A guide for exploration of Dragon Database of Genes Implicated in Prostate Cancer.

This tutorial serves as a guide in exploring data available in DDPC. This is a basic tutorial and users are encouraged to comprehensively query the database to derive the maximum benefits. The FAQ file also answers certain questions concerning this database and can be accessed via: http://apps.sanbi.ac.za/ddpc faq.php

There are two types of searches: “Gene Search” and “Drug Search”. The Gene Search menu contains information about genes experimentally verified to be involved in prostate cancer. Drug Search menu contains information on drugs and drug targets associated with prostate cancer.

Gene Search Tutorials


2. Click on gene search menu as indicated in Figure 1.

3. There are three other search options namely: Gene Select, Transcription Regulation and Batch queries (Figure 2). Click on these options to familiarize yourself with their contents.
4. Click on Gene Select menu to retrieve the list of genes contained in DDPC (Figure 3).

Figure 2: A representation of different search categories.

Figure 3: Search options
5. You can select one or more genes to retrieve information associated with each gene. In this tutorial the gene of interest is ATP-binding cassette (Gene symbol ADAM10 and gene ID 102). Firstly, highlight the gene of interest by clicking on it. You then click on the “Select” button to retrieve the associated gene information (Figure 4).

![Figure 4: A selected gene is highlighted for further exploration.](image)

6. The following gene information are obtained: “Symbol”, “Aliases”, “Name”, “EntrezID” and “Details”. Click on the details menu to obtain comprehensive data on the gene (Figure 5).

![Figure 5: A window showing a list of gene(s) selected.](image)

7. Click on the gene details options to familiarize yourself with their contents (Figure 6):
   - General Information
   - Gene in other resources
8. For example, by clicking on the “Experimental Evidence” option button, you would obtain the experimental evidence used to determine the involvement of the gene in prostate cancer (Figure 7).
Figure 7: Information showing evidence of how the gene is implicated in PC.

9. By clicking on the “Regulations” option button (Figure 8), you obtain information on transcription regulation. The various transcription factors are displayed with their corresponding identification numbers (TF ID) and symbols (TF Symbol). The transcriptions factors are also mapped onto their Entrez and UniProt links.

Figure 8: Different transcription factors that bind to the TFBSs of a gene.
Text Mining Reports

10. Click on the “Text Mining Reports” option button to obtain information on pre-compiled text-mining results based on specified dictionaries (Figure 9).

![Figure 9: Text mining reports](image)

11. Click on the “Summary of results” link (Figure 10), to obtain the text mining report according to the following dictionaries: “Metabolites+Enzymes”, “Toxins” and “Chemicals with pharmacological effects”. These dictionaries are colour coded. Click on the other links to explore the unique features of the text mining reports in DDPC.

![Figure 10: Text mining results](image)

**Summary of results**
A summary of the text-mining results is presented in a vocabulary-style list of entities. In succession, the entities are listed alphabetically and joined with other entities found in the same abstracts. The entities are clustered by dictionaries and alphabetically sorted and by
amount of abstracts which is illustrated in a bracket [] inside. Clicking on the number in bracket will open a new window where the abstracts that contains paired entities will be shown. Else, clicking on the entity, a new window will link the chosen entity to external databases and information such as genes and protein databases, gene ontology etc. will appear.

**Entity list**
The entities are organized by dictionaries and frequency of occurrence inside the documents.

**Frequency of document**
Sort documents by the amount of entities found inside each of them.

**Frequency of pairs**
Assemble pairs of entities that appear together in documents.

**Document clustering**
Present groups of entities organized by frequency of appearance.

**Recommended reading**
Top 10 documents with the most entities found are displayed.

12. Click on the “draw network” link to obtain a graphical representation of genes with their assigned frequency of occurrence in the compiled abstracts used (Figure 11).

![Dragon Database of Genes Implicated in Prostate Cancer](image)

Figure 11: Summary of results
13. Click on any of the genes in the network (Figure 12) to obtain a list of abstracts displaying colour-coded entities corresponding to the specified dictionaries (Figure 13).

Figure 12: A graphical presentation of network representing the different dictionaries.
Figure 13: Abstract showing colour-coded entities.
Drug Search Tutorials

14. Click on the drug search menu to retrieve the names of drugs associated with prostate cancer (Figure 14).

Figure 14: Drug Search menu highlighted by an arrow.
15. Click on any of the drugs to obtain detailed drug information (Figure 15).

<table>
<thead>
<tr>
<th>No.</th>
<th>Drug</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Abarelix</td>
<td>For palliative treatment of advanced prostate cancer.</td>
</tr>
<tr>
<td>2.</td>
<td>Alfuzosin</td>
<td>For the treatment of the signs and symptoms of benign prostatic hyperplasia.</td>
</tr>
<tr>
<td>3.</td>
<td>Aminoglutethimide</td>
<td>For the suppression of adrenal function in selected patients with Cushing’s syndrome, malignant neoplasm of the female breast, and carcinoma in situ of the breast.</td>
</tr>
<tr>
<td>4.</td>
<td>Bicalutamide</td>
<td>For treatment (together with surgery or LHRH analogue) of advanced prostatic cancer.</td>
</tr>
<tr>
<td>5.</td>
<td>Caprotnab</td>
<td>For diagnosis of prostate cancer and detection of intra-pelvic metastases.</td>
</tr>
<tr>
<td>6.</td>
<td>Cephelexin</td>
<td>For the treatment of respiratory tract infections caused by Streptococcus pneumoniae and Streptococcus pyogenes, otitis media due to Streptococcus pneumoniae, Haemophilus influenzae, Staphylococcus aureus, Streptococcus pyogenes, and Moraxella catarrhalis; skin and skin structure infections caused by Staphylococcus aureus and/or Streptococcus pyogenes; bone infections caused by Staphylococcus aureus and/or Proteus mirabilis; genitourinary tract infections, including acute prostatitis, caused by Escherichia coli, Proteus mirabilis, and Klebsiella pneumoniae.</td>
</tr>
<tr>
<td>7.</td>
<td>Chlorotrianisene</td>
<td>Used to treat symptoms of menopause, deficiencies in every function (including underdevelopment of female sexual characteristics and some types of infertility), and in rare cases, prostate cancer. Chlorotrianisene may also be used to prevent breast engorgement following childbirth.</td>
</tr>
<tr>
<td>8.</td>
<td>Ciprofloxacin</td>
<td>For the treatment of the following infections caused by susceptible organisms: urinary tract infections, acute uncomplicated cystitis, chronic bacterial prostatitis, lower respiratory tract infections, acute sinusitis, skin and skin structure infections, bone and joint infections, complicated intra-abdominal infections (used in combination with metronidazole), infectious diarrhea, typhoid fever (enteric fever), uncomplicated cervical and urethral gonorrhea, and inhalational anthrax (post-exposure).</td>
</tr>
<tr>
<td>9.</td>
<td>Conjugated Estrogens</td>
<td>For the treatment of moderate to severe vasomotor symptoms associated with the menopause, atrophic vaginitis, osteoporosis, hypogonadism due to hypoandrogenism, castration, primary ovarian failure, breast cancer (for palliation only), and Advanced androgen-dependent carcinoma of the prostate (for palliation only).</td>
</tr>
<tr>
<td>10.</td>
<td>Cyproterone</td>
<td>For the palliative treatment of patients with advanced prostatic carcinoma.</td>
</tr>
</tbody>
</table>

Figure 15: A list of PC associated drugs integrated from DrugBank.
16. For example, click on the drug Alfuzosin to obtain a window with detailed information on the drug (Figure 16).

Figure 16: A window showing detailed information on the drug Alfuzosin