IMAGE INFORMATICS APPROACHES TO ADVANCE CANCER DRUG DISCOVERY

Scott J. Warchal

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The University of Edinburgh
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DECLARATION

This thesis presents my own work, and has not been submitted for any other degree or professional qualification. Wherever results were obtained in collaboration with others, I have clearly stated it in the text. Any information derived from the published work of others has been cited in the text, and a complete list of references can be found in the bibliography. Published papers arising from the work described in this thesis can be found in the appendices.

– Scott Warchal, 2018

epigraph here

ACKNOWLEDGEMENTS

Acknowledgements here.

ABSTRACT

Abstract here.

LAY SUMMARY

Lay summary here.

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LIST OF ACRONYMS

2D Two-dimensional

3D Three-dimensional

PBS Phosphate buffered saline

DMSO Dimethyl sulfoxide

1 INTRODUCTION

1.1 Eroom's Law: The increasing cost of drug discovery

Throughout the last 70 years the cost of developing a new drug has steadily increased. Scannel *et al.* observed that the cost to develop a new drug has approximately doubled every 9 years[1]. This observation has been dubbed "Eroom's law", a homage to Moore's law – an observation that the number of transistors in microprocessors approximately doubles every 2 years. The cost of bringing a new drug to market is now approaching £1 billion, taking 10 years from initial concept to approval, the reasons behind this every-increasing cost are multi-faceted. One explanation may be that the low-hanging fruit has been taken, effective long-standing remedies have been studied and commercialised, natural products screened, and we are now tackling the more complex diseases and pharmacological targets.

1.2 Phenotypic Screening

- define phenotypic screening
- how it differs from target-based screening
- why there is a resurgence in phenotypic drug discovery
- benefits, downfalls

1.2.1 High Content Imaging

- define, multiparametric etc.
- historic success stories
- high-content profiling

2 CHAPTER NAME

2.1 Section name

Stuff here, text text text test citation[2].

BIBLIOGRAPHY

[1] Jack W Scannell, Alex Blanckley, Helen Boldon, and Brian Warrington. "Diagnosing the decline in pharmaceutical R&D efficiency". *Nature Reviews Drug Discovery* 11.March (2012), pp. 191–200.

[2] Mi Yang, Jaak Simm, Pooya Zakeri, Yves Moreau, and Julio Saez-Rodriguez. "Linking drug target and pathway activation for effective precision therapy using multi-task learning". *bioRxiv* (2018), p. 225573.