total	Anti-Inflammatory	Absorbable	Elasticity	Biodegradable	Hydrating Properties
Ingredient Categories (Rows)						
Total	1095	672	796	593	216	15
Chemical Peels	748	490	538	399	140	4
Alpha Hydroxy Acids	166	98	116	81	36	1
Beta Hydroxy Acids	152	129	123	69	18	
Retinoic Acid Peel	75	47	53	31	9	
Phenol Peels	19	13	14	8	1	
Trichloroacetic Acid Peels	8	5	6	6	2	
Jessner Peel	2	1	1	2		
Peptides	217	121	164	149	59	1
Copper Peptides	5	4	2	4	2	
Acetyl hexapeptide-3	4	3	4	3		
Peptones	2	1	1	2		
Sunscreen Ingredients	164	101	129	96	18	
Zinc Oxide	63	35	48	38	6	
Titanium Dioxide	63	33	48	37	11	
Oxybenzone	48	31	38	26	4	
Dioxybenzone	43	28	33	24	4	
Sulisobenzone	42	27	32	24	4	
P-Aminobenzoic Acid	29	20	24	14	1	
Bemotrizinol	19	13	17	14	3	
Octyl Salicylate	18	13	14	9		
Octyl Methoxycinnamate	18	12	14	8	1	
Ethylhexyl Triazone	18	9	17	14	3	

Homosalate	17	13	12	10		
Benzophenone-9	17	12	17	16	2	
Octocrylene	16	13	14	11		
Padimate O	12	7	7	6	1	
Avobenzene	11	10	11	5		
Trolamine Salicylate	10	10	10	4		
Bisdisulizole Disodium	10	4	9	8		
Menthyl Anthranilate	9	9	9	5		
Polysilicone-15	8	3	7	6		
Phenylbenzimidazole Sulfonic Acid	6	6	6	1		
Cinoxate	5	5	5	4		
4-Methylbenzylidene Camphor	2	1	2	1		
Isopentenyl-4-methoxycinnamate	1	1	1			
Iscotrizinol	1	1	1			
Ecamsule	1	1	1			
Drometizole Trisiloxane	1	1	1			
Diethylamino hydroxybenzoyl hexyl benzoate	1	1	1			
Bisotrizole	1	1	1			
Hyaluronic Acid	111	81	90	56	20	10
Anti Oxidants	98	89	77	48	9	1
Retinol	91	54	55	56	15	
Niacinamide	53	41	49	38	6	
Polylactic Acid	48	30	33	38	41	
Coenzyme Q10	41	30	35	22	12	2
Botox	21	4	3	19	2	
Exfoliants	15	6	15	8	3	
Boswellia Serrata	9	9	8	7		

How we did it?

We manually created categories of key ingredients and properties. A two-level categorization was done in case of Properties. Then using the co-occurrence matrix, a map was generated for properties vs. ingredients.

How do the key ingredients compare across various aging skin problems areas?

The matrix below shows to what extent a particular problem area has been targeted by using different ingredients. For example, Beta Hydroxy Acids and Anti Oxidants appear to be important ingredients in the research around tackling skin laxity.

Aging Skin Problems (Columns)	Total	Rhytids	Blemishes	Photoaging				Pigmentation Changes	Blotches	Laxity
				Total	Erythema	Keratoses	Solar Elastosis			
Ingredient Categories (Rows)										
Total	789	597	91	381	281	131	47	60	80	134
Chemical Peels	605	483	78	299	230	102	39	55	74	120
Beta Hydroxy Acids	140	121	17	60	40	26	17	13	19	23
Alpha Hydroxy Acids	139	118	26	70	53	28	11	15	15	8
Retinoic Acid Peel	68	56	8	49	37	19	11	3	12	11
Phenol Peels	14	12	2	10	7	3	4	1	3	5
Trichloroacetic Acid Peels	7	7	1	5	2	2	1	1	1	3
Jessner Peel	2	2		2	2	1	1		1	1
Sunscreen Ingredients	135	115	16	63	50	30	11	8	15	33
Titanium Dioxide	48	38	6	17	12	12	4	2	6	9
Zinc Oxide	47	38	5	18	12	12	4	3	7	10
Oxybenzone	46	37	5	31	27	15	5	2	4	10
Dioxybenzone	41	32	5	25	21	15	5	2	4	8
Sulisobenzone	39	29	5	25	21	14	5	2	4	8
P-Aminobenzoic Acid	30	24	5	19	18	13	4	1		4
Bemotrizinol	19	18	2	5	3	2		1	3	4
Octyl Methoxycinnamate	18	17	5	14	11	11	4	1	1	1
Octyl Salicylate	17	15	5	13	12	10	4	1		2
Homosalate	17	17	5	12	12	8	4	2		3
Ethylhexyl Triazone	17	17	2	5	2	2	2	2	2	1
Benzophenone-9	17	17	1	6	4	2	1	2	2	8
Octocrylene	16	14	2	12	8	10	4	1	4	7
Padimate O	12	11	5	11	11	8	4	1		1

Continued...

Avobenzene	11	10	1	7	6	5		1		2
Trolamine Salicylate	10	9	1	6	6	4		1		1
Menthyl Anthranilate	9	9	1	6	6	4		2	1	2
Bisdisulizole Disodium	8	8		6	4	1	2		4	3
Polysilicone-15	7	7		4	3	1	1		4	3
Phenylbenzimidazole Sulfonic Acid	6	6	1	5	5	4		1		1
Cinoxate	5	5	1	1	1			1		1
4-Methylbenzylidene Camphor	2	1		1	1	1				1
Isopentenyl-4-methoxycinnamate	1	1								
Iscotrizinol	1	1								
Ecamsule	1	1								
Drometrizole Trisiloxane	1	1								
Diethylamino hydroxybenzoyl hexyl benzoate	1	1								
Bisotrizole	1	1								
Peptides	131	102	9	56	34	19	19	12	26	27
Acetyl hexapeptide-3	7	7		1	1				2	1
Copper Peptides	5	5		1		1	1	1	1	1
Peptones	1	1								
Hyaluronic Acid	79	51	7	48	22	31	4	6	1	6
Anti Oxidants	76	67	11	32	22	10	9	8	25	26
Retinol	75	71	19	37	27	19	11	2	12	16
Niacinamide	43	36	2	27	17	11	9	4	13	15
Coenzyme Q10	21	18		9	8		2	1		4
Polylactic Acid	20	14		7	7	1				
Botox	15	13		2	2					
Exfoliants	11	11	2	4	3	1	1	1	6	2
Boswellia Serrata	9	7	1	4	3	1		2		

How we did it?

The clusters of categories of skin cream ingredients and skin aging problems that were created for the previous analysis were correlated using the co-occurrence analyzer and then the resulting matrix for converted into a chart and a heatmap was generated.

Assignee Landscape around Key Ingredients and popular skin aging problems

The below chart shows the Assignee Landscape around the above matrix.

Skin Problems (Columns)	Photoaging			Rhytids		Pigmentation Changes	Laxity	Blemishes	Blotches
Ingredient Categories (Rows)	Photoaging			Rhytids		Pigmentation Changes	Laxity	Blemishes	Blotches
Chemical Peels									
Alpha Hydroxy Acids	ACTIVE ORGANICS INC.; ALTCOR INC.; AVON PRODUCTS INC.; BIODERM RESEARCH; BRETON LIONEL; DE LA CHARRIERE OLIVIER; DERMATRENDS INC.; DIEDRICH FALKO; ETHOX CHEMICALS LLC; FLEET CAPITAL CORP; GALDERMA S.A.; GROSS DENNIS; IDEA AG; IVREA PHARMACEUTICALS INC.; KATZ BRUCE E. LION CORP;	LOREAL S.A.; MARY KAY INC.; MILLER MICKEY MR.; NEOSTRATA CO INC.; NEUDECKER BIRGIT; NYCOMED; PERRICONE MD; PROCTER & GAMBLE CO.; PRO-NEURON INC.; PROPHASE LABS INC.; SANOFI-AVENTIS; SOKEN CHEMICAL & ENGINEERING CO. LTD.; URL PHARMA INC.; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP; WIELAND EBERHARD	ACTIVE ORGANICS INC.; ALTCOR INC.; AMT CAPITAL LTD.; AVEKA INC.; AVON PRODUCTS INC.; BASF AG; BIODERM RESEARCH; CLASSIFIED COSMETICS INC.; DE LA CHARRIERE OLIVIER; DERMATOLOGY HOME PRODUCTS INC.; ELC MANAGEMENT LLC; ETHOX CHEMICALS LLC; FLEET CAPITAL CORP; HARBECK MARIE; HYDROMER INC; INTERNATIONAL FLAVORS FRAGRANCES INC.; IVREA PHARMACEUTICALS INC.; JOHNSON & JOHNSON; KIMBERLY-CLARK WORLDWIDE INC.; LAUGHLIN PRODUCTS INC.; LION CORP; LOREAL S.A.; LUBRIZOL CORP; MARY KAY INC.;	MEDGRAFT MICROTECH INC.; MGP INGREDIENTS INC.; NEOCHEMIR INC.; NEOSTRATA CO INC.; NOVOZYMES BIOPOLYMER A/S PALOMA PHARMACEUTICALS INC.; PERRICONE MD; PROCTER & GAMBLE CO.; PRO-NEURON INC.; RAMSCOR INC.; SANOFI-AVENTIS; SEMBIOSYS GENETICS INC.; SIGMA-TAU INDUSTRIE FARMACEUTICHE RIUNITE SPA SKY HIGH LLC; SOKEN CHEMICAL & ENGINEERING CO. LTD.; TOMAS LLC; UNILEVER PLC; VSL PHARMACEUTICALS INC.; WELLSTAT THERAPEUTICS CORP; WIELAND EBERHARD; YAIZU SUISANKAGAKU INDUSTRY CO. LTD.; YU RUEY J	BIODERM RESEARCH; BRETON LIONEL; DE LA CHARRIERE OLIVIER; DERMATOLOGY HOME PRODUCTS INC.; GALDERMA S.A.; HSU TSUNG MIN; JOHNSON & JOHNSON; LION CORP; LOREAL S.A.; LUO ERIC C; MAIBACH HOWARD I; SYMRISE GMBH	ALTCOR INC.; AVON PRODUCTS INC.; BIODERM RESEARCH; JOHNSON & JOHNSON; LOREAL S.A.; MARY KAY INC.; PERRICONE MD	ACTIVE ORGANICS INC.; AVON PRODUCTS INC.; BERG RICHARD; BIODERM RESEARCH; CLASSIFIED COSMETICS INC.; DERMATOLOGY HOME PRODUCTS INC.; FLEET CAPITAL CORP; LAUGHLIN PRODUCTS INC.; LAVIPHARM LABORATORIES INC.; LOREAL S.A.; O NEIL MICHAEL P; PALOMA PHARMACEUTICALS INC.; LOREAL S.A.; LUO ERIC C; NEOCHEMIR INC.; PERRICONE MD; PROCTER & GAMBLE CO.	AVON PRODUCTS INC.; BIODERM RESEARCH; DERMATOLOGY HOME PRODUCTS INC.; FLEET CAPITAL CORP; LAUGHLIN PRODUCTS INC.; LAVIPHARM LABORATORIES INC.; LOREAL S.A.; O NEIL MICHAEL P; PALOMA PHARMACEUTICALS INC.; LOREAL S.A.; LUO ERIC C; NEOCHEMIR INC.; PERRICONE MD; PROCTER & GAMBLE CO.	
Beta Hydroxy Acids	ACTION MEDICINES S.L.; ALTCOR INC.; ANACOR PHARMACEUTICALS INC.; AUSTRALIAN IMPORTERS LTD.; AVON PRODUCTS INC.; BIODERM RESEARCH; COLOR ACCESS; DERMATRENDS INC.; GROSS DENNIS; HSU TSUNG MIN; IDEA AG; JACOBSON ERIC C; JOHNSON & JOHNSON;	KATZ BRUCE E. LOREAL S.A.; LUO ERIC C; MILLER MICKEY MR.; NEOSTRATA CO INC.; PERRICONE MD; PROCTER & GAMBLE CO.; SANOFI-AVENTIS; SINCLAIR PHARMACEUTICALS LTD.; VAN SCOTT EUGENE J; VICEPT THERAPEUTICS INC.; WATSON PHARMACEUTICALS INC.; YU RUEY J	ACTION MEDICINES S.L.; ALTCOR INC.; AMMAR KHODOR; AUSTRALIAN IMPORTERS LTD.; AVON PRODUCTS INC.; BIODERM RESEARCH; COLOR ACCESS; DERMATOLOGY HOME PRODUCTS INC.; ELC MANAGEMENT LLC; GROSS DENNIS; HYDROMER INC; IOI GROUP; JOHNSON & JOHNSON; JRX BIOTECHNOLOGY INC.; LOREAL S.A.; LUBRIZOL CORP; MILLER MICKEY MR.; NEOSTRATA CO INC.; O NEIL MICHAEL P;	PROCTER & GAMBLE CO.; RAMSCOR INC.; REGENERX BIOPHARMACEUTICALS INC.; REICHERT UWE; RUBIN JOEL; SANOFI-AVENTIS; SEDERMA S.A.S.; SEMBIOSYS GENETICS INC.; SHEFER ADI; SHEFER SAMUEL; SINCLAIR PHARMACEUTICALS LTD.; STRATEGIC SCIENCE TECHNOLOGIES LLC; UNILEVER PLC; WATSON PHARMACEUTICALS INC.; YU RUEY J	ACTION MEDICINES S.L.; BIODERM RESEARCH; DERMATOLOGY HOME PRODUCTS INC.; GALDERMA S.A.; LOREAL S.A.; PROCTER & GAMBLE CO.; SINCLAIR PHARMACEUTICALS LTD.; SPERON SAM; SYMRISE GMBH	ACTION MEDICINES S.L.; ALTCOR INC.; AVON PRODUCTS INC.; BIODERM RESEARCH; IOI GROUP; JOHNSON & JOHNSON; LOREAL S.A.; PROCTER & GAMBLE CO.; SEDERMA S.A.S.; STRATEGIC SCIENCE TECHNOLOGIES LLC; UNILEVER	AVON PRODUCTS INC.; BIODERM RESEARCH; DERMATOLOGY HOME PRODUCTS INC.; JOHNSON & JOHNSON; LOREAL S.A.; O NEIL MICHAEL P; PERRICONE MD; PROCTER & GAMBLE CO.; RUBIN JOEL; SEMBIOSYS GENETICS INC.; STIMSON DRAKE	AVON PRODUCTS INC.; BIODERM RESEARCH; DERMATOLOGY HOME PRODUCTS INC.; LOREAL S.A.; O NEIL MICHAEL P; PROCTER & GAMBLE CO.; RUBIN JOEL; SEMBIOSYS GENETICS INC.; STIMSON DRAKE	
Retinoic Acid Peel	ASAN LABORATORIES COMPANY (CAYMAN) LTD.; AVON PRODUCTS INC.; BASILEA PHARMACEUTICA AG; BIODERM RESEARCH; DERMIPSOR LTD.; GALDERMA S.A.; GENTRIX LLC; GENZYME CORP; HUMAN MATRIX SCIENCES LLC; IVREA PHARMACEUTICALS	JOHNSON & JOHNSON; KLIGMAN ALBERT M; LAVIN THOMAS N; LOREAL S.A.; NEOSTRATA CO INC.; PENEDERM INC.; PROCTER & GAMBLE CO.; REGENTS OF THE UNIVERSITY OF MICHIGAN; SANOFI-AVENTIS; SEDERMA S.A.S.; SYTHEON LTD.; THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	AMMAR KHODOR; AVON PRODUCTS INC.; BIODERM RESEARCH; DERMIPSOR LTD.; ELIZABETH ARDEN INC.; GENTRIX LLC; GENZYME CORP; HUMAN MATRIX SCIENCES LLC; ISOLAGEN INC.; IVREA PHARMACEUTICALS INC.; JOHNSON & JOHNSON; KLIGMAN ALBERT M; LAVIN THOMAS N; LOREAL S.A.;	LUBRIZOL CORP; NEOSTRATA CO INC.; PARSONS DIANA J; PROCTER & GAMBLE CO.; RAMSCOR INC.; REGENERX BIOPHARMACEUTICALS INC.; REGENTS OF THE UNIVERSITY OF MICHIGAN; SANOFI-AVENTIS; SEDERMA S.A.S.; SYTHEON LTD.; THE REGENTS OF THE UNIVERSITY OF CALIFORNIA; VAN SCOTT EUGENE J; YU RUEY J	LOREAL S.A.; SYMRISE GMBH	AVON PRODUCTS INC.; JOHNSON & JOHNSON; LOREAL S.A.; PROCTER & GAMBLE CO.; REGENTS OF THE UNIVERSITY OF MICHIGAN; SEDERMA S.A.S.; SYTHEON LTD.;	GENTRIX LLC; GENZYME CORP; JOHNSON & JOHNSON; PROCTER & GAMBLE CO.; VAN SCOTT EUGENE J; YU RUEY J	AVON PRODUCTS INC.; JOHNSON & JOHNSON; KLIGMAN ALBERT M; LOREAL S.A.; PROCTER & GAMBLE CO.; SEDERMA S.A.S.; SYTHEON LTD.; THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	
Phenol Peels	ACTION MEDICINES S.L.; ASTELLAS PHARMA INC.; FLEET CAPITAL CORP; KLIGMAN ALBERT M; OBAGI ZEIN E; REGENICS A/S; SYTHEON LTD.; WATSON PHARMACEUTICALS INC.		ACTION MEDICINES S.L.; CHOAY J SA FR; DELFT PHARMA INTERNATIONAL; EDWARDS BOBBY GENE; FLEET CAPITAL CORP; KLIGMAN ALBERT M; LOREAL S.A.; OBAGI ZEIN E; REGENICS A/S; SYTHEON LTD.; WATSON PHARMACEUTICALS INC.		ACTION MEDICINES S.L.	ACTION MEDICINES S.L.; REGENICS A/S; SYTHEON LTD.; WATSON PHARMACEUTICALS INC.	FLEET CAPITAL CORP; OBAGI ZEIN E	FLEET CAPITAL CORP; KLIGMAN ALBERT M; SYTHEON LTD.	
Trichloroacetic Acid Peels	ACTION MEDICINES S.L.; GROSS DENNIS; OBAGI ZEIN E; SYTHEON LTD.		ACTION MEDICINES S.L.; ADAMIS PHARMACEUTICALS CORP; GROSS DENNIS; LUBRIZOL CORP; OBAGI ZEIN E; SYTHEON LTD.		ACTION MEDICINES S.L.	ACTION MEDICINES S.L.; ADAMIS PHARMACEUTICALS CORP; SYTHEON LTD.	OBAGI ZEIN E	SYTHEON LTD.	
Jessner Peel	KATZ BRUCE E; SYTHEON LTD.		KATZ BRUCE E; SYTHEON LTD.			SYTHEON LTD.		SYTHEON LTD.	
Peptides									
Acetyl hexapeptide-3	BELFER COSMETICS LLC		BELFER COSMETICS LLC; FALLSBURGH DEVELOPMENT LLC; GUTHY-RENKER CORP; HA TAMMY; REVLON INC.;			REVLON INC.		GUTHY-RENKER CORP	
Copper Peptides	BIODERM RESEARCH		AMOREPACIFIC CORPORATION; BIODERM RESEARCH; REGENERX BIOPHARMACEUTICALS INC.;		BIODERM RESEARCH	BIODERM RESEARCH		BIODERM RESEARCH	

Peptones			DEEPAK JAIN					
Sunscreen Ingredients								
Titanium Dioxide	AVON PRODUCTS INC.; BAYER AG; BROOKS LESLEE S; BROOKS NORMAN A; EPATENTMANAGER.COM; GALDERMA S.A.; GRUNE GUERRY L; JOHNSON & JOHNSON; MERCK & CO INC.; PERRICONE MD; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC		AVEKA INC.; AVICENA GROUP INC.; BASF AG; BERG RICHARD; BIODERM RESEARCH; CLASSIFIED COSMETICS INC.; DUPONT; GRUNE GUERRY L; GUTHY-RENKER CORP; HALSTON YOLANDA; HYDROMER INC; JOHNSON & JOHNSON; KIMBERLY-CLARK WORLDWIDE INC.;	LOREAL S.A.; MAZZIO ELIZABETH ANNE; MERCK & CO INC.; PROCTER & GAMBLE CO.; REACTIVE SURFACES LTD.; REVLON INC.; SAKURA PROPERTIES LLC; SEMBIOSYS GENETICS INC.; SHISEIDO CO. LTD.; SOLIMAN KARAM F; SOUTHEASTERN MEDICAL TECHNOLOGIES LLC	SAKURA PROPERTIES LLC; SHISEIDO CO. LTD.	PROCTER & GAMBLE CO.; REVLON INC.; SAKURA PROPERTIES LLC; SHISEIDO CO. LTD.	BERG RICHARD; CLASSIFIED COSMETICS INC.; HALSTON YOLANDA; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC	PROCTER & GAMBLE CO.; SEMBIOSYS GENETICS INC.
Oxybenzone	AVON PRODUCTS INC.; LAVIN THOMAS N; LOREAL S.A.; MARY KAY INC.; MERCK & CO INC.; NEOSTRATA CO INC.; PACIFIC SPECIALTY OILS INC.; PERRICONE MD; PROCTER & GAMBLE CO.; PRO-NEURON INC.;	REGENTS OF THE UNIVERSITY OF MICHIGAN; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; THE REGENTS OF THE UNIVERSITY OF CALIFORNIA; VAN SCOTT EUGENE J; VOYT WALTER F; WELLSTAT THERAPEUTICS CORP; YU RUEY J	AVICENA GROUP INC.; BIODERM RESEARCH; JOHNSON & JOHNSON; LAUGHLIN PRODUCTS INC.; LAVIN THOMAS N; LIVING PROOF INC.; MARY KAY INC.; MERCK & CO INC.; NEOSTRATA CO INC.; PACIFIC SPECIALTY OILS INC.; PALOMA PHARMACEUTICALS INC.; PROCTER & GAMBLE CO.; PRO-NEURON INC.;	REGENTS OF THE UNIVERSITY OF MICHIGAN; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; SEMBIOSYS GENETICS INC.; SIGMA-TAU INDUSTRIE FARMACEUTICHE RIUNITE SPA; SPERON SAM; THE REGENTS OF THE UNIVERSITY OF CALIFORNIA; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP; YU RUEY J	SAKURA PROPERTIES LLC; SPERON SAM	MARY KAY INC.; PROCTER & GAMBLE CO.; REGENTS OF THE UNIVERSITY OF MICHIGAN; SAKURA PROPERTIES LLC; THE REGENTS OF THE UNIVERSITY OF	SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	LAUGHLIN PRODUCTS INC.; PALOMA PHARMACEUTICALS INC.; SEMBIOSYS GENETICS INC.
Sulisobenzene	AVON PRODUCTS INC.; BAYER AG; LAVIN THOMAS N; LOREAL S.A.; MARY KAY INC.; MERCK & CO INC.; NEOSTRATA CO INC.; PACIFIC SPECIALTY OILS INC.; PERRICONE MD;	PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; VAN SCOTT EUGENE J; VOYT WALTER F; WELLSTAT THERAPEUTICS CORP; YU RUEY J	AVICENA GROUP INC.; BIODERM RESEARCH; LAUGHLIN PRODUCTS INC.; LAVIN THOMAS N; LIVING PROOF INC.; MARY KAY INC.; MERCK & CO INC.; NEOSTRATA CO INC.; PACIFIC SPECIALTY OILS INC.; PALOMA PHARMACEUTICALS INC.;	PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; SEMBIOSYS GENETICS INC.; SIGMA-TAU INDUSTRIE FARMACEUTICHE RIUNITE SPA; SPERON SAM; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP; YU RUEY J	SAKURA PROPERTIES LLC; SPERON SAM	MARY KAY INC.; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC; THERMO FISHER SCIENTIFIC INC.	SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	LAUGHLIN PRODUCTS INC.; PALOMA PHARMACEUTICALS INC.; SEMBIOSYS GENETICS INC.
Dioxybenzone	AVON PRODUCTS INC.; LAVIN THOMAS N; LOREAL S.A.; MARY KAY INC.; MERCK & CO INC.; NEOSTRATA CO INC.; PACIFIC SPECIALTY OILS INC.; PERRICONE MD;	PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; VAN SCOTT EUGENE J; VOYT WALTER F; WELLSTAT THERAPEUTICS CORP;	AVICENA GROUP INC.; BIODERM RESEARCH; LAUGHLIN PRODUCTS INC.; LAVIN THOMAS N; LIVING PROOF INC.; MARY KAY INC.; MERCK & CO INC.; NEOSTRATA CO INC.; PACIFIC SPECIALTY OILS INC.; PALOMA PHARMACEUTICALS INC.;	PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; SEMBIOSYS GENETICS INC.; SIGMA-TAU INDUSTRIE FARMACEUTICHE RIUNITE SPA; SPERON SAM; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP;	SAKURA PROPERTIES LLC; SPERON SAM	MARY KAY INC.; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC; THERMO FISHER SCIENTIFIC INC.	SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	LAUGHLIN PRODUCTS INC.; PALOMA PHARMACEUTICALS INC.; SEMBIOSYS GENETICS INC.
Zinc Oxide	AVON PRODUCTS INC.; BIODERM RESEARCH; BLONDE HOLDINGS PTY LTD.; EPATENTMANAGER.COM; FLEET CAPITAL CORP; GRUNE GUERRY L;	JOHNSON & JOHNSON; LOREAL S.A.; PERRICONE MD; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	ADAMIS PHARMACEUTICALS CORP; AQUAPHOTONICS INC.; AVICENA GROUP INC.; BIODERM RESEARCH; COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH; DUPONT; FLEET CAPITAL CORP; GRUNE GUERRY L;	GUTHY-RENKER CORP; HYDROMER INC; LOREAL S.A.; PROCTER & GAMBLE CO.; REACTIVE SURFACES LTD.; SAKURA PROPERTIES LLC; SEMBIOSYS GENETICS INC.; SHISEIDO CO. LTD.; TENTA L US	SAKURA PROPERTIES LLC; SHISEIDO CO. LTD.	ADAMIS PHARMACEUTICALS CORP; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC; SHISEIDO CO. LTD.; TENTA L US	BLONDE HOLDINGS PTY LTD.; FLEET CAPITAL CORP; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC; TENTA L US	LOREAL S.A.; PROCTER & GAMBLE CO.; SEMBIOSYS GENETICS INC.
P-Aminobenzoic Acid	BAYER AG; LAVIN THOMAS N; LOREAL S.A.; NEOSTRATA CO INC.; PERRICONE MD; PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP; YU RUEY J		AVICENA GROUP INC.; BIODERM RESEARCH; LAVIN THOMAS N; NEOSTRATA CO INC.; PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; SIGMA-TAU INDUSTRIE FARMACEUTICHE RIUNITE SPA; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP; YU RUEY J		SAKURA PROPERTIES LLC	PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	
Octyl Methoxycinnamate	AVON PRODUCTS INC.; MERCK & CO INC.; NEOSTRATA CO INC.; PACIFIC SPECIALTY OILS INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; VAN SCOTT EUGENE J; WELLSTAT		BIODERM RESEARCH; JOHNSON & JOHNSON; LOREAL S.A.; MERCK & CO INC.; NEOSTRATA CO INC.; PACIFIC SPECIALTY OILS INC.; PALOMA PHARMACEUTICALS INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; VAN SCOTT EUGENE J;		SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	PALOMA PHARMACEUTICALS INC.
Octyl Salicylate	BAYER AG; NEOSTRATA CO INC.; PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; VAN SCOTT EUGENE J;		BIODERM RESEARCH; NEOSTRATA CO INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SANOFI-AVENTIS; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP; YU RUEY J		SAKURA PROPERTIES LLC	PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	

Homosalate	MARY KAY INC.; NEOSTRATA CO INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP;		BIODERM RESEARCH; MARY KAY INC.; NEOSTRATA CO INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; SPERON SAM; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP; YU RUEY J		SAKURA PROPERTIES LLC; SPERON SAM	MARY KAY INC.; SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	
Padimate O	LOREAL S.A.; NEOSTRATA CO INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; WELLSTAT		LIVING PROOF INC.; NEOSTRATA CO INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; WELLSTAT THERAPEUTICS CORP; YU RUEY J		SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC; VAN SCOTT EUGENE J; YU RUEY J	
Bisdisulizole Disodium	BEIERSDORF AG; EMI INDUSTRIES; MERC & CO INC.; PROCTER & GAMBLE CO.; SYTHEON LTD.		BEIERSDORF AG; EMD CHEMICALS INC.; EMI INDUSTRIES; LOREAL S.A.; MERC & CO INC.; PROCTER & GAMBLE CO.; SYTHEON LTD.			PROCTER & GAMBLE CO.; SYTHEON LTD.		LOREAL S.A.; PROCTER & GAMBLE CO.; SYTHEON LTD.
Octocrylene	MERC & CO INC.; PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		BIODERM RESEARCH; MERC & CO INC.; PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		SAKURA PROPERTIES LLC	PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC	PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC	PROCTER & GAMBLE CO.
Ethylhexyl Triazone	BEIERSDORF AG; BIODERM RESEARCH; GENEPHARM INC.; LOREAL S.A.; PROCTER & GAMBLE CO.		BASF AG; BEIERSDORF AG; BIODERM RESEARCH; GENEPHARM INC.; LOREAL S.A.; PROCTER & GAMBLE CO.		BIODERM RESEARCH; GENEPHARM INC.	PROCTER & GAMBLE CO.	BASF AG; BIODERM RESEARCH	LOREAL S.A.; PROCTER & GAMBLE CO.
Avobenzene	AVON PRODUCTS INC.; MARY KAY INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		BIODERM RESEARCH; MARY KAY INC.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		SAKURA PROPERTIES LLC	MARY KAY INC.; SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	
Trolamine Salicylate	BAYER AG; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		BIODERM RESEARCH; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	
Menthyl Antranilate	PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		BIODERM RESEARCH; PROCTER & GAMBLE CO.; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC	PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	PROCTER & GAMBLE CO.
Bemotrizinol	AVON PRODUCTS INC.; BIODERM RESEARCH; LOREAL S.A.; SYTHEON LTD.		ANDERSON GLEN T; AVON PRODUCTS INC.; BIODERM RESEARCH; LOREAL S.A.; SYTHEON LTD.		BIODERM RESEARCH	ANDERSON GLEN T; AVON PRODUCTS INC.; SYTHEON	AVON PRODUCTS INC.; BIODERM RESEARCH	LOREAL S.A.; SYTHEON LTD.
Phenylbenzimidaz ole Sulfonic Acid	PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		BIODERM RESEARCH; PRO-NEURON INC.; SAKURA PROPERTIES LLC; WELLSTAT THERAPEUTICS CORP		SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	
Benzophenone-9	BIODERM RESEARCH; LOREAL S.A.; MARY KAY INC.; PROCTER & GAMBLE CO.		BIODERM RESEARCH; LOREAL S.A.; MARY KAY INC.; PROCTER & GAMBLE CO.		BIODERM RESEARCH; MARY KAY INC.	MARY KAY INC.; PROCTER & GAMBLE CO.	BIODERM RESEARCH	MARY KAY INC.; PROCTER & GAMBLE CO.
Polysilicone-15	LOREAL S.A.; PROCTER & GAMBLE CO.; SYTHEON LTD.		LOREAL S.A.; PROCTER & GAMBLE CO.; SYTHEON LTD.			PROCTER & GAMBLE CO.; SYTHEON LTD.		LOREAL S.A.; PROCTER & GAMBLE CO.; SYTHEON LTD.
Cinoxate	SAKURA PROPERTIES LLC		BIODERM RESEARCH; SAKURA PROPERTIES LLC		SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	SAKURA PROPERTIES LLC	
4- Methylbenzylidene Camphor	PROCTER & GAMBLE CO.		BIODERM RESEARCH			PROCTER & GAMBLE CO.		
Isopentenyl-4- methoxycinnamate			BIODERM RESEARCH					
Iscotrizinol			BIODERM RESEARCH					
Ecamsule			BIODERM RESEARCH					
Drometrizole Trisiloxane			BIODERM RESEARCH					
Diethylamino hydroxybenzoyl Bisotrizole			BIODERM RESEARCH					

Hyaluronic Acid	ACTIVE ORGANICS INC.; ALCHEMIA LTD.; ARGINTEANU RONIT Y.; AUSTRALIAN IMPORTERS LTD.; BIODERM RESEARCH; CHEN CHIA WEN; DIEDRICH FALKO; ESM TECHNOLOGIES LLC; FLEET CAPITAL CORP; FOAMIX LTD.; GAN DAVID C; GENZYME CORP; GOLDSTEIN MINDY S; IDEA AG; MAMMONE THOMAS;	NEUDECKER BIRGIT; PATENT BIOPHARMACEUTICS INC.; REGENICS A/S; SINCLAIR PHARMACEUTICALS LTD.; SKYEPHARMA PLC; SOKEN CHEMICAL & ENGINEERING CO. LTD.; SURROGATE PHARMACEUTICAL PATHWAYS, LLC; THE WESTAIM CORP; WATSON PHARMACEUTICALS INC.; WIELAND EBERHARD; YOUSSEFYEH PARVIN	ACTIVE ORGANICS INC.; ADVANCED TISSUE SCIENCES INC.; AUSTRALIAN IMPORTERS LTD.; BIOCELL TECHNOLOGY LLC; BIODERM RESEARCH; BURGESS CHERYL; CENTURYLINK INC.; CHILDRENS HOSPITAL MEDICAL CENTER; COLORADO STATE UNIVERSITY; COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH; DEEPAK JAIN; DIEDRICH FALKO; ESM TECHNOLOGIES LLC; FLEET CAPITAL CORP; FOAMIX LTD.;	GENZYME CORP; ISOLAGEN INC.; JOHNSON & JOHNSON; KHORIONYX; LOREAL S.A.; MEDGRAFT MICROTECH INC.; NOVOZYMES BIOPOLYMER A/S; REGENICS A/S; RIMON THERAPEUTICS LTD.; SANOFI-AVENTIS; SINCLAIR PHARMACEUTICALS LTD.; SKYEPHARMA PLC; SMITH & NEPHEW PLC; SOKEN CHEMICAL & ENGINEERING CO. LTD.; WATSON PHARMACEUTICALS INC.; WIELAND EBERHARD; YAIZU SUISANKAGAKU INDUSTRY CO. LTD.	ALCHEMIA LTD.; CHILDRENS HOSPITAL MEDICAL CENTER; COLORADO STATE UNIVERSITY; SINCLAIR PHARMACEUTICALS LTD.	ARGINTEANU RONIT Y.; BIODERM RESEARCH; JOHNSON & JOHNSON; KHOT HOMA; REGENICS A/S; WATSON PHARMACEUTICALS INC.; YOUSSEFYEH PARVIN	ACTIVE ORGANICS INC.; ESM TECHNOLOGIES LLC; FLEET CAPITAL CORP; GENZYME CORP	BIODERM RESEARCH
Retinol	AVON PRODUCTS INC.; BASILEA PHARMACEUTICA AG; GENTRIX LLC; JOHNSON & JOHNSON; KLIGMAN ALBERT M; LEO PHARMA A/S; LOREAL S.A.; MARY KAY INC.; NEOSTRATA CO INC.; PROCTER & GAMBLE CO.; REGENTS OF THE UNIVERSITY OF MICHIGAN; SANOFI-AVENTIS; THE REGENTS OF THE UNIVERSITY OF TEXAS SYSTEM; CLASSIFIED COSMETICS INC.; CYTORI THERAPEUTICS INC.; DASK TECHNOLOGIES LLC; ELIZABETH ARDEN INC.; GENTRIX LLC; HAL STON YOLANDA;		ADAMIS PHARMACEUTICALS CORP; ADVANCED BIOHEALING INC.; ADVANCED TISSUE SCIENCES INC.; AVON PRODUCTS INC.; BERG RICHARD; BIODERM RESEARCH; BOARD OF REGENTS UNIVERSITY OF TEXAS SYSTEM; CLASSIFIED COSMETICS INC.; CYTORI THERAPEUTICS INC.; DASK TECHNOLOGIES LLC; ELIZABETH ARDEN INC.; GENTRIX LLC; HAL STON YOLANDA;	MERCK & CO INC.; NATURA COSMETICOS S.A.; NEOSTRATA CO INC.; PHOTOMEDEX INC.; PROCTER & GAMBLE CO.; RAMSCOR INC.; REGENERX BIOPHARMACEUTICALS INC.; REGENTS OF THE UNIVERSITY OF MICHIGAN; SANOFI-AVENTIS; SIGMA-TAU INDUSTRIE FARMACEUTICHE RIUNITE SPA; SMITH & NEPHEW PLC; THE REGENTS OF THE UNIVERSITY OF CALIFORNIA; TORRENT PHARMACEUTICALS LTD.; VAN SCOTT EUGENE J.	DASK TECHNOLOGIES LLC; JOHNSON & JOHNSON	ADAMIS PHARMACEUTICALS CORP; AVON PRODUCTS INC.; JOHNSON & JOHNSON; MARY KAY INC.; PROCTER & GAMBLE CO.; REGENTS OF THE UNIVERSITY OF MICHIGAN; THE REGENTS OF THE UNIVERSITY OF CALIFORNIA; VAN SCOTT EUGENE J.	AVON PRODUCTS INC.; BERG RICHARD; CLASSIFIED COSMETICS INC.; GENTRIX LLC; HALSTON YOLANDA; JOHNSON & JOHNSON; LEO PHARMA A/S; PROCTER & GAMBLE CO.; TORRENT PHARMACEUTICALS LTD.; VAN SCOTT EUGENE J.	AVON PRODUCTS INC.; JOHNSON & JOHNSON; KLIGMAN ALBERT M; LOREAL S.A.; PHOTOMEDEX INC.; PROCTER & GAMBLE CO.; THE REGENTS OF THE UNIVERSITY OF CALIFORNIA
Anti Oxidants	ASAN LABORATORIES COMPANY (CAYMAN) LTD.; AVESTHAGEN INC.; BELFER COSMETICS LLC; BIODERM RESEARCH; EMD CHEMICALS INC.; ESM TECHNOLOGIES LLC; GRUNE GUERRY L; JOHNSON & JOHNSON; LOREAL S.A.; MERCK & CO INC.;		AMGEN INC.; AMT CAPITAL LTD.; AQUAPHOTONICS INC.; AVON PRODUCTS INC.; BELFER COSMETICS LLC; BIODERM RESEARCH; CJ CHEILJEDANG CORP; ESM TECHNOLOGIES LLC; GRUNE GUERRY L; HANKOOK KORUS PHARM CO. LTD.; IBR LTD.; JOHNSON & JOHNSON;	LOREAL S.A.; MARY KAY INC.; O NEIL MICHAEL P; PHYTON BIOTECH INC.; PROCTER & GAMBLE CO.; RUBIN JOEL; SAKURA PROPERTIES LLC; SEMBIOSYS GENETICS INC.; SHEFER ADI; SHEFER SAMUEL; STIMSON DRAKE; UNILEVER PLC	AVON PRODUCTS INC.; IBR LTD.; LOREAL S.A.; MARY KAY INC.; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC; SEMBIOSYS GENETICS INC.	AVON PRODUCTS INC.; BIODERM RESEARCH; JOHNSON & JOHNSON; MARY KAY INC.; PHYTON BIOTECH INC.; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC; SHEFER ADI; SHEFER	AVON PRODUCTS INC.; ESM TECHNOLOGIES LLC; O NEIL MICHAEL P; PHYTON BIOTECH INC.; PROCTER & GAMBLE CO.; SAKURA PROPERTIES LLC; SHEFER ADI; SHEFER	BIODERM RESEARCH; JOHNSON & JOHNSON; MARY KAY INC.; O NEIL MICHAEL P; PROCTER & GAMBLE CO.; RUBIN JOEL; SEMBIOSYS GENETICS INC.; STIMSON DRAKE
Niacinamide	AB SCIENCE; ANACOR PHARMACEUTICALS INC.; BIODERM RESEARCH; DERMIPSOR LTD.; EMI INDUSTRIES; GLAXOSMITHKLINE PLC; JOHNSON & JOHNSON; MERCK & CO INC.; PROCTER & GAMBLE CO.; REGENICS A/S		AVICENA GROUP INC.; BIODERM RESEARCH; COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH; DERMIPSOR LTD.; EMI INDUSTRIES; GLAXOSMITHKLINE PLC; ISOLAGEN INC.; MAZZIO ELIZABETH ANNE; MERCK & CO INC.; PROCTER & GAMBLE CO.; REGENICS A/S		BIODERM RESEARCH; PROCTER & GAMBLE CO.; SYMRISE GMBH	BIODERM RESEARCH; DERMIPSOR LTD.; PROCTER & GAMBLE CO.; REGENICS A/S		BIODERM RESEARCH; PROCTER & GAMBLE CO.
Coenzyme Q10	ALTICOR INC.; LOREAL S.A.; PROPHASE LABS INC.; TRACIE MARTYN INTERNATIONAL LLC		ALTICOR INC.; AVICENA GROUP INC.; BEIERSDORF AG; ISOLAGEN INC.; LOREAL S.A.; RAMSCOR INC.; REGENERX BIOPHARMACEUTICALS INC.; TRACIE MARTYN INTERNATIONAL LLC; UNIGEN PHARMACEUTICALS INC.		UNIGEN PHARMACEUTICALS INC.	ALTICOR INC.; TRACIE MARTYN INTERNATIONAL LLC		
Botox	OMOIGUI OSEMWOTAS		ALLERGAN INC.; CAPPELLOS INC.; DPM THERAPEUTICS CORP; KYTHERA BIOPHARMACEUTICALS INC.; MODI PANKAJ; RAMSCOR INC.; US WORLDMEDS LLC					
Polylactic Acid	CELLTECH R D LIMITED; FRAUNHOFER USA INC.; HYDRA BIOSCIENCES INC.; JENNINGS SPRING BARBARA L		EVERA MEDICAL INC.; HYDRA BIOSCIENCES INC.; MEDGRAFT MICROTECH INC.; RAMSCOR INC.					
Exfoliants	AUSTRALIAN IMPORTERS LTD.; GENEPHARM INC.; PROCTER & GAMBLE CO.		AUSTRALIAN IMPORTERS LTD.; AVON PRODUCTS INC.; GENEPHARM INC.; LAUGHLIN PRODUCTS INC.; LUBRIZOL CORP; PROCTER & GAMBLE CO.		GENEPHARM INC.	AVON PRODUCTS INC.; PROCTER & GAMBLE CO.	AVON PRODUCTS INC.; PROCTER & GAMBLE CO.	AVON PRODUCTS INC.; LAUGHLIN PRODUCTS INC.; PROCTER & GAMBLE CO.
Boswellia Serrata	BIODERM RESEARCH		BIODERM RESEARCH; JRX BIOTECHNOLOGY INC.		BIODERM RESEARCH		BIODERM RESEARCH	

Many inferences around the Assignee focus area can be made from the above matrix. We can see that Allergan Inc. focuses primarily on Botox as Key ingredient in Rhytids.

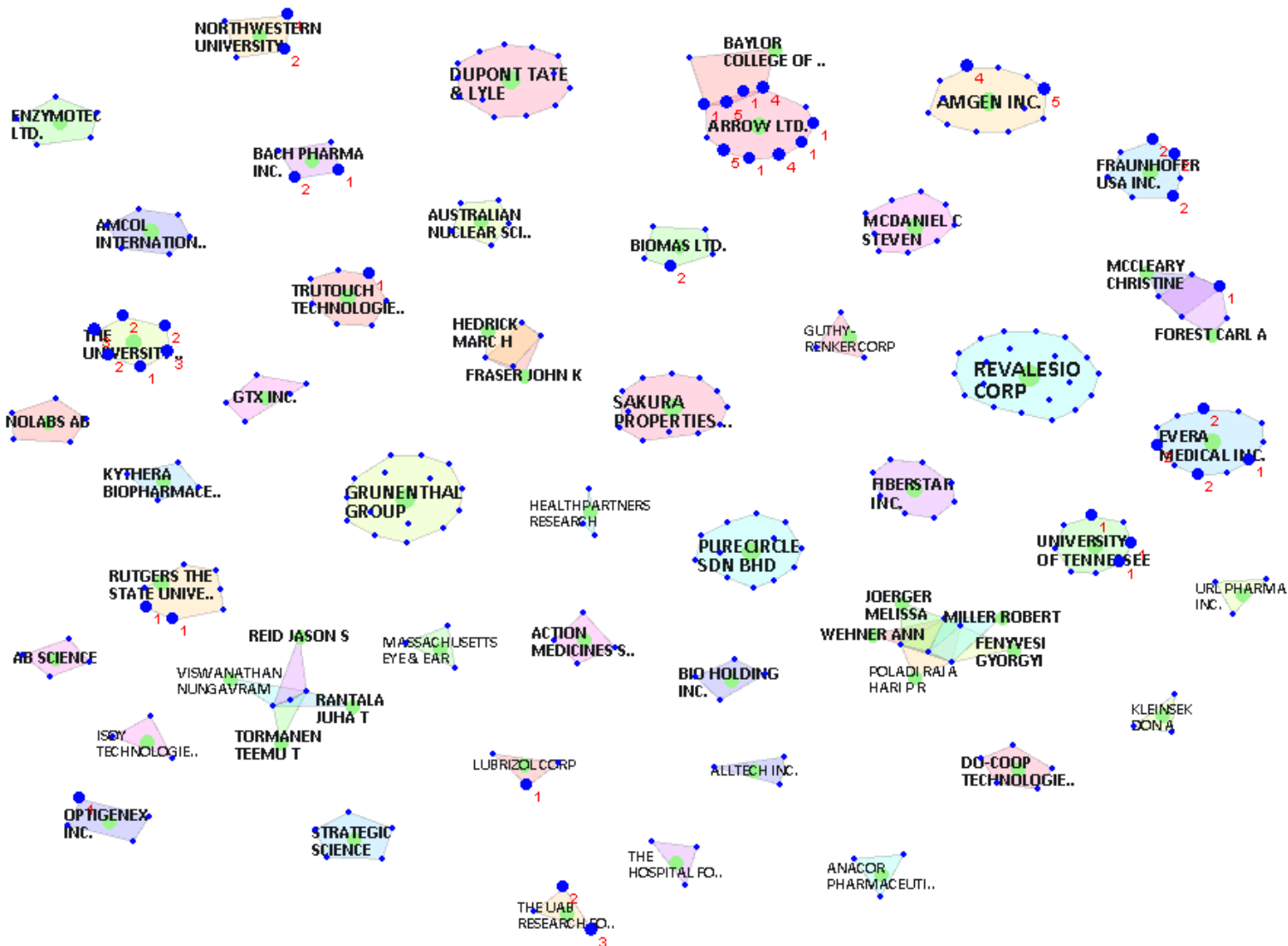
How we did it?

The clusters of skin cream ingredients and skin cream problems that were created for the previous analysis were correlated using the co-occurrence analyzer. The “Show Data” option in the Co-occurrence Analyzer was used to Drill out the companies from the resulted matrix and then the resulting matrix was converted into a chart.

New Companies in the last 5 years having 3 or more records

The map below shows patents of new assignees in the last 5 years having 3 or more records. The size of the patent node in dark blue color is dependent on the number of forward citing documents for that record and the number against the node represents the exact number of forward citations.

A new company with a promising new technology usually has a small but highly cited portfolio.



How we did it?

Using the Assignee Activity feature in VizMAP tool, we first set the filter definition for New Assignees to be equivalent to "All Patents Issued In/After 2005". Clicking on New Assignees then generated the above map. We then restricted the map to those Assignees having 3 or more filings in the last 5 years. Each patent node for then further enhanced by the number of forward citations it received.

Appendix A: Key Assignee Normalization Table

<p>PROCTER & GAMBLE CO. PROCTER AND GAMBLE BISSETT DONALD L CLEAR ROSE M ROBINSON LARRY R HEINRICH JAMES M MIDHA SANJEEV SMITH EDWARD D III STRIFE ROBERT J SYFERT SCOTT W WAGNER JULIE A WEI KARL S SMITH EDWARD DEWEY III WAGNER JULIE ANN WEI KARL SHIQING MIDHA SANJEEV M WELLA AG RICHARDSON VICKS INC GILLETTE CO</p>	<p>JOHNSON & JOHNSON</p> <p>ALELES MARGARET A COLE CURTIS A LUKENBACH ELVIN R NIEMIEC SUSAN SHAH SNEHAL BOBZIN STEVEN BODDUPALLI SEKHAR BROWN LESLEY CHEN JIAN DEL BALZO UGHETTA GILAT SYLVAIN MILLER GUY SONG JIANGAO WANG BING ZHANG WEI ZHANG YONG KANG COLE CURTIS GANOPOLSKY IRINA LUKENBACH ELVIN SKOVER GREGORY LIN CONNIE BAOZHEN SEIBERG MIRI IOTSOVA VIOLETTA LIU JUE CHEN CONNEY ALLAN H HUANG MOU TUAN PAINE CHRISTINE SHAPIRO STANLEY S DOLE VICTORIA NYSTRAND GLENN SAH ARCHANA BURROWS MARK CRONIN JOHN HULL RAYMOND J JR NARSANA TUSHAR RYTEL JOHN F HULL RAYMOND JR MENKE JAMES C HULL RAYMOND J GUBEMICK DAVID STONE VIOLETTA I ZHAO RENBIN GALILEO PHARMACEUTICALS INC BORDOLOI BINOY K LUKENBACH GLORIA J RUVOLO EDUARDO SOUTHALL MICHAEL D KIZOULIS MENAS</p> <p>MARTIN KATHARINE MITCHELL PHYLLIS SOUTHALL MICHAEL TIERNEY NEENA KING DEANNA L FERNANDEZ CANDELARIO A JR KAMINSKI CLAUDIA LUIZZI JOSEPH NATTER FLORENCE BARKOVIC SYLVIA FERNANDEZ ALDO O MARTENS NICOLAS SINGLETON LAURA C LIN CONNIE B SCARPA RICHARD C BERNSTEIN KEITH J NOORDUIN HENK SOUTHAM MARY PAPPAS APOSTOLOS SALEMO CATHERINE S BRUNING ELIZABETH CAVENDER DRUIE E JANSSEN PHARMACEUTICA NV JOHNSON AND JOHNSON CONSUMER ALZA CORP ORTHO MCNEIL PHARM INC JOHNSON AND JOHNSON PROD INC JOHNSON AND JOHNSON SA UNIV RUTGERS</p>
<p>LOREAL S.A. OREAL BRETON LIONEL NONOTTE ISABELLE CASTIEL ISABELLE FERRARIS CORINNE BERNERD FRANCOISE MARTIN RICHARD MAIGNAN JEAN MICHEL SERGE CHEVALIER VERONIQUE CHRISTOPHIDES LORDI KALLIOPE POTIN ANTHONY QUEST MELANIE ULRICH MARIA GENARD SYLVIE BOULLE CHRISTOPHE DALKO MARIA LEVEQUE JEAN LUC SIMONETTI LUCIE GIRIER DUFOURNIER FRANCK KHACHIKIAN HELENE LEMANN PATRICIA RICARD AUDREY MOUGIN NATHALIE DELACOUR MARIE LAURE RAY XAVIER HADASCH ANKE BISSEY BEUGRAS LAURE SENEER JEROME WILLEMIN CLAUDIE SOCI ET E L OREAL S A SOCIETEL OREAL S A</p>	

<p>PFIZER INC. WILLIAMS KEVIN JON ESPERION LUV DEV INC UNIV BRITISH COLUMBIA AMERICAN HOME PROD INTELLIGENT MED SYST BASF AG WARNER LAMBERT CO TALARIA THERAPEUTICS INC AMERICAN CYANAMID CO PFIZER BAKER JANNIE LEA GROSU GEORGE THEODORE CARON STEPHANE VENKATESAN ARANAPAKAM MUDUMBAI</p>	<p>UNILEVER PLC UNILEVER HOME AND PERSONAL CARE CONOPCO INC DBA UNILEVER LEVER BROTHERS LTD UNILEVER PATENT HOLDINGS CHESEBROUGH PONDS USA CHESEBROUGH POND S USA CO A DI CHESEBROUGH POND S USA DIVISIO</p>
<p>SKYEPHARMA PLC HYAL PHARMA CORP HYAL PHARMACEUTICALS CORP BIOGLAN AB JAGOTEC AG</p>	<p>ALLERGAN INC. ALLERGAN SALES INC ALLERGAN INC HUNT TERRENCE J</p>

Appendix B: Search Strings Used for Categorization

Categorization: Ingredient Categories

1. Chemical Peels

Chemical Peels	
aclm contains (α -hydroxy or alpha hydroxy) w/3 acid* or AHA	70 results
aclm contains (Citric w/3 Acid)	83 results
aclm contain (Glycolic or Dicarboxylic or hydroxyacetic) w/3 acid*	16 results
aclm contains (lactic w/3 acid)	104 results
aclm contains (malic w/3 acid)	44 results
aclm contains (tartaric w/3 acid)	45 results
aclm contains (Beta w/2 "hydroxy acid") or BHA	26 results
aclm contains Salicylic acid or "2-Hydroxybenzoic acid"	146 results
Jessner* w/3 peel	2 results
(Phenol or Croton) w/2 peel*	5 results
croton w/5 oil	17 results
aclm contains croton w/5 oil	1 result
phenol w/2 oil	1 result
aclm contains (Retino* w/3 acid)	84 results
aclm contains (Trichloroacetic or "trichloroethanoic acid") or TCA	9 results

2. Anti oxidants

Anti-oxidants	
aclm contains anti w/3 oxidant*	100 results

3. Exfoliants

Exfoliants	
aclm contains exfoliant*	15 results

4. Hyaluronic Acid

Hyaluronic Acid	
aclm contains Hyaluronan or "hyaluronic acid" or hyalurona	112 results

5. Botox

Botox	
aclm contains botox or botulinum toxin*	28 results

6. Boswellia Serrata

Boswellia Serrata	
aclm contains boswelli*	9 results

7. Polylactic Acid

Polylactic Acid	
aclm contain (Poly w/3 "lactic acid") or polylactide	50 results

8. Coenzyme Q10

Coenzyme Q10	
aclm contains "coenzyme q10" or ubiquinone* or ubidecarenone* or "coenzyme q" or coq10 or coq or q10	44 results

9. Niacinamide

Niacinamide	
aclm contains Nicotinamide* or niacinamide* or "nicotinic acid amide" or 3-pyridinecarboxamide* or Vitamin PP	54 results

10. Retinol

Retinol	
aclm contains retinal or retinol or retinaldehyde* or retinyl palmitate* or vitamin palmitate* or "retinol palmitate" or c36h60o2	98 results

11. Peptides

Peptides	
aclm contains peptide*	226 results
acetyl hexapeptide-3	13 results
aclm contains Argireline* or Acetyl hexapeptide-3	7 results
aclm contains "Acetyl hexapeptide-3"	7 results
Argireline* or Acetyl hexapeptide-3	18 results
aclm contains peptone*	2 results
aclm contains Copper peptide* or GHK-Cu or tri-peptide*	5 results

12. Sunscreen Ingredients

Sunscreen Ingredients	
aclm contains Enzacamene* or Parsol 5000 or Eusolex 6300 or MBC or 4-Methylbenzylidene camphor* or 4-MBC	2 results
aclm contains Avobenzene* or "1-(4-methoxyphenyl)-3-(4-tert-butylphenyl)propane-1 or 3-dione" or "Butyl methoxy dibenzoylmethane" or BMDBM or Parsol 1789 or Eusolex 9020 or "t-butyl dimethoxydibenzoylmethane"	11 results
uvinul ds 49 or cas 3121-60-6 or "sodium dihydroxy dimethoxy disulfobenzophenone"	3 results
Benzophenone-9	21 results
aclm contains "2-Ethoxyethyl p-methoxycinnamate" or Cinoxate*	5 results
aclm contains Dioxybenzone* or benzophenone- 8	44 results
aclm contains ecamsule* or mexoryl sx or "terephthalylidene dicamphor sulfonic acid"	1 result
aclm contains Homomethyl salicylate* or HMS or Homosalate*	17 results
aclm contains "isopentenyl-4-methoxycinnamate" or "isoamyl p-methoxycinnamate"	1 result
aclm contains Menthyl anthranilate* or Meradimate*	9 results
aclm contains "drometrizole trisiloxane"	1 result
"Bisdisulizole Disodium" or "Disodium phenyldibenzimidazole tetrasulfonate" or bisimidazylate* or DPDT	10 results
aclm contains octocrylene* or "2-ethylhexyl-2-cyano-3 3-diphenylacrylate"	16 results
aclm contains "octyl methoxycinnamate" or Octinoxate* or EMC or OMC or Ethylmethoxycinnamate* or Escalol 557 or "2-ethylhexyl-paramethoxycinnamate" or Parsol MCX	18 results
aclm contains Octisalate* or "2-Ethylhexyl salicylate" or Escalol 587 or Octyl salicylate*	18 results
aclm contains oxybenzone* or Benzophenone-3 or Eusolex 4360 or Escalol 567 or "2-hydroxy-4-methoxy-benzophenone"	49 results
aclm contains padimate O or "2-ethylhexyl 4-dimethylaminobenzoate" or Escalol 507 or octyldimethyl PABA or OD-PABA or σ -PABA	12 results
aclm contains P-Aminobenzoic Acid* or 4-Aminobenzoic acid* or "para-aminobenzoic acid" or PABA	30 results

dimethico-diethylbenzmalonate* or polysilicone-15 or parsol slx	8 results
aclm contains Ensulizole* or Eusolex 232 or PBSA or Parsol HS or "Phenylbenzimidazole sulfonic acid" or C13H10N2O3S	6 results
aclm contains "2-Hydroxy-4-Methoxybenzophenone-5-sulfonic acid" or "3-benzoyl-4-hydroxy-6-methoxybenzenesulfonic acid" or Benzophenone-4 or Escalol 577 or Sulisobenzone* or benzophenone-5	42 results
aclm contains bisotrizole or "methylene bis-benzotriazolyl tetramethylbutylphenol"	1 result
aclm contains "Bis-ethylhexyloxyphenol methoxyphenol triazine" or Bemotrizinol or BEMT or anisotriazine	1 result
aclm contains Titanium dioxide* or titanium(IV) oxide* or titania or TiO2 or titanium white* or "Pigment White 6" or CI 77891	66 results
aclm contains trolamine salicylate* or triethanolamine salicylate*	10 results
aclm contains iscotrizinol or "diethylhexyl butamido triazone" or diethylhexylbutamidotriazone* or dbt or uvasorb heb	1 result
aclm contains "Diethylamino hydroxybenzoyl hexyl benzoate" or Uvinul A Plus or DHHB	1 result
Ethylhexyl Triazone* or Ethylhexyltriazone* or Uvinul T150	18 results
aclm contains zinc oxide* or zno	69 results

Categorization: Properties of Skin Care Compositions

1. Hydrating Properties

Hydrating Properties	
hydrat* w/3 propert*	27 results

2. Absorbable

Absorbable	
absorbab*	71 results

3. Elasticity

Elasticity	
Elastic*	552 results
flexibil* or flexibl* or elastic* or stretch*	1053 results

4. Anti inflammatory

Anti inflammatory	
anti w/3 inflam*	1016 results
non w/2 inflam*	103 results

5. Biodegradable

Biodegradable	
Biodegrade*	370 results

Categorization: Aging Skin Problems

Aging Skin Problems	
Blemish* or "dark spot"	129 results
Blotch*	112 results
laxit* or sag*	415 results
laxit* or sagging	175 results
rhytid* or wrinkle*	863 results
Erythema	438 results
"Solar elastosis"	13 results
(actinic or solar) w/3 elastosis	18 results
Keratose*	162 results
"skin pigmentation"	59 results
skin w/2 pigmentation	73 results

Summary

Patent analysis shows research around anti aging skin care compounds start to take shape as early as the 1950's but the last decade has certainly been the era when this space has taken off to levels far above any of the previous decades. The research and development around this field is clearly on the rise with no immediate signs of reducing as the markets for anti aging skin care products also grow very rapidly. Several of the large cosmetics, health and personal care global businesses have IP portfolios within this market with P&G and L'Oreal topping the key assignees of patents.

In terms of focus areas, the 4 largest assignees of patents appear to cover all the problem areas related to aging skin while the remaining assignees have clearly defined problem areas within which they work to build their patents. Similarly we have seen the use of certain ingredients commonly used within compounds to tackle a specific problem while few ingredients are used exclusively for one aging related skin problem.

Overall, the research and development work related to finding solutions to aging skin appears to be a highly active and growing one that can only be expected to increase in the near future.

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