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Original Research Article

Role of nanoparticles in pancreatic drug delivery: Including a bibliography on Targeted drug delivery

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ABSTRACT

Background: The number of times a publication or an individual author has been discussed in the scientific community is a common metric for measuring their impact. The goal of the bibliometric study was to look at the maximum cited articles in the area of "pancreatic cancer, nanoparticles, targeted ligand, binding, drug delivery and treatment.".
Materials and Methods: The database SCOPUS was used to conduct a computerised literature search. The top 100 articles with the most citations were chosen and studied further
Results: There were 298 citations in the most cited article, with an average of 62 citations per publication. These highly cited publications appeared in 33 journals, with the Journal of Controlled Release leading the pack (27 articles). The United States contributed 53 articles, which originated from 19 different countries. These 100 citations were provided by 85 institutions, with the "Department of Chemical and Biomolecular Engineering" leading the way (4).
Conclusions: The investigation of the top highly cited articles concedes for recognizing significant advances in pancreatic cancer targeted drug delivery study and gives a historical perspective on the advancement of this speciality of cancer research.

1. Background

Pancreatic cancer is a deadly disease because of its poor prognosis. The chances of the development of this cancer are increasing day by day. Through the physician, scientists got knowledge of advancements through the papers. As the growth of the disease increased, the publication rate also increased. In recent years, there is a huge difference inthe article published count than the previous ones. We received 298 articles by which 15 articles are cited more than 100 times. The main purpose of our analysis is to identify the top citations in the area of pancreatic cancer nanoparticle targeted drug delivery research.[1]

2. Materials and Methods

The information was collected using the SCOPUS database, which was launched by Elsevier and generated 298 results. Table 3 lists the top 100 most cited papers in order of citation count. The article with the most citations received 298 while the item with the fewest received only 80. Over 100 citations were found in fourteen papers. The citations of a work from

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before 2006 that had been cited for 10 years with an average count for each paper was 62.[2]

Table 1: The top 100 publications referenced in pancreatic cancer nanoparticles targeted drug - delivery research

Year	Citations of 298 Documents	Number of Papers
<2006	0	0
2006	1	1
2007	8	0
2008	12	4
2009	38	3
2010	76	2
2011	113	7
2012	174	12
2013	249	10
2014	303	19
2015	404	27
2016	560	26
2017	761	36
2018	922	31
2019	1250	39
2020	1736	39
2021	1947	42
Total	8554	298

3. Results

The SCOPUS database, which was launched by Elsevier, was used to conduct the literature search, which yielded 298 results. Table 3 shows the top 100 most referenced papers ranked by the number of citations. The article with the most citations earned 298 citations, while the article with the least citations saved 80. A total of fourteen articles saved over 100 citations. Each paper received an average of 62 citations. We also looked at the citations of a publication published before 2006 that had been cited for the previous ten years. The results indicate there was no document published and cited before 2006. In the year 2006 number of papers cited: and number of Paper published was 1:1, 2007 (8:0),2008 (12:4),2009 (38:3),2010 (76:2), 2011 (113:7), 2012 (174:12), 2013 (249:10), 2014 (303:19), 2015 (404:27), 2016 (560:26), 2017 (761:36), 2018 (922:31), 2019 (1250:39), 2020 (1736:39), and 2021(1947:42) respectively (Table 2).

The top-cited papers were published in 33 high-impact journals (Table 4), led by the Journal of Controlled Release (27 articles), Theranostics (12 articles), International Journal of Nanomedicine (10 articles), and Molecular Pharmaceutics (7 articles). The top 100 referenced papers came from 19 different nations, with the United States generating 53, China 16 and Germany 5 each (Table 5). These top 100 referenced publications were generated by 85 different universities. Eleven universities generated two or more of the top-cited publications (Table 5), with the Department of Chemical and Biomolecular Engineering leading the way with four articles, followed by the University of Texas with seven, and Harvard University with six (7 articles).

Table 2: The top 100 publications referenced in pancreatic cancer nanoparticles targeted drug delivery system research

Rank	Reference Number	Number of Citations	Rank	Reference Number	Number of Citations
1	3	280	**35**	4	70
2	5	230	**36**	6	68
3	7	209	**37**	8	68
4	9	157	**38**	10	66
5	11	151	**39**	12	64
6	13	148	**40**	14	64
7	15	145	**41**	16	64
8	17	142	**42**	18	63
9	19	140	**43**	20	63
10	21	125	**44**	22	62
11	23	124	**45**	24	61
12	25	112	**46**	26	60
13	27	111	**47**	28	58
14	29	109	**48**	30	57
15	31	100	**49**	32	57
16	33	97	**50**	34	54
17	35	96	**51**	36	54
18	37	95	**52**	38	54
19	39	94	**53**	40	54
20	41	93	**54**	42	53
21	43	88	**55**	44	52
22	45	86	**56**	46	52
23	47	86	**57**	48	51
24	49	84	**58**	50	50
25	51	80	**59**	52	49
26	53	80	**60**	54	49
27	55	76	**61**	56	48
28	57	75	**62**	58	48
29	59	74	**63**	60	48
30	61	73	**64**	62	48
31	63	72	**65**	64	47
32	65	71	**66**	66	47
33	67	71	**67**	68	47
34	69	70	**68**	70	47

4. Discussion

A number of aims are served by bibliometric examination of the most frequently cited publications and the journals in which they appear. It acknowledges and emphasises the value of our predecessors' and colleagues' work, highlights major milestones in pancreatic cancer research,

Table 3: Journals published the top 100 cited papers

Rank	Journals	Number of Article
1	Journal of Controlled Release	27
2	Theranostics	12
3	International Journal of Nanomedicine	10
4	Molecular Pharmaceutics	7
5	Pharmacological Reviews	6
6	Bioconjugate Chemistry	5
7	Advanced Healthcare Materials	3
7	Journal of Nanobiotechnology	3
8	Frontiers in Pharmacology	2
8	Molecular Therapy	2
9	ActaPharmaceuticaSinica B	1
10	Bioconjugate Chemistry	1
11	BioImpacts	1
12	Brazilian Journal of Pharmaceutical Sciences	1
13	ChemMedChem	1
14	Current Cancer Drug Targets	1
15	Current Drug Delivery	1
16	Current Drug Metabolism	1
17	Current Drug Targets	1
18	Current Medicinal Chemistry	1
19	Current Pharmaceutical Design	1
20	Drug Delivery	1
21	Drug Resistance updates	1
22	European Journal of Pharmaceutical Sciences	1
23	European Journal of Pharmaceutics and Biopharmaceutics	1
24	Journal of Clinical Pharmacology	1
25	Journal of Pharmaceutical Analysis	1
26	Journal of Pharmaceutical Sciences	1
27	Molecular Therapy - Nucleic Acids	1
28	Nanomedicine: Nanotechnology, Biology, and Medicine	1
29	Nucleic Acid Therapeutics	1
30	Pharmaceuticals	1
31	Pharmaceutics	1

Table 4: The top 100 referenced articles' countries of origin

Rank	Country	No. of Articles
1	United States	53
2	China	16
3	Germany	5
4	Iran	3
4	Japan	3
4	Poland	3
4	South Korea	3
5	India	2
5	Italy	2
6	Australia	1
6	South Korea	1
6	Estonia	1
6	France	1
6	Mexico	1
6	Netherlands	1
6	Portugal	1
6	Switzerland	1
6	Taiwan	1
6	United Kingdom	1

Table 5: Originating institutions with two or more highly referenced papers

Rank	Institution	Number of Articles
1	Yonsei University	4
2	Department of Biomedical Engineering	3
2	Department of Pharmaceutics	3
3	Cancer Biology Research Centre	2
3	Hampton University	2
3	University of Colorado School of Pharmacy	2
3	Department of Pharmacy	2
3	Department of Surgery	2
3	Department of Technology and Biotechnology of Drugs	2
3	Experimental Pathology and Therapeutics Group	2
3	Laboratory of Cytobiochemistry	2

and provides helpful historical data. Citation analysis of published research on pancreatic cancer targeted drug delivery gives quantifiable information on authors, nations, and publications, aiding in the finding of high-impact works and journals. This is the first time, as far as we know, that a citation-based analysis of the top citations in pancreatic cancer research has been conducted. Although examining all 100 top citations in detail would be difficult, the top ten may reveal some interesting data.

These 10 notable citations have highlighted significant accomplishments in pancreatic cancer nanoparticle targeted drug delivery research and a variety of related fields throughout the preceding 50 years. The primary paper, written by P. Yingchoncharoen, detailed a lipid medicine delivery system for cancer therapy that might be the most important advancement in medical treatment research in decades. Many articles are still mentioned on a daily basis, and their citation is fully reliable on the passage of time, since the date of publication is a significant determinant in citation. As a consequence, modern works get less citations than older ones. However, no document was cited before 2006, and the years 2015-2021 had the most citations, with 27 and 42, respectively. It illustrates that changes in the previous six years have been more significant. In addition, each year, a huge number of new journals are founded, the number of published papers rises dramatically, and more references are referenced. Three journals namely Theranostics, Journal of Controlled Release, and International Journal of Nanomedicine published 27,12, and 10 papers respectively. This data suggests that these three journals were the most influential in the field of pancreatic cancer nanoparticles targeted drug delivery research. Molecular Pharmaceutics, Pharmacological Reviews, and Bioconjugate Chemistry were also excellent medical journals, with 18 papers published each.

Because this is an important issue and a major concern on a worldwide scale, the publication rate on this topic is consistently increasing in these journals. Another conclusion is that the majority of the most highly reference papers come from the United States. The United States is home to the majority of productive institutions. Because of its big population and funding agencies, the United States has a significant effect on targeted medication delivery for the treatment of pancreatic cancer. The United States government assists and supports the scientific community in their research. There were at least 100 top-cited publications in this review, however, the majority of them were document-type articles. A few of them are not original study papers, but they are classified as opinion pieces for future cancer research, which is why they are often mentioned. The top articles found while searching for "pancreatic cancer nanoparticles tailored ligand binding medication delivery" were mostly about cancer. This article may open up new avenues for medical study and aid in the identification of gaps in pancreatic cancer therapy.

5. Conclusion

The articles that received the most citations contributed to advancements in the field of pancreatic cancer research. This analysis identifies important advancements in pancreatic cancer and targeted drug delivery research, as well as providing a historical perspective on the history of pancreatic cancer research.

6. Source of Funding

None.

7. Conflict of Interest

None.

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