# Drug discovery is a process in medicine and pharmacology assignment

Drug discovery is a process in medicine and pharmacology where a drug is discovered and designed. In the past drug discovery was very different to the current form, previously active ingredients were used to tackle illnesses. Nowadays more detailed research on diseases has been pursued, details such as what the genes are coding or what protein is involved, therefore are allowing the designing of drugs to target specific sites to act on the disease. Once detailed information of the disease has been recorded and the target identified, there are couple more stages for target identification.

If the company are tackling an existing disease then the company will target either the same target as current drugs. If the disease target is new then the company should tackle the pathophysiology of the disease (new target protein). The current drug targets include enzymes, cell surface receptors GCPR, transporters and ion channels. The most common target is the enzyme and GCPR interaction. (Rang, 2005) ( Seneci and Terstappen, 2009) After the target has been identified the company has to take steps into verifying if the target is correct, target validation.

If this step is not completed correctly then the actual drug might not be as effective as first thought. Ways in which to complete this is firstly target validation on human tissue, measure the gene expression profiling the disease tissue, cellular localisation of target in normal and diseased tissue. Further methods include using blood samples to test function of targets, this is vital to check levels in humans as recombinant systems do not prove to show the exact expression of target and also the function maybe cell dependant. Rang, 2005) Once the target has been validated and the company have decided to continue with the development, the next process

of screening will occur. This primarily involves High Throughput Screening (HTS). This process involves a massive library of compounds tested against the target protein, i. e. GCPR, to see which compound has the best effect on the target protein. This allows the screening of how the compound inhibits or stimulates the target receptor or protein. HTS allows the monitoring of how selective a compound is and if it only interacts with the target and not any other, this is vital to ensure that toxicity is kept low. Rang, 2005) ( Seneci and Terstappen, 2009) Once the screening for the compound has been completed and candidate compound is selected, stages into optimising the compound occur. This process is known as lead optimisation. Structure activity relationships (SAR) is the process in which chemists can improve the lead compound so that it can increase activity towards the target, reduce the toxicity of the compound and also increase the drug-like factors of the compound. This process can also be completed on computer programs known as quantitative structure-activity relationships (QSAR). Rang, 2005) Once the compound has been modified to comply with the drug industry, the next stages it has to complete is the testing of the drug in real life models. In the current industry the drug cannot be tested on humans for the first trial due to many regulations set by the FDA, the company have to test on animal. The test data show the toxicity levels of the drug, other drug interaction, dosages, behaviour changes, lethal dose, efficacy and elimination of the drug. These studies allow the company to work the ideal dose for an ideal therapeutic effect, therapeutic window.

Once the drug has proved that it has a positive effect on the disease and the pharmacokinetics of the drug assessed the company can assess the data to

continue into clinical trials. If the drug can prove that it is effective then it can continue into the human trial. Clinical trials are split into 3 phases and the number of volunteers increases in each of the phases. (Rang, 2005)

References ??? Humphrey P. Rang , Drug Discovery and Development: Technology In Transition, 24 Nov 2005 Pierfausto Seneci and Georg C. Terstappen, Modern Drug Discovery: From Ideas to Clinical Candidates, 6 Mar 2009