3D Mapping for Tumours

By: Rapid Access International, Inc.

December 2018

Cancer Research UK's website touts their Grand Challenge as "the most ambitious cancer research grant in the world - a series of £20m awards seeking international, multidisciplinary teams willing to take on the toughest challenges in cancer - providing the freedom to try novel approaches, at scale, in the pursuit of life changing discoveries."[1]

In the first round thanks the support of donors and the Dutch Cancer Society, four international, multidisciplinary teams, each received up to £20m over a period of 5 years to take on the toughest challenges in cancer research[2]

Creating Virtual Reality Maps of Tumours

As director of Cancer Research UK Cambridge Institute (CRUK), Professor Greg Hannon at the University of Cambridge leads one of the first CRUK Grand Challenge Awards. In 2017, his team received a Grand Award of £20m over 6 years to "create the world's first virtual reality map of cancer tumours to reveal their cellular and molecular make up, in order to improve diagnosis and treatment."[3] The team consists of 15 investigators located in the UK, Switzerland, USA, Canada and the Republic of Ireland.

In a summary of the project posted on the CRUK website, a simple graphic illustrates the process of Creating a Cirtual Reality Tumor[4]:

1) A detailed reverence picture of a tumor is taken
2) Wafer thin slices are cut from the tumour
3) The slices are deeply analysed right down to their genetic information
4) The information is processed and the tumour is rebuilt in virtual reality
5) Multiple users earing 3D virtual reality headsets can step into the tumour, view and analyse it simultaneously.

The Promise of Tumour Mapping

The project is placing focus on building a 3D breast cancer tumour map that will lead to "significant advances in the understanding – and thus diagnosis, treatment and management – of cancer"[5].

---

[1] Overview – Grand Challenge. Cancer Research UK Website. Available at: https://www.cancerresearchuk.org/funding-for-researchers/how-we-deliver-research/grand-challenge-award. Accessed on December 29, 2018.

[2] Teams. Cancer Research UK Website. Available at: https://www.cancerresearchuk.org/funding-for-researchers/how-we-deliver-research/grand-challenge-award/previously-funded-teams. Accessed on December 29, 2018.

[3] "Professor Greg Hannon Leads £20 Million Grand Challenge Project to Build 3D Cancer Tumor". Cambridge In America. Available at: https://www.cantab.org/about-us/1729. Accessed on December 29, 2018.

[4] Fully Funded Team – Their Project. *Creating a Virtual Reality Tumor* Graphic. Cancer Research UK Website. Available at: https://www.cancerresearchuk.org/funding-for-researchers/how-we-deliver-research/grand-challenge-award/funded-teams-hannon. Accessed on December 29, 2018.

[5] Cambridge In America, *op. cit*.

Professor Hannon explains: “Cells communicate with each other in ways that we really don’t yet capture with any technology that we have developed so far. But with our project, we hope to change that.”[6]

He further explained what he called a ‘Superman mode’ wherein scientists will be able to ‘walk into’ the 3D tumour using virtual reality and then examine its workings in unprecedented detail: "It literally lets you fly inside a tumour, point at every cell, know exactly what kind of cell it is, know what it’s doing, who it is talking to, and what it is saying to them. By doing this, we could learn more about tumours and begin to answer questions that have eluded cancer scientists for many years."[7] He provides these same details in a Cancer Research UK video posted on YouTube, entitled “Creating Virtual Reality Maps of Tumours”.[8]

The Grand Challenge: Going Forward

The first round of Grand Challenge Awards included Professor Hannon’s team and four other recipients. Back in June 2017, the second round of £20m Grand Challenge funding awards was opened. 134 applications across 41 countries were reviewed, and 10 multidisciplinary, international teams have been shortlisted. Each of these teams have received £30,000 seed funding to work up their applications for interviews. Decisions about which teams will receive full funding will be announced in early 2019.

The Cancer Research UK website has posted details on the Round 2 shortlisted teams on their website.[9] Some of the areas of focus include how obesity can cause cancer, the impact of chronic inflammation as a cause of cancer, mining of medical records for early signs of cancer, and the use of personalized cancer vaccines.

---

[6] Cambridge In America. *op. cit*

[7] *Ibid*.

[8] Creating virtual reality maps of tumours | Cancer Research UK. Cancer Research UK YouTube Channel. February 10, 2017. Available at: https://youtu.be/a8mZqcmRJrk. Accessed on December 29, 2018.

[9] Teams – Round 2 Shortlisted Teams. Cancer Resarch UK Website. Available at: https://www.cancerresearchuk.org/funding-for-researchers/how-we-deliver-research/grand-challenge-award/round-2-shortlisted-teams. Accessed on December 29, 2018.