# Cytochrome P450 Search Application Documentation

## 1. Overview

This project is a web-based application that allows users to query the Cytochrome P450 database for enzyme-related information such as gene IDs, mutation info, drug interactions, allele frequency, and clinical relevance.

## 2. Project Files

The project consists of the following files:

* search\_cytochrome.html - HTML form for user input.
* cytochrome\_query.cgi - Python script to query the database and display results.
* db\_config.txt - Database configuration file containing credentials.
* cytochrome\_p450.sql - SQL script to create and populate the database.

## 3. Setup Instructions

Follow these steps to set up and run the application:

### 3.1 Database Setup

1. Import the database schema and data using the provided SQL file:

mysql -u <username> -p <database\_name> < cytochrome\_p450.sql

### 3.2 Edit Database Configuration

1. Open the 'db\_config.txt' file and update the database credentials:

host=localhost  
 user=your\_username  
 password=your\_password  
 database=your\_database

### 3.3 Deploy Project Files

1. Place the project files in the appropriate web server directory.

2. Ensure correct file permissions for the CGI script:

chmod +x cytochrome\_query.cgi

### 3.4 Test the Application

1. Access the following URL in your browser:

http://bfx3.aap.jhu.edu/amulpur1/project01/search\_cytochrome.html

## 4. Troubleshooting

* 404 Error - Verify file paths and permissions.
* Internal Server Error - Check the shebang line in the CGI script:  
   #!/usr/local/bin/python3
* No Results Displayed - Ensure the database is populated and search terms are correct.
* Line Ending Issues - Run 'dos2unix' on any files uploaded from Windows.

## 5. Key Commands Used

* Create a tarball: tar -cvzf project01.tar.gz project01
* Copy files using scp: scp user@server:path/to/file .
* Set permissions: chmod 755 file\_or\_directory
* Convert line endings: dos2unix filename

## 6. Credits

Developed by Akhil.  
Special thanks to resources such as the Python CGI documentation, MySQL Connector documentation, and UNIX man pages.

## 7. Bibliography

### 7.1 Enzyme Information Sources

* CYP2D6 - Alters pain relief from Codeine: https://www.ncbi.nlm.nih.gov/gene/1565
* CYP3A4 - Impacts drug clearance rates: https://www.pharmgkb.org/gene/PA130
* CYP2C19 - Increased risk of clotting: https://www.uniprot.org/uniprot/Q9UHK6
* CYP1A2 - Affects caffeine metabolism: https://www.ncbi.nlm.nih.gov/gene/1544
* CYP2C9 - Alters anticoagulant dosing: https://www.pharmgkb.org/gene/PA131

### 7.2 Coding Resource References

* Python CGI Documentation: https://docs.python.org/3/library/cgi.html
* MySQL Connector Python: https://dev.mysql.com/doc/connector-python/en/
* HTML Forms Tutorial: https://www.w3schools.com/html/html\_forms.asp
* SQL Parameterized Queries: https://www.w3schools.com/sql/sql\_injection.asp
* Unix File Permissions: https://linux.die.net/man/1/chmod
* Shebang Line Explanation: https://linuxhint.com/bash-shebang/
* Fixing Line Endings with dos2unix: https://linux.die.net/man/1/dos2unix
* Secure Copy (scp) Command: https://linuxize.com/post/how-to-use-scp-command-to-securely-transfer-files/