Bibliometric Analysis

for the U.S. Environmental Protection Agency/Office of Research and Development's Safe Pesticides/Safe Products Research Program

This is a bibliometric analysis of the papers prepared by intramural and extramural researchers of the U.S. Environmental Protection Agency's (EPA) Safe Pesticides/Safe Products Research Program. For this analysis, 357 papers were reviewed, and they were published from 1996 to 2006. These publications were cited 3,534 times in the journals covered by Thomson's *Web of Science*[1] and Scopus[2]. Of these 357 publications, 288 (81%) have been cited at least once in a journal.

Searches of Thomson Scientific's *Web of Science* and Scopus were conducted to obtain times cited data for the safe pesticides/safe products journal publications. The analysis was completed using Thomson's *Essential Science Indicators (ESI)* and *Journal Citation Reports (JCR)* as benchmarks. *ESI* provides access to a unique and comprehensive compilation of essential science performance statistics and science trends data derived from Thomson's databases. For influence and impact measures, *ESI* employs both total citation counts by field and cites per paper scores. The former reveals gross influence while the latter shows weighted influence, also called impact. *JCR* is a recognized authority for evaluating journals. It presents quantifiable statistical data that provide a systematic, objective way to evaluate the world's leading journals and their impact and influence in the global research community. The two key measures used in this analysis to assess the journals in which the EPA safe pesticides/safe products papers are published are the Impact Factor and Immediacy Index. The Impact Factor is a measure of the frequency with which the "average article" in a journal has been cited in a particular year. The Impact Factor helps evaluate a journal's relative importance, especially when compared to other journals in the same field. The Immediacy Index is a measure of how quickly the "average article" in a journal is cited. This index indicates how often articles published in a journal are cited within the same year and it is useful in comparing how quickly journals are cited.

The report includes a summary of the results of the analysis, an analysis of the 357 safe pesticides/safe products papers analyzed by *ESI* field (e.g., clinical medicine, environment/ecology, plant & animal science), an analysis of the journals in which the safe pesticides/safe products papers were published, a table of the highly cited researchers in the Safe Pesticides/Safe Products Research Program, and a list of the patents and patent applications resulting from the program.

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[1] Thomson Scientific's *Web of Science* provides access to current and retrospective multidisciplinary information from approximately 8,830 of the most prestigious, high impact research journals in the world. *Web of Science* also provides cited reference searching.

[2] Scopus is a large abstract and citation database of research literature and quality Web sources designed to support the literature research process. Scopus offers access to 15,000 titles from 4,000 different publishers, more than 12,850 academic journals (including coverage of 535 Open Access journals, 750 conference proceedings, and 600 trade publications), 27 million abstracts, 245 million references, 200 million scientific Web pages, and 13 million patent records.

SUMMARY OF RESULTS

1. Nearly one-quarter of the safe pesticides/safe products publications are highly cited papers. A review of the citations indicates that 82 (23%) of the safe pesticides/safe products papers qualify as highly cited when using the *ESI* criteria for the top 10% of highly cited publications. This is 2.3 times the number expected. Ten (2.8%) of the safe pesticides/safe products papers qualify as highly cited when using the *ESI* criteria for the top 1%, which is 2.8 times the number expected. One (0.28%) of these papers qualifies as very highly cited when using the criteria for the top 0.1%, which is 2.8 times the number anticipated. As expected, no papers actually meet the 0.01% threshold for the most highly cited papers (the expected number for this size program is 0.04 papers in the most highly cited category).

2. The safe pesticides/safe products papers are more highly cited than the average paper. Using the *ESI* average citation rates for papers published by field as the benchmark, in 12 of the 16 fields in which the EPA safe pesticides/safe products papers were published, the ratio of actual to expected cites is greater than 1, indicating that the safe pesticides/safe products papers are more highly cited than the average papers in those fields. For all 16 fields combined, the ratio of total number of cites to the total number of expected cites (3,534 to 2,583.17) is 1.37, indicating that the safe pesticides/safe products papers are more highly cited than the average paper.

3. More than one-third of the safe pesticides/safe products papers are published in high impact journals. One hundred twenty-five (125) of the 357 papers were published in the top 10% of journals ranked by *JCR* Impact Factor, representing 35% of EPA's safe pesticides/safe products papers. This number is 3.5 times higher than expected. One hundred eleven (111) of the 357 papers appear in the top 10% of journals ranked by *JCR* Immediacy Index, representing 31% of EPA's safe pesticides/safe products papers. This number is 3.1 times higher than expected.

4. Eight of the safe pesticides/safe products papers qualify as hot papers. Using the hot paper thresholds established by *ESI* as a benchmark, 8 hot papers, representing 2.2% of the safe pesticides/safe products papers, were identified in the analysis. Hot papers are papers that were highly cited shortly after they were published. The number of safe pesticides/safe products hot papers is 22 times higher than expected.

5. The authors of the safe pesticides/safe products papers cite themselves much less than the average author. One hundred ninety-four (194) of the 3,534 cites are author self-cites. This 5.5% author self-citation rate is well below the accepted range of 10-30% author self-citation rate.

6. Eighteen of the authors are included in Thomson's *ISIHighlyCited.com*, a database of the world's most influential researchers who have made key contributions to science and technology from 1981 to 1999.

Highly Cited Safe Pesticides/Safe Products Publications

The 357 safe pesticides/safe products papers reviewed for this analysis covered 16 of the 22 *ESI* fields. The distribution of the papers among these 16 fields and the number of citations by field are presented in Table 1.

Table 1. Safe Pesticides/Safe Products Papers by *ESI* Fields

No. of Citations	*ESI* Field	No. of EPA SP/SP Papers	Average Cites/Paper
1,462	Environment/Ecology	139	10.52
563	Pharmacology & Toxicology	72	7.82
325	Plant & Animal Science	35	9.28
219	Chemistry	20	10.95
190	Microbiology	7	27.14
182	Molecular Biology & Genetics	19	9.58
180	Biology & Biochemistry	16	11.25
124	Neuroscience & Behavior	14	8.86
93	Multidisciplinary	4	23.25
74	Clinical Medicine	12	6.17
56	Engineering	10	5.60
26	Agricultural Sciences	4	6.50
21	Immunology	1	21.00
10	Computer Science	2	5.00
8	Economics & Business	1	8.00
1	Geosciences	1	1.00
Total = 3,534		**Total = 357**	**9.90**

There are 82 (23.0% of the papers analyzed) highly cited EPA safe pesticides/safe products papers in 14 of the 16 fields—Environment/Ecology, Plant & Animal Science, Pharmacology & Toxicology, Microbiology, Chemistry, Multidisciplinary, Biology & Biochemistry, Neuroscience & Behavior, Clinical Medicine, Engineering, Molecular Biology & Genetics, Economics & Business, Agricultural Sciences, and Computer Science—when using the *ESI* criteria for the **top 10% of papers**. Table 2 shows the number of EPA papers in those 14 fields that meet the **top 10% threshold in *ESI***.

Ten (2.8%) of the papers analyzed qualify as highly cited when using the *ESI* criteria for the **top 1% of papers**. These papers cover four fields—Environment/Ecology, Pharmacology & Toxicology, Plant & Animal Science, and Engineering. Table 3 shows the 10 papers by field that meet the **top 1% threshold in *ESI***. The citations for these 10 papers are provided in Tables 4 through 7.

There was 1 (0.28%) very highly cited safe pesticides/safe products paper in the field of Environment/Ecology. This paper, which met the **top 0.1% threshold in *ESI*,** is listed in Table 8. None of the safe pesticides/safe products papers actually met the **top 0.01% threshold in *ESI*,** which is to be expected.

Table 2. Number of Highly Cited Safe Pesticides/Safe Products Papers by Field (top 10%)

Citations	*ESI* Field	No. of Papers	Average Cites/Paper	% of EPA Papers in Field
810	Environment/Ecology	35	23.14	25.18%
261	Plant & Animal Science	16	16.31	45.71%
160	Pharmacology & Toxicology	14	11.43	19.44%
124	Microbiology	2	62.00	28.57%
118	Chemistry	2	59.00	10.00%
93	Multidisciplinary	2	46.50	50.00%
83	Biology & Biochemistry	2	41.50	12.50%
68	Neuroscience & Behavior	1	68.00	7.14%
42	Clinical Medicine	2	21.00	16.67%
34	Engineering	2	17.00	20.00%
27	Molecular Biology & Genetics	1	27.00	5.26%
8	Economics & Business	1	8.00	100.00%
6	Agricultural Sciences	1	6.00	25.00%
3	Computer Science	1	3.00	50.00%
Total = 1,837		**Total = 82**		**22.97%**

Table 3. Number of Highly Cited Safe Pesticides/Safe Products Papers by Field (top 1%)

Citations	*ESI* Field	No. of Papers	Average Cites/Paper	% of EPA Papers in Field
121	Environment/Ecology	4	30.25	2.88%
12	Pharmacology & Toxicology	4	3.00	5.56%
9	Plant & Animal Science	1	9.00	2.86%
3	Engineering	1	3.00	10.00%
Total = 145		**Total = 10**		**2.84%**

Table 4. Highly Cited Safe Pesticides/Safe Products Papers in the Field of Environment/Ecology (top 1%)

No. of Cites	First Author	Paper
89	Ankley GT	Description and evaluation of a short-term reproduction test with the fathead minnow (*Pimephales promelas*). *Environmental Toxicology and Chemistry* 2001;20(6):1276-1290.
10	Tietge JE	Metamorphic inhibition of *Xenopus laevis* by sodium perchlorate: Effects on development and thyroid histology. *Environmental Toxicology and Chemistry* 2005;24(4):926-933.
16	Shafer TJ	Developmental neurotoxicity of pyrethroid insecticides: critical review and future research needs. *Environmental Health Perspectives* 2005;113(2): 123-136.
6	Garrison AW	Probing the enantioselectivity of chiral pesticides. *Environmental Science & Technology* 2006;40(1):16-23.

Table 5. Highly Cited Safe Pesticides/Safe Products Papers in the Field of Pharmacology & Toxicology (top 1%)

No. of Cites	First Author	Paper
3	Barton HA	The acquisition and application of absorption, distribution, metabolism and excretion (ADME) data in agricultural chemical safety assessments. *Critical Reviews in Toxicology* 2006;36(1):9-35.
3	Carmichael NG	Agricultural chemical safety assessment: a multisector approach to the modernization of human safety requirements. *Critical Reviews in Toxicology* 2006;36(1):1-7.

No. of Cites	First Author	Paper
3	Cooper RL	A tiered approach to life stages testing for agricultural chemical safety assessment. *Critical Reviews in Toxicology* 2006;36(1):69-98.
3	Doe JE	A tiered approach to systemic toxicity testing for agricultural chemical safety assessment. *Critical Reviews in Toxicology* 2006;36(1):37-68.

Table 6. Highly Cited Safe Pesticides/Safe Products Papers in the Field of Plant & Animal Science (top 1%)

No. of Cites	First Author	Paper
9	Greytak SR	Isolation and characterization of two cytochrome P450 aromatase forms in killifish (*Fundulus heteroclitus*): differential expression in fish from polluted and unpolluted environments. *Aquatic Toxicology* 2005;71(4): 371-389.

Table 7. Highly Cited Safe Pesticides/Safe Products Paper in the Field of Engineering (top 1%)

No. of Cites	First Author	Paper
3	Ankley GT	The fathead minnow in aquatic toxicology: past, present and future. *Aquatic Toxicology* 2006;78(1):91-102.

Table 8. Very Highly Cited Safe Pesticides/Safe Products Papers (top 0.1%)

ESI Field	No. of Cites	First Author	Paper
Environment/ Ecology	6	Garrison AW	Probing the enantioselectivity of chiral pesticides. *Environmental Science & Technology* 2006;40(1):16-23.

Ratio of Actual Cites to Expected Citation Rates

The expected citation rate is the average number of cites that a paper published in the same journal in the same year and of the same document type (article, review, editorial, etc.) has received from the year of publication to the present. Using the *ESI* average citation rates for papers published by field as the benchmark, in 12 of the 16 fields in which the EPA safe pesticides/safe products papers were published, the ratio of actual to expected cites is greater than 1, indicating that the safe pesticides/safe products papers are more highly cited than the average papers in those fields (see Table 9). For all fields combined, the ratio of total number of cites to total number of expected cites (3,534 to 2,583.17)

is 1.37, indicating that the safe pesticides/safe products papers are more highly cited that the average paper.

Table 9. Ratio of Actual Cites to Expected Cites for Safe Pesticides/Safe Products Papers by Field

***ESI* Field**	**Total Cites**	**Expected Cite Rate**	**Ratio**
Agricultural Sciences	26	15.09	1.72
Biology & Biochemistry	180	151.87	1.18
Chemistry	219	131.53	1.66
Clinical Medicine	74	41.14	1.80
Computer Science	10	4.33	2.31
Economics & Business	8	1.28	6.25
Engineering	56	27.97	2.00
Environment/Ecology	1,462	854.74	1.71
Geosciences	1	4.70	0.21
Immunology	21	22.11	0.95
Microbiology	190	105.59	1.80
Molecular Biology & Genetics	182	373.19	0.49
Multidisciplinary	93	11.11	8.37
Neuroscience & Behavior	124	135.63	0.91
Pharmacology & Toxicology	563	547.25	1.03
Plant & Animal Science	325	155.64	2.09
All Fields Combined	**3,534**	**2,583.17**	**1.37**

***JCR* Benchmarks**

Impact Factor. The *JCR* Impact Factor is a well known metric in citation analysis. It is a measure of the frequency with which the "average article" in a journal has been cited in a particular year. The Impact Factor helps evaluate a journal's relative importance, especially when compared to others in the same field. The Impact Factor is calculated by dividing the number of citations in the current year to articles published in the 2 previous years by the total number of articles published in the 2 previous years.

Table 10 indicates the number of safe pesticides/safe products papers published in the top 10% of journals, based on the *JCR* Impact Factor. One hundred twenty-five (125) of 357 papers were published in the top 10% of journals, representing 35% of EPA's safe pesticides/safe products papers.

This indicates that more than one-third of the safe pesticides/safe products papers are published in the highest quality journals as determined by the *JCR* impact factor, which is 3.5 times the expected percentage.

Table 10. Safe Pesticides/Safe Products Papers in Top 10% of Journals by *JCR* Impact Factor

EPA SP/SP Papers in that Journal	Journal	Impact Factor (IF)	*JCR* IF Rank
1	Science	30.927	6
1	Nature	29.273	11
1	JAMA-Journal of the American Medical Association	23.332	19
2	Proceedings of the National Academy of Sciences of the United States of America	10.231	89
1	Molecular & Cellular Proteomics	9.876	99
1	Human Mutation	7.923	145
1	Progress in Nuclear Magnetic Resonance Spectroscopy	6.462	201
1	Journal of Immunology	6.387	205
1	Molecular Biology and Evolution	6.233	211
1	Bioinformatics	6.019	224
1	Analytical Chemistry	5.635	242
24	Environmental Health Perspectives	5.342	257
3	Mutation Research-Reviews in Mutation Research	5.333	259
1	Endocrinology	5.313	261
2	American Journal of Epidemiology	5.068	290
4	Critical Reviews in Toxicology	5.000	296
1	Physiological Genomics	4.636	346
1	Journal of Applied Ecology	4.594	351
1	Ecology	4.506	366
1	Cancer Epidemiology Biomarkers & Prevention	4.460	378
1	Biotechnology Advances	4.455	381
1	Biochimica et Biophysica Acta-Bioenergetics	4.302	413
3	Molecular Ecology	4.301	414
1	New Phytologist	4.285	417
1	Conservation Biology	4.110	455

EPA SP/SP Papers in that Journal	Journal	Impact Factor (IF)	*JCR* IF Rank
1	Global Change Biology	4.075	464
19	Environmental Science & Technology	4.054	467
1	Drug Metabolism and Disposition	4.015	481
3	Applied and Environmental Microbiology	3.818	544
2	Ecological Applications	3.804	548
1	Mutation Research-Fundamental and Molecular Mechanisms of Mutagenesis	3.340	696
2	Chemical Research in Toxicology	3.339	699
1	Green Chemistry	3.255	722
1	Lung Cancer	3.172	753
4	Toxicology and Applied Pharmacology	3.148	764
2	Journal of Chromatography A	3.096	778
29	Toxicological Sciences	3.088	780
1	Rapid Communications in Mass Spectrometry	3.087	781
1	Water Research	3.019	809
Total = 125			

Immediacy Index. The *JCR* Immediacy Index is a measure of how quickly the *average article* in a journal is cited. It indicates how often articles published in a journal are cited within the year they are published. The Immediacy Index is calculated by dividing the number of citations to articles published in a given year by the number of articles published in that year.

Table 11 indicates the number of safe pesticides/safe products papers published in the top 10% of journals, based on the *JCR* Immediacy Index. One hundred eleven (111) of the 357 papers appear in the top 10% of journals, representing 31% of the safe pesticides/safe products papers. This indicates that nearly one-third of the safe pesticides/safe products papers are published in the highest quality journals as determined by the *JCR* immediacy index, which is 3.1 times higher than the expected percentage.

Table 11. Safe Pesticides/Safe Products Papers in Top 10% of Journals by *JCR* Immediacy Index

EPA SP/SP Papers in that Journal	Journal	Immediacy Index (II)	*JCR* II Rank
1	Science	6.398	6
1	Nature	5.825	11
1	JAMA-Journal of the American Medical Association	5.082	17
1	Molecular Biology and Evolution	1.832	109
2	Proceedings of the National Academy of Sciences of the United States of America	1.746	121
1	ILAR Journal	1.595	137
1	Human Mutation	1.395	172
1	Molecular & Cellular Proteomics	1.377	177
2	International Journal of Toxicology	1.309	193
1	Endocrinology	1.260	210
3	Mutation Research-Reviews in Mutation Research	1.143	252
1	New Phytologist	1.125	258
1	Progress in Nuclear Magnetic Resonance Spectroscopy	1.111	266
2	American Journal of Epidemiology	1.099	271
1	Physiological Genomics	1.058	287
24	Environmental Health Perspectives	0.955	346
1	Bioinformatics	0.944	354
1	Journal of Immunology	0.906	381
1	Biochimica et Biophysica Acta-Bioenergetics	0.895	390
3	Ecotoxicology	0.846	434
1	Lung Cancer	0.735	532
1	Drug Metabolism and Disposition	0.733	534
3	Science of the Total Environment	0.731	538
2	Chemical Research in Toxicology	0.729	542
1	Journal of Applied Ecology	0.726	551
1	Analytical Chemistry	0.713	569
1	Journal of Experimental Biology	0.684	601

EPA SP/SP Papers in that Journal	Journal	Immediacy Index (II)	*JCR* II Rank
1	Mutation Research-Fundamental and Molecular Mechanisms of Mutagenesis	0.682	604
1	Green Chemistry	0.631	695
8	Human and Ecological Risk Assessment	0.628	699
1	Ecology	0.621	710
29	Toxicological Sciences	0.617	716
3	Molecular Ecology	0.598	742
1	Biological Conservation	0.589	762
1	Cancer Epidemiology Biomarkers & Prevention	0.579	785
1	Bioorganic & Medicinal Chemistry	0.577	791
3	Journal of Exposure Analysis and Environmental Epidemiology	0.571	801
2	Ecological Applications	0.543	870
Total = 111			

Hot Papers

ESI establishes citation thresholds for hot papers, which are selected from the highly cited papers in different fields, but the time frame for citing and cited papers is much shorter—papers must be cited within 2 years of publication and the citations must occur in a 2-month time period. Papers are assigned to 2-month periods and thresholds are set for each period and field to select 0.1% of papers. There were no hot papers identified for the current 2-month period (i.e., July-August 2006), but there were a number of hot papers identified from previous periods.

Using the hot paper thresholds established by *ESI* as a benchmark, 8 hot papers, representing 2.2% of the safe pesticides/safe products papers, were identified in two fields—Environment/Ecology and Pharmacology & Toxicology. The hot papers are listed in Table 12.

Table 12. Hot Papers Identified Using *ESI* Thresholds

Field	*ESI* Hot Papers Threshold	No. of Cites in 2-Month Period	Paper
Environment/ Ecology	3	4 cites in April-May 2004	Schumaker NH, et al. Projecting wildlife responses to alternative future landscapes in Oregon's Willamette Basin. *Ecological Applications* 2004;14(2):381-400.

Field	*ESI* Hot Papers Threshold	No. of Cites in 2-Month Period	Paper
Environment/ Ecology	3	3 cites in April-May 2004	Baker JP, et al. Alternative futures for the Willamette River Basin, Oregon. *Ecological Applications* 2004;14(2):313-324.
	3	3 cites in November-December 2003	Schreinemachers DM. Birth malformations and other adverse perinatal outcomes in four US wheat-producing states. *Environmental Health Perspectives* 2003;111(9): 1259-1264.
	3	3 cites in March-April 2001	Cory-Slechta DA, et al. Methods to identify and characterize developmental neurotoxicity for human health risk assessment. I: Behavioral effects. *Environmental Health Perspectives* 2001;109(Suppl 1):79-91.
Pharmacology & Toxicology	2	3 cites in January-February 2006	Carmichael NG, et al. Agricultural chemical safety assessment: A multisector approach to the modernization of human safety requirements. *Critical Reviews in Toxicology* 2006;36(1):1-7.
	2	3 cites in January-February 2006	Cooper RL, et al. A tiered approach to life stages testing for agricultural chemical safety assessment. *Critical Reviews in Toxicology* 2006;36(1):69-98.
	2	3 cites in January-February 2006	Doe JE, et al. A tiered approach to systemic toxicity testing for agricultural chemical safety assessment. *Critical Reviews in Toxicology* 2006;36(1):37-68.
	2	2 cites in January-February 2006	Barton HA, et al. The acquisition and application of absorption, distribution, metabolism and excretion (ADME) data in agricultural chemical safety assessments. *Critical Reviews in Toxicology* 2006;36(1):9-35.

Author Self-Citation

Self-citations are journal article references to articles from that same author (i.e., the first author). Because higher author self-citation rates can inflate the number of citations, the author self-citation rate was calculated for the safe pesticides/safe products papers. Of the 3,534 total cites, 194 are author self-cites—a 5.5% author self-citation rate. Garfield and Sher[3] found that authors working in research-based disciplines tend to cite themselves on the average of 20% of the time. MacRoberts and MacRoberts[4] claim that approximately 10% to 30% of all the citations listed fall into the category of

[3] Garfield E, Sher IH. New factors in the evaluation of scientific literature through citation indexing. *American Documentation* 1963;18(July):195-210.

[4] MacRoberts MH, MacRoberts BR. Problems of citation analysis: a critical review. *Journal of the American Society of Information Science* 1989;40(5):342-349.

author self-citation. Kovacic and Misak[5] recently reported a 20% author self-citation rate for medical literature. Therefore, the 5.5% self-cite rate for the safe pesticides/safe products papers is well below the range for author self-citation.

Highly Cited Researchers

A search of Thomson's *ISIHighlyCited.com* revealed that 18 (1.7%) of the 1,062 authors of the safe pesticides/safe products papers are highly cited researchers. *ISIHighlyCited.com* is a database of the world's most influential researchers who have made key contributions to science and technology during the period from 1981 to 1999. The highly cited researchers identified during this analysis of the safe pesticides/safe products publications are presented in Table 13.

Table 13. Highly Cited Researchers Authoring Safe Pesticides/Safe Products Publications

Highly Cited Researcher	Affiliation	*ESI* Field
Ankley, Gerald T	U.S. EPA	Environment/Ecology
Bollag, Jean-Marc	Pennsylvania State University	Environment/Ecology
Boobis, Alan R.	Imperial College London	Pharmacology
Fuchs, Elaine	The Rockefeller University	Molecular Biology & Genetics
Giesy, John P.	University of Saskatchewan	Environment/Ecology
Gray, Jr., Leon Earl	U.S. EPA	Pharmacology
Kadlubar, Fred F.	U.S. Food and Drug Administration	Pharmacology
Kimber, Ian	Syngenta Central Toxicology Laboratory	Pharmacology
Melillo, Jerry M.	Marine Biological Laboratory, Woods Hole	Environment/Ecology
Muir, Derek C.G.	Environment Canada	Environment/Ecology Engineering
Needham, Larry L.	Centers for Disease Control and Prevention	Environment/Ecology
Roelofs, Wendell L.	Cornell University	Environment/Ecology
Rubin, Gerald M.	University of California-Berkeley	Molecular Biology & Genetics
Smith, Gary C.	Colorado State University	Agricultural Sciences
Springer, Timothy A.	Wildlife International, Ltd.	Molecular Biology & Genetics Immunology Clinical Medicine
Suidan, Makram T.	University of Cincinnati	Environment/Ecology

[5] Kavaci N, Misak A. Author self-citation in medical literature. *Canadian Medical Association Journal* 2004;170(13):1929-1930.

Highly Cited Researcher	Affiliation	*ESI* Field
Sumpter, John P.	Brunel University	Environment/Ecology
Yang, Chung S.	Rutgers, The State University of New Jersey	Pharmacology
Total = 18		

Patents

There were no patents or patent applications associated with this research program.

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