



A Review on Study of Toxicity using IOT

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Abstract

Platinum is one of the most used metals for implants. The review analysis had been conducted to understand the active authors, organizations, journals, and countries involved in the research domain of “toxicity of Platinum-implants”. All published articles related to “toxicity of Platinum-implants” from “Scopus”, were analyzed using the Meta Analysis to develop analysis tables and visualization maps. This article had set the objective to consolidate the scientific literature regarding “toxicity Platinum-implants” and also to find out the trends related to the same. The leading Journals were the Acta Neuropathologica and Journal of Biomedical Materials Research: Applied Biomaterials. The most active country was the United States of America. The leading organizations engaged in the research regarding the toxicity of Platinum-implants were The French National Centre for Scientific Research of France and Colorado State University of United States of America. The most active authors who had made valuable contributions related to the toxicity of Platinum-implants were Powers B.E., Straw R.C. Withrow S.J Stensaas L.J., and Stensaas S.S.

Keywords: Toxicity, Platinum-implants, Material engineering, Review analysis, Meta Analysis,

1. Introduction

An engineered medical device to replace a missing or damaged biological structure is known as an implant. Different types of metals and materials are used to create implants. Platinum had been used for diversified purposes.

Platinum metal is being widely used in breast implants, especially as catalysts in Silicon-based breast implants (Maharaj, 2008). The health issues associated with the usage of Platinum among women using Silicone breast implants had been highlighted (Maharaj, 2007)(Maharaj, 2004). There are concerns over allergic reaction of platinum in breast implants and the high metal content in body fluids, tissues, and explants (Lykissa and Maharaj, 2006b)(Lykissa and Maharaj, 2006a). There are also concerns associated with platinum implants and urinary platinum (Nuttall, Gordon and Ash, 1994). However no published records are highlighting the allergic reactions of platinum among women with breast implants (Arepalli, Bezabeh and Brown, 2002); the comments regarding high platinum concentration are not backed by experimental studies(Lane, 2006)(Brook, 2006)(Wixtrom, 2007). Platinum is also used for chemotherapy (Koumantakis *et al.*, 1998).

Material engineering and surface engineering can play a significant role in improving the performance and life of Platinum–implants along with measures for reducing toxicity and



hypersensitivity of the metal implants. Future research can also be on surface coatings by using metal implants using Platinum. Similarly, there is ample scope for research in corrosion, allergies, hypersensitivity, toxicity, and other health issues of platinum implants. This review analysis will be a useful platform for future researchers by realizing the top researchers, organizations, and countries involved in research regarding Platinum-implants.

This article is arranged into four sections. The first section is the introduction, followed by the discussion of the methodology by which the research was conducted. The third section deals with results and discussion. The fourth section deals with the conclusion. The following research objectives and research questions were framed for conducting the review analysis systematically.

1.1 Research Objectives

- a) To consolidate the literature regarding the toxicity of Platinum-implants
- b) To find out the trends related to research in toxicity of Platinum-implants

1.2 Research Questions

- a) Who are the active researchers working on the toxicity of Platinum-implants?
- b) Which are the main organizations and countries working on the toxicity of Platinum-based implants?
- c) Which are the main journals on the toxicity of Platinum-implants?

2. Research Methodology

Scopus files had been used for this article. For the article selection, the Boolean used was TITLE-ABS-KEY(Toxicity Platinum-implant). All the tables in this paper were created by using Microsoft Excel and Meta Analysis. Grammarly was used for spelling and grammar checks. Mendeley was used for article review and citation. This paper had been inspired by review analysis in its presentation style, analysis, and methodology from the works.

3. Results and discussion

3.1 Results

This first round of search produced an outcome of 35 documents, all 35 documents were in English. The classification of document categories is shown in Table 1. For improving the quality of the analysis, we had selected only the peer-reviewed articles and all other documents had not been considered. Thus after using filters “Article” and “English” the second round search produced an outcome of 29 English articles (both open access and others) and had been used to conduct review analysis and visualization using Meta Analysis. The English research articles in this domain since



1975 had been shown in Table1. Co-authorship analysis of top authors had been shown in Table1. For a better presentation of the analysis, the parameters used were the minimum number of documents of an author as two and the minimum number of citations of authors as one. This combination plotted the map of five authors, in two clusters. The overlay visualization map of co-authorship analysis plotted in Table1, points out the major researchers with their strong co-authorship linkages and clusters involved. The citation analysis of top authors had been shown in table 1, along with co-authorship links. For the citation analysis, the parameters used were the minimum number of documents of an author as one and the minimum citations of an author as one.

Table 1: Highlights of most active authors

Description	Authors	Documents	Citations	Average citations per documents	Link strength
Authors with the highest publication and links	Powers B.E.	2	68	34	16
	Straw R.C.	2	68	34	16
	Withrow S.J.	2	68	34	16
Authors with the highest citations	Stensaas L.J.	1	144	144	1
	Stensaas S.S.	1	144	144	1

In Co-occurrence analysis, we had used all keyword analyses, by keeping the minimum number of occurrences of a keyword as 6. This combination plotted the map of 22 thresholds, in three clusters. The overlay visualization of co-occurrence analysis of keywords has been shown in Table2. The leading organizations engaged in research on “toxicity of Platinum-implants” had been found out by the volume of publications and citation analysis, the parameters used are the minimum number of documents of an organization as one and the minimum number of citations of organizations as one. The leading organizations in the research regarding “toxicity of Platinum-implants”, with the highest number of publications and citations, were The French National Centre for Scientific Research of France and Colorado State University of United States of America (Refer to table 2).

Table 2: Highlights of the most active organization

Organizations	Country	Documents	Citations	Average Citations per document
The French National Centre for Scientific Research	France	2	56	28
Colorado State University	United States of America	2	68	34

Co-authorship analysis of the countries engaged in the research on “Toxicity of Platinum-implants” had been shown in Table3. The overlay visualization map of co-authorship analysis plotted in



Table 3, points out the main countries with their strong co-authorship linkages and clusters involved. The citation analysis of top countries had been shown in table 3, along with co-authorship links. For the citation analysis, the parameters used were the minimum number of documents of a country as one and the minimum citations of the country as one.

Table 3: Highlights of Active Countries

Description	Country	Documents	Citations	Link strength
The country with the highest publication, citations, and co-authorship links	United States of America	13	368	0

The most active country in this research domain was the United States of America, with the highest number of publications, links, and citations.

Link analysis and citation analysis were used to identify the most active journal in this research domain. We have taken the parameters of the minimum number of documents of a journal as one and the minimum number of citations of a journal as one for the link analysis and citation analysis. Highlights of the most active and relevant journals related to “Toxicity of Platinum-implants” are shown in table 4. Table 4 shows the journal activity of this research domain through parameters of publication volume, citations, and co-authorship linkages.

Table 4: Analysis of journal activity

Description	Journal details	Documents	Citations	Average citations per documents	Links
Journal with the highest publications	Journal of Biomedical Materials Research: Applied Biomaterials	2	26	13	1
Journal with highest citations	Acta Neuropathologica	1	144	144	0

From the above discussion regarding the review patterns in the research regarding the toxicity of Platinum-implants, this research had observed a gradual increase in research interest regarding the toxicity of Platinum-implants from the starting of the millennium, and the momentum is going on positively. This points out the relevance and potential of this research domain (Refer to Table 2). The most active authors in this research domain were Powers B.E., Straw R.C. Withrow S.J with the highest publication; and co-authorship.; and Stensaas L.J. and Stensaas S.S. with the



highest citations(Refer to table 1).The overlay analysis of top countries researching the toxicity of Platinum-implants indicates that the United States of America was the leading country relating to the highest number of publications, citations, and co-authorship links(Refer to Table 5). The top journals of this research domain were identified as the Acta Neuropathologica and Journal of Biomedical Materials Research: Applied Biomaterials. From these wide sources of information, researchers can focus on top journals where they can identify the most relevant and highly cited articles regarding the toxicity of platinum–implants.

4. Conclusion

Platinum-implants was an interesting research domain and the most active journals related to this research domain were the Acta Neuropathologica and Journal of Biomedical Materials Research: Applied Biomaterials. The most active country was the United States of America. The leading organizations engaged in the research regarding the toxicity of Platinum-implants were The French National Centre for Scientific Research of France and Colorado State University of United States of America. The most active authors who had made valuable contributions related to the toxicity of Platinum-implants were Powers B.E., Straw R.C.Withrow S.J Stensaas L.J., and Stensaas S.S. This research domain offers a new avenue for researchers and future research can be on innovations in the toxicity of Platinum-implants.

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