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Commentary

Searching the online biomedical literature from developing countries

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This commentary highlights popular research literature databases and the use of the internet to obtain valuable research information. These literature retrieval methods include the use of the popular PubMed as well as internet search engines. Specific websites catering to developing countries' information and journals' websites are also highlighted.

Key words: Research information, retrieval methods, internet, search engines, PubMed.

INTRODUCTION

Researchers are continually informed by the published literature and can find out about reliable and up-to-date information available by searching bibliographic databases (Marlborough, 2001). The cost of journals is increasing by the year, and most universities and research institutes libraries have not subscribed to any journal for years. Medical literature searches have become more complex because of the increasing amount of published material and the multiple available databases indexing those publications. As this volume have increased, so has the need for efficient methods for searching the data (Kastin and Wexler, 1998). Access to published data is crucial, and the importance of a systematic approach to searching cannot be overemphasized (Smith et al., 2004).

Traditional universities and research institutes in developing countries have not adequately used the internet for literature search. Since most faculty lack computer training and exposure, online searches are sometimes very daunting tasks. Most developing countries are yet to fully embrace the open access model for research communication (Tonukari, 2004). As part of my molecular biology course, I introduce students on how to obtain literature from online scientific literature databases as well as using the popular search engines. This short commentary focuses on relevant scientific databases and how they can be searched. It also introduces the internet as a rich source of biomedical literature.

PUBMED

The widespread use of computers and the Internet have made searching the medical literature easier and more accessible to most physicians, researchers and academicians. The National Library of Medicine (NLM) maintains MEDLINE, a comprehensive, cross-referenced database of citations to the medical literature covering 1966 to the present. The NLM maintains several other literature databases that are also available online (Stewart and Moore, 1998). The main purpose of database indexing is to enhance the yield and accuracy of search results (Becker et al., 2003). Indexers carry out indexing manually in MEDLINE (Murphy et al., 2003).

Searching the MEDLINE literature database of greater than 14 million entries one-by-one makes establishing biological significance a daunting task. The basic PubMed search nwindow (www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed) for querying the MEDLINE literature database contains a typical single search box (Figure 1). PubMed does allows complex searches using advanced search options, but this requires some knowledge of string search assembly, and an understanding of the PubMed Entrez programming utilities. PubMed search provides links to the full-text of more than 4400 journals available on the web (Wheeler et al., 2005). Using the PubMed window, the investigator can type in key words which will retrieve

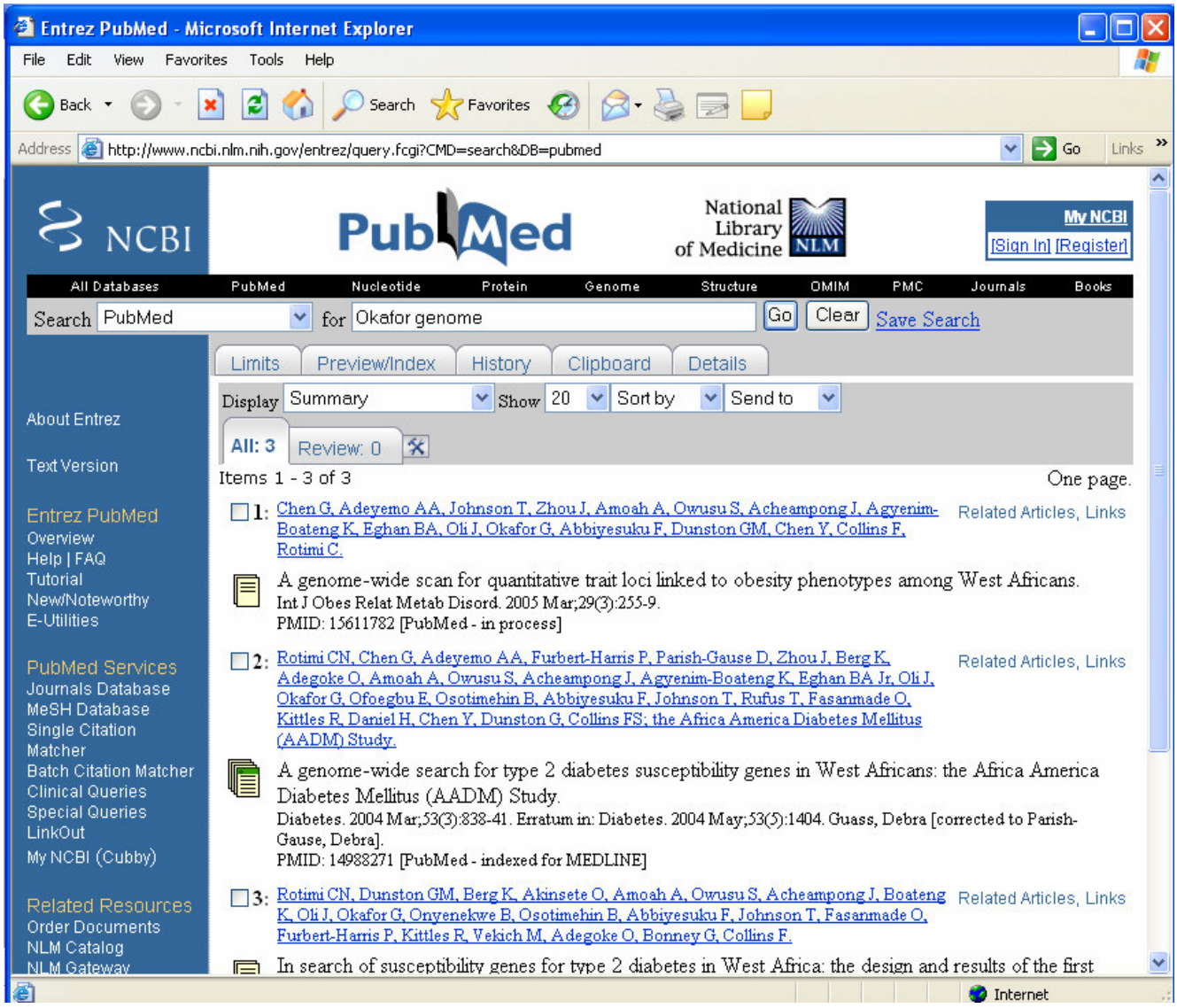

Figure 1. Search results displayed on the PubMed (National Center for Biotechnology Information) website (www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed).

abstracts containing those words. Only their titles are first displayed and have to be clicked to obtain the abstract. In some cases a link to the (free) full article is provided, which is always very desirable. But in most cases only the abstract can be obtained for free and only subscribers of that journal can access the full article. Sometimes, non-subscribers can also access such articles for a fee. Authors from most developing countries usually cannot afford such fees.

GOOGLE, YAHOO AND MSN

Researchers all over the world now rely to a large extent on the popular and free world wide web indexing search engines commonly accessed from Google (www.google.com), Yahoo (www.yahoo.com) and MSN (www.msn.com) websites. Knowing how to effectively and efficiently utilize such search engines is critical for effective and efficient literature retrieval (Day, 2001). The internet was originally conceived as a tool for researchers to communicate, and still serve this function very adequately in spite of the overwhelming commercial applications. These public search engines are now constantly used to retrieve research information and even obscure literatures. For investigators in developing countries (having no subscription to western countries' journals), internet searches are the most effective means to obtain full text literatures both from western and developing countries' journals. Although, several

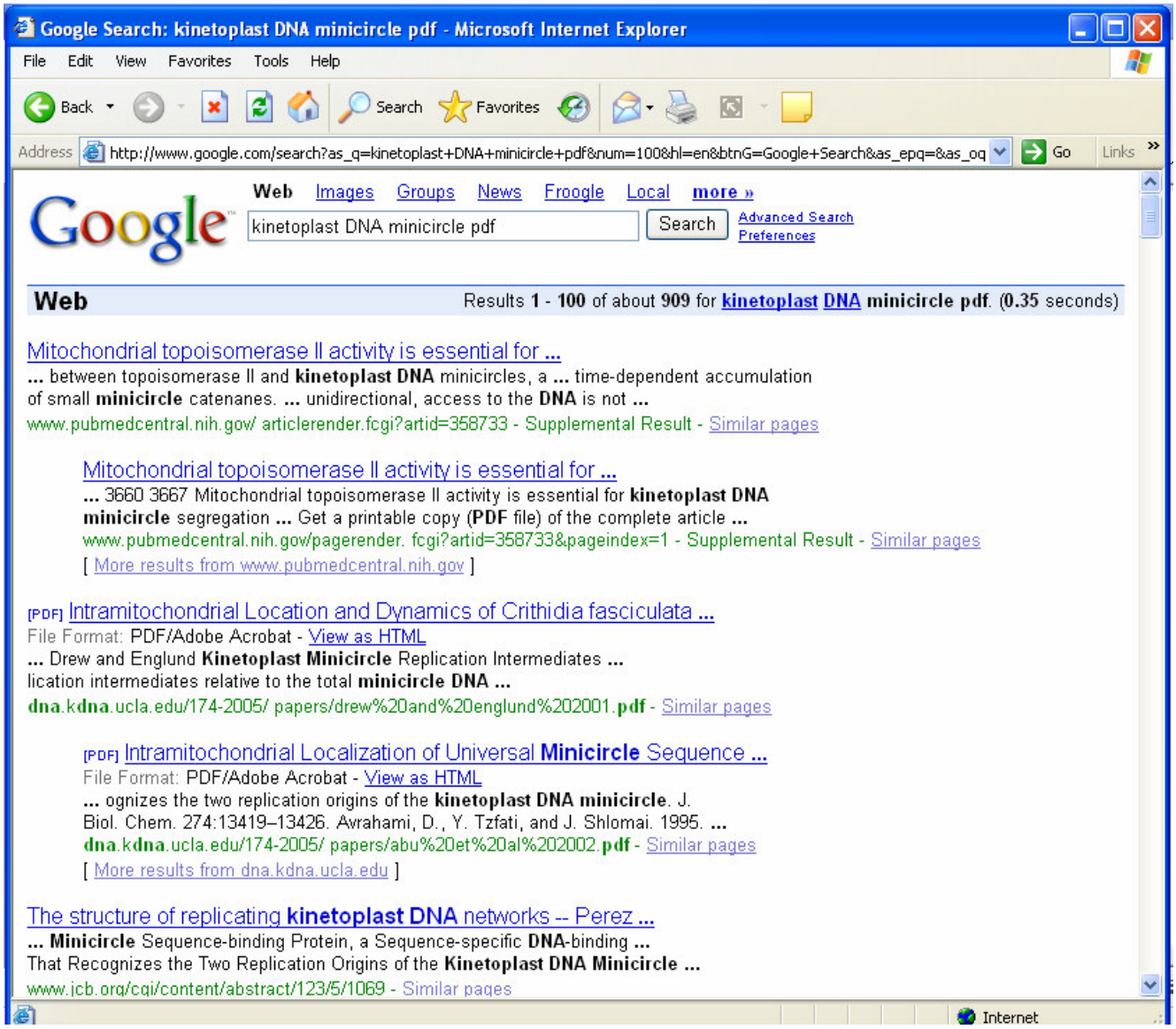

Figure 2. Search results (with pdf included as search word) displayed on the Google (www.google.com) website.

unimportant results show up in these searches, several strategies can be applied to maximize the retrieval of relevant literature:

1. Like in PubMed, authors' names can be used as key words, and this is very effective if there is more than one author for the article required. In the case of one author, it is often necessary to include another key word from the title.

2. Text key words only can also be used to retrieve literature from the internet. One strategy to obtain full text academic literature is to add "pdf" as one of the key words (Figure 2). Most pdf articles are often full text literatures and this technique will retrieve very relevant articles. Here, it is necessary that the computer being used for the search should also be able to display pdf articles. The pdf viewing software is freely available and can be downloaded from the Adobe website (www.adobe.com).

3. A similar strategy to the above is to include "review" as one of the keywords. This will yield several review articles and researchers can use the references in these articles to obtain other relevant literatures.

Other fine tuning of the key words using the public search engines can retrieve adequate information for research. Key word and text word searches can provide an overwhelming number of results. It is better to use the

Figure 3. The AJOL (African Journals Online) website (www.ajol.info) with the search box.

advanced search option which allows the investigator better control of the process. For example, in Google, the advanced search can display up to 100 results and it is possible to search within results. Using the advanced search options, the investigator can also search for exact phrases in all three search engines. The applications of phrase searching, or searches that limit the number of words improve the precision of search engines (Kastin and Wexler, 1998).

HINARI

The HINARI (Health InterNetwork Access to Research Initiative, www.healthinternetwork.org/scipub.php) program was started to give authors from developing countries access to some western countries' literature which they cannot afford to subscribe to in the first place. However, the numbers of journals available in this program is limited and the process to register and obtain the password is overwhelmingly cumbersome. Passwords can only be obtained through university librarians. The organizers of this project have wrongly assumed that all university librarians in developing countries have access to the internet, which is not the case. The project needs to be much more simplified to receive wider appeal. Infact, addition of free access journals from developed and developing countries will boost the appeal of the project.

BIOLINE AND AJOL

One of the major downside of Medline and the HINARI project is the very limited amount of literature from developing countries. Researchers from developing countries as well as their counterparts from the western world cannot use these media to retrieve adequate information about developing countries. Even ISI (www.isinet.com), which publishes the Science Citation Index, a subscription-based indexing service, has very few non-western journals in its database. Nevertheless, obtaining literature from developing countries is not as demoralizing as it used to be in the past. Several journals from developing countries have taken advantage of the internet to have the abstracts of their articles published online. Some even make the full text articles freely available. The organizations such as Bioline and the African Journals Online (AJOL) have greatly facilitated this process. Support for full text is offered by Bioline (www.bdt.org.br/bioline) which provides a full text online service with sophisticated data conversion and linking possibilities. AJOL publishes the abstracts of articles of African journals and they currently cover more than 200 journals. Like PubMed, both Bioline and AJOL have very good search engines (Figure 3). Infact, African researchers can obtain the full text articles from AJOL by mail if they request for it (and it is available). These websites have become very popular because of their unique services to developing countries. I have always recommended these sites to my students and colleagues.

JOURNAL'S WEBSITE

The development of electronic publishing technologies appears to provide a solution to the problem of distribution, since it has the potential to make locally-published research become more available worldwide (Smart et al., 2004). Some African journals now have their own complete websites which are rich in contents and often indistinguishable from western countries journals' websites. A good example is the African Journal of Biotechnology (www.academicjournals.org/ajb) which is a free and open access journal. Researchers can read and even download full text articles without any need for subscription, registration or password. The website has its own search (adapted from Google) which is used a great deal to retrieve literature. Title, abstract or authors' key words can be used to obtain relevant information.

CONCLUSION

The internet is leveling the playing field as far as research literature retrieval is concerned. Granted that investigators from developing countries still do not have as much access to literature as their western colleagues, the situation is now much better with free public search engines' availability for searching, free hosting websites like AJOL and Bioline that offer the abstracts/full texts of developing countries' articles and free access journal websites like that of the African Journal of Biotechnology whose full text papers are accessible to all. Online publications are the best and fastest way to communicate research findings and subsequently create new knowledge, and this should be taken advantage off by developing countries scientists. Open access to scientific research enabled by electronic journals is a great boon to science and a tremendous opportunity to researchers.

REFERENCES

Becker KG, Hosack DA, Dennis G, Lempicki RA, Bright TJ, Cheadle C, Engel J (2003). PubMatrix: a tool for multiplex literature mining. BMC Bioinformatics 4:61.

Day J (2001). The quest for information: a guide to searching the Internet. J Contemp. Dent. Pract. 2(4):33-43.

Kastin S, Wexler J (1998). Bioinformatics: searching the Net. Semin. Nucl. Med. 28(2):177-87.

Marlborough HS (2001). Accessing the literature: using bibliographic databases to find journal articles. Part 1. Prim. Dent. Care 8(3):117-21.

Murphy LS, Reinsch S, Najm WI, Dickerson VM, Seffinger MA, Adams A, Mishra SI (2003). Searching biomedical databases on complementary medicine: the use of controlled vocabulary among authors, indexers and investigators. BMC Complementary Alternative Med. 2003, 3:3

Smart P, Pearce C, Tonukari NJ (2004). E-publishing in developing economies. Can. J. Commun. 29:329-341.

Smith CG, Herzka AS, Wenz JF Sr (2004). Searching the medical literature. Clin. Orthop. 421:43-9.

Stewart MG, Moore AS (1998). Searching the medical literature. Otolaryngol. Clin. North Am. 31(2):277-87.

Tonukari NJ (2004). Research communications in the 21st century. Afr. J. Biotechnol. 3:123-126.

Wheeler DL, Barrett T, Benson DA, Bryant SH, Canese K, Church DM, DiCuccio M, Edgar R, Federhen S, Helmberg W, Kenton DL, Khovayko O, Lipman DJ, Madden TL, Maglott DR, Ostell J, Pontius JU, Pruitt KD, Schuler GD, Schriml LM, Sequeira E, Sherry ST, Sirotkin K, Starchenko G, Suzek TO, Tatusov R, Tatusova TA, Wagner L, Yaschenko E (2005). Database resources of the National Center for Biotechnology Information. Nucleic Acids Res. 33:D39-D45.