BIOUROLOGY.COM

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Abstract

Objectives

In order to be updated with the latest improvements in the field of molecular biology and because of the huge amount of available information and the multiple sources, we have tried to develop a tool with the objective of joining and organizing the published knowledge about basic research on Urology, mainly in regards to bladder, prostate, kidney and testicular tumors.

Material and Methods

We have developed a search engine, with automated daily updates. This engine show the obtained results organized into genomics, proteomics, metabolic pathways, pharmacogenomics, drugs developments, clinical trials and pubmed references.

This idea is one of the final projects for the 2º MS con Bioinformatics for Health Sciences, organized by Pompeu i Fabra University (UPF) and Barcelona University (UB).

Our main reference has been the OMIM database (NCBI) where are published the relationships between genes and human diseases. Using its public web services in a programmatic way, it is possible to get the reference identifications and to use these to look for further information in multiple related databases.

These results are saved into a local database and the information is showed in a structured and navigable way, related to the original sources.

We also offer the possibility of subscribing to an Alerts Newsgroup in order to receive and automated email with each new entry.

All these information is also available through a set of public web services.

Results

We think, we have been able to join in a web site, and in an easy using way, the main information about molecular mechanisms involved in the oncogenesis of urinary bladder, prostate, kidney and testis.

We also offer an alerts newsgroup and a complete set of public web services.

Conclusions

We try to offer a tool to help and make easy to general urologists keep an up-to-date state of the art about the mechanisms of molecular biology in oncological Urology, because we are sure that these are going to be the definitive therapeutic targets of these tumors.

Objectives

Thinking about the huge amount of available information, the multiple sources and the necessary skills needed to be informed about developments in the field of molecular biology, we have tried to design a tool with the objective of facilitate to general urologist, joining and organizing the published knowledge about basic research on Urology, mainly in regards to bladder, prostate, kidney and testicular tumors.

This idea has been one of the final projects for the 2º MS con Bioinformatics for Health Sciences, organized by Pompeu i Fabra University (UPF) and Barcelona University (UB).

The tool is free accessible in Internet under this url: www.biourology.com. The novelty of this article is to explain why and how we have developed this tool and to spread it with the intention of making it accessible for as many users as possible.

We don't know about the existence of similar tools for specific specialties in the medical fields. This tool is search-engine oriented to inexperienced users and it will allow every physician to get a lot of information from basic to clinical and translational research, just by navigating through the links in the web site.

A very interesting tool is the DISEASE CARD (www.diseasecard.org) developed by Institute of Health Carlos III. With this other tool you can look for a specific disease and get in a structured way a lot of information about basic research, more oriented to trained professionals.

Material and Methods

We have developed a web search engine, based on automated daily updates. This engine show the obtained results organized into genomics, proteomics, metabolic pathways, pharmacogenomics, drugs developments, clinical trials and pubmed references.

Our main reference has been the OMIM database (NCBI) where are published the relationships between genes and human diseases. Using its public web services in a pro-

grammatic way, it is possible to get the reference identifications and to use these to look for further information in multiple related databases.

All these results are saved into a local database and the information is showed in a structured and navigable way, related to the original sources.

We also offer the possibility of subscribing to an Alerts Newsgroup in order to receive and automated email with each new entry. The user only needs to write once the name and email and this information is store to send emails after each daily update with new entries to all subscribed users.

All these information is too available through a set of public web services, in order to be accessible by other informatics applications.

We have developed a .NET application that takes information daily from public sources and register the links in a local MySql database. The steps that we have followed are:

1. We connect through a proxy to the NCBI web services, available at http://eutils.ncbi.nlm.nih.gov/entrez/eutils/soap/eutils.wsdl

2. We check for matches in the OMIM database for 4 diseases "Bladder cancer", "Prostate Cancer", "Kidney cancer" and "Testis Cancer".

3. We register the OmimNumber, title and symbol of each gene matching the search.

4. Through these data we get the gene_id from the genes database, as well as the chromosome, locus and position of each gene.

5. We get the associated nucleotides and proteins through the gene_id and the genbank_id.

6. We get the associated registers in the PDB database.

7. Through the gene_id we also get the records in the Reactome and KEGG pathways databases.

8. We get the pharmacoresearch database link (www.pharmgkb.org).

9. Finally we get the pubmed publications matching the symbol of the gene and the disease. We also perform a generic "genomics and " plus organ plus "cancer".

We present the links to the original sources of all this information in an easy and structured way.

Results

We describe each item of showed information.

Genomics

Under this tab you can see the published genes in OMIM related to each kind of tumor. The available information is divided into Gene name (www.gene.ucl.ac.uk) , Omim reference (www.ncbi.nlm.nih.gov), Entrez reference (www.ncbi.nlm.nih.gov) , Genercard link (www.genecards.org) , SNP (www.ncbi.nlm.nih.gov) and loci MapView (www.ncbi.nlm.nih.gov) , with direct links to original sources.

Proteomics

Using the gene_id obtained from OMIM we showed all the protein sequences (www.ncbi.nlm.nih.gov) and PDB structures (www.expasy.org) related to each gene.

Metabolic pathways

We show the Reactome (www.reactome.org) and KEGG (www.genome.jp) described pathways in relation to the prior genes.

Pharmaco research

Information and links to the pharmagkb site (http://www.pharmgkb.org) for each gene.

Drugs

We offer a direct link to DrugBank (www.drugbank.ca) and to Therapeutic Target Database (http://xin.cz3.nus.edu.sg/ group/cjttd/TTD_ns.asp) in relation to each gene.

Pubmed

We show the title, Journal, Publication date and direct link to pubmed (www.ncbi.nlm.nih.gov/pubmed) entry of all the articles about each gene and the relation with one particular tumor.

We also offer a direct link to all articles about "genomics" and each tumor, according to MeSH terms. (http://www.ncbi.nlm.nih.gov)

Clinical trials

Direct link to the National Cancer Institute Clinical trials search results.   (http://www.cancer.gov)

We also offer an alerts newsgroup and a complete set of public web services.

Conclusions

With this project, we would like to be able to join in a web site, and in an easy using way, the main information about molecular mechanisms involved in the oncogenesis of urinary bladder, prostate, kidney and testis. We offer quick links to the information of about 15 different public databases.

We tried to offer a tool to help and make easy to general urologists keep an up-to-date state of the art about the mechanisms of molecular biology in oncological Urology, because we are sure that these are going to be the definitive therapeutic targets of these tumors.

This working schema could be also useful for any kind of tumor or disease.

This tool could be easily integrated in any type of supporting decision-making systems, through a external link to the site or programmatically using the available web services. It allows checking in an easy and quick way , specially what clinical trials are being performed and review the newest literature about the disease.