# SMART ELEGANT

To successfully develop one new drug, a pharmaceutical company will screen 100,000s of compounds using *in vitro[[1]](#footnote-1)* tests. After optimisation, the most promising leads are tested in animal models. Such experiments are laborious, costly and ethically controversial. Consequently, there is an urgent need for more cost effective and ethical tests yielding data at whole organism-level for large numbers of compounds early in the drug development process.

The nematode *C. elegans[[2]](#footnote-2)* is an attractive model that could meet this need, and has, for example, been utilized in the identification of new antifungal agents[[3]](#footnote-3). High-throughput screening (HTS) methodologies[[4]](#footnote-4) enable such tests to be undertaken quickly on millions of compounds to rapidly identify toxic compounds. Currently available *C. elegans* assays[[5]](#footnote-5) are typically read-out using plate readers[[6]](#footnote-6), yielding per-well data that may reflect target expression in up to 96-wells. Alternative assay read-out systems are based on flow cytometry[[7]](#footnote-7), and have been scaled up to HTS using advances in microfluidic technology[[8]](#footnote-8). However, aforementioned systems provide observations of organism characteristics only at a single moment in time. In addition, existing systems are expensive, laborious to use, and inaccessible to the large number of small research labs that exist around the world (such as HAN Biocentre[[9]](#footnote-9)).

Recently, HAN Engineering has demonstrated an automated low-cost set-up for *in vivo* screening of microorganisms[[10]](#footnote-10). Combining this technology with Biocentre’s expertise on *C. elegans* assays could possibly enable digital phenotyping of whole organisms as a new approach to human risk-based regulatory toxicity testing, yet at very low-cost. To further investigate this opportunity, a small research project will start from February 2018.

While still in a very early stage of development, HAN Biocentre and Engineering want to find out whether the proposed technology could lead to a viable smart business proposition. The envisioned product and/or service will be highly automated and will produce vast amounts of data, that could be disclosed via networks, and obviously should be refined towards customer centred information. In this project you are given the opportunity to define a business proposition that could possibly lead to a new method for automated high through-put antifungal/antimicrobial screens. To that end, we would like you to identify end-users, customers and other stakeholders, and propose ideas on how to involve these groups now and in the future (intimacy). Next, we want you to investigate these groups and provide insights into requirements (or dreams) on e.g. the level of automation, quality, and flexibility expected of the product/service to be developed. Then, a value (chain) proposition could be composed, together with business models, possibly splitting the physical product and data collection and analysis services. We are highly interested in models that would allow for open-sourcing hard- and software and interfacing to existing iniatives such as CellProfiler’s WormToolbox[[11]](#footnote-11).

1. <https://en.wikipedia.org/wiki/In_vitro> [↑](#footnote-ref-1)
2. <https://en.wikipedia.org/wiki/Caenorhabditis_elegans> [↑](#footnote-ref-2)
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3719869/> [↑](#footnote-ref-3)
4. <https://en.wikipedia.org/wiki/High-throughput_screening> [↑](#footnote-ref-4)
5. <https://en.wikipedia.org/wiki/Assay> [↑](#footnote-ref-5)
6. <https://en.wikipedia.org/wiki/Plate_reader> [↑](#footnote-ref-6)
7. <https://www.ncbi.nlm.nih.gov/pubmed/16988441> [↑](#footnote-ref-7)
8. <https://www.nature.com/articles/ncomms13023> [↑](#footnote-ref-8)
9. <http://specials.han.nl/sites/biocentre/> [↑](#footnote-ref-9)
10. <https://www.han.nl/onderzoek/werkveld/projecten/rast/> [↑](#footnote-ref-10)
11. <http://cellprofiler.org/wormtoolbox/> [↑](#footnote-ref-11)