



SYNBIOBACTER – Engineering “therapeutic” bacteria

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Statistics show that over 1.3 million persons will be diagnosed with breast cancer worldwide this year, hence this is an enormously important health risk, and progress leading to enhanced survival is a global priority. Several strategies have been pursued over the years, whether searching new biomarkers, drugs or treatments. Ultrasound is often used to treat solid tumours. However, this technique is not always successful, as sometimes it just heats the tumour without destroying it. If it would be possible to link this treatment with the expression/release of a therapeutic agent, the joint effect could be more effective. Some efforts have been made in this direction, although to date the results have not been very encouraging; potential reasons include lack of precise control over administration of the drug. Therefore, the idea is to overcome this barrier through the use of synthetic and systems biology strategies to engineer a model bacterium to trigger release of a therapeutic agent concurrent with ultrasound treatment. The search for new cancer-fighting drugs has traditionally driven research efforts in this field. Curcumin, due to its attractive properties as a novel drug has recently attracted increased attention. Nevertheless, it is well known that it has a poor bioavailability. Cellular uptake is slow, and it is quickly metabolised once inside cells, requiring repetitive oral doses to achieve sufficient concentration inside the cells for therapeutic activity. Hence, the possibility of synthesizing curcumin *in situ* in a controlled way, as proposed in this project, provides a powerful alternative.

References

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