Systems pharmacology of the endocannabinoid system
Kantae, V.

Citation

Version: Not Applicable (or Unknown)
License: Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden
Downloaded from: https://hdl.handle.net/1887/65054

Note: To cite this publication please use the final published version (if applicable).
The handle http://hdl.handle.net/1887/65054 holds various files of this Leiden University dissertation.

Author: Kantae, V.
Title: Systems pharmacology of the endocannabinoid system
Issue Date: 2018-09-06
Systems Pharmacology of the Endocannabinoid System

1. Systems pharmacology provides a novel approach to characterize the molecular network changes due to a disease state and its changes due to a drug. (*Chapter 1, this thesis*)

2. To achieve tangible advances in current health care system, the “omics” based biomarkers as health indicators should be urgently progressed to large biomarker validation trails. Validation in large randomized clinical trials should be conducted, however due to lack of resources (money, time and people) these trails happen sparsely. (*Chapter 2, this thesis*)

3. The endocannabinoid system (ECS) is involved in many physiological regulation pathways in the human body, which makes this system the target of many drugs and therapies and at the same time difficult to target due to its complexity and ubiquitous in nature. (*this thesis*)

4. Metabolomics and Activity based protein profiling (ABPP) are powerful phenotypic tools that cannot only be applied in academia for drug research but also in industry across the whole drug discovery pipelines to investigate drug on-target engagement, downstream effect and off-target effect of drugs or drug candidates. (*this thesis*)

5. Lessons learned such as the drug side-effects can be species-dependent from fetal clinical trial of BIA 10-2474 should also be implemented to other drug candidates to deliver effective and safe drugs more systematically. (*Chapter 5, this thesis*)

6. Zebrafish is an attractive *in vivo* pre-clinical model applied in drug research. Although the larvae is very small in size, the information it provides is substantial to draw conclusions. However, this requires very sensitive analytical technologies for drug and metabolite analysis. (*Chapter 6-7, this thesis*)

7. System-based approach can transform the drug discovery and development process from disease diagnosis to the prescribing of drug treatment. (van der Greef, J. & McBurney, R. 2005, *Nat. Rev. Drug Discov.* 4, 961–967). Although this approach has been advocated for long time, its application to translate findings from lab to clinic is still at premature stage.

8. Personalized medicine has great potential to transform medical care. In this context, metabolomics can be used as a powerful phenotypic tool for disease risk assessment and customized drug therapy in clinics. (Guo, L et al., 2015, *PNAS.* 112, E4901-10). This approach can further be improved by incorporating pharmacology concepts (PK-PD), clinical phenome measurements and information obtained from other “omics” studies.

9. Better scientific results can be achieved with a multi-disciplinary and collaborative approach involving large and open networks of researchers.

10. The Dutch weather is very unpredictable but favorable towards core muscle training, especially while biking in headwind and rain.

11. The whole is greater than the sum of its parts (*Aristotle in Metaphysics*)

12. Satisfaction of one's curiosity is one of the greatest sources of happiness in life. (*Linus Pauling*)

Vasudev Kantae