Proposal: PhD

Title: Computational and bioinformatic techniques for compiling potential drugs candidates for repositioning

Background and area or work:

This project is concerned with drug repositioning, this is where an existing drug may be deployed for a disease that is unrelated to its original target condition. The most often cited example is the drug developed by Pfizer (sildenafil) which was intended to treat angina by relaxing the coronary arteries and therefore allowing greater blood flow. This drug was discovered to have an interesting side-effect on male participants and was later marketed as Viagra, the drug now has annual sales of $1.6 Billion.

Drug repositioning is a suitable application area for computational intelligence because numerous online databases containing technical information on drug targets, protein interactions, side-effects and biological knowledge are freely available. Thus in-silico analysis can be used as a useful first stage to screen potential candidate drugs for possible redeployment. Within this PhD I take the position that drugs with side-effects are potential candidates for use elsewhere; it is a case of identifying potential diseases that may benefit from this re-deployment. The system would probably use graph based computational techniques to analyze drugs with known side-effects and compare the proteins involved in these side-effects with proteins known to be identified with other diseases.

Aim

The aim of this PhD would be to identify possible drugs that may be candidates for deploying against other diseases by using computational techniques to score and rank the candidate drugs. The student would NOT be expected to have a deep knowledge of chemistry or biology but a willingness to understand the bioinformatics and computational techniques that could be used, and to become familiar with the databases and the ability to program.

References


K. McGarry and U. Daniel, Computational Techniques for Identifying Networks of Interrelated Diseases, The 14th UK Workshop on Computational Intelligence, UKCI-2014, Bradford, Uk, 8th-10th Sept, 2014.


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