



Translational Cancer

Representative Case Study — Promising new small molecule drugs for treating gastrointestinal cancer.

Prof. Jacintha O'Sullivan

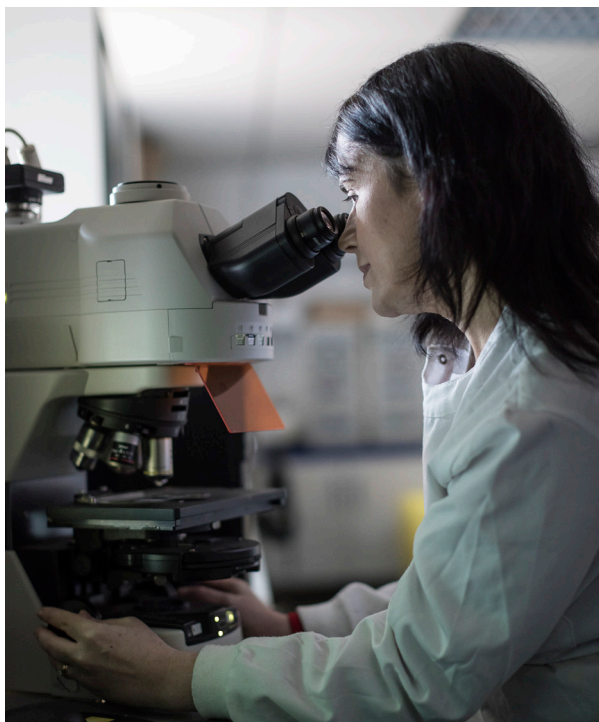
Treatment algorithms and survival for colorectal cancer patients have changed dramatically over the past decade due to the advent of molecular targeted therapies such as bevacizumab, an anti-angiogenic therapy. However, response rates to this anti-angiogenic therapy is 40% or less and can result in the development of drug resistance. Therefore, there is a need to develop alternative drugs such as small molecules with potent anti-angiogenic activity.

A drug discovery program led by Professor Jacintha O'Sullivan in TTMI in collaboration with Dr. Breandán Kennedy in UCD have identified and patented a small molecule drug Quininib with potent anti-angiogenic activity. Patent: Quininib is the subject of the patent. Anti-angiogenic compounds, WO 2012/095836, granted Dec 2014.

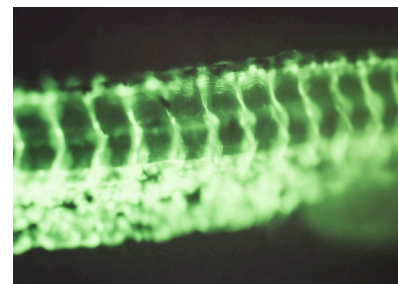
This study recently published in Scientific Reports has demonstrated that Quininib has strong anti-angiogenic activity in human colorectal *ex vivo* explants, in zebrafish and mice and mechanistically is a novel anti-angiogenic small-molecule CysLT receptor antagonist. Structural analogs to Quininib have revealed they can exert an additive anti-angiogenic response in combination with the current licensed therapy Bevacizumab. Quininib and its analogs may complement current anti-VEGF biological agents and act as novel therapeutic agents for colorectal cancer and others cancers driven by angiogenesis. Through recently awarded Horizon 2020 RISE funding (3DNEONET) and in collaboration with European industry partners, further therapeutic development of these novel drugs is now underway using different model systems to test their clinical utility in the neoadjuvant and adjuvant settings in both colorectal and oesophageal cancers.

Murphy AG, Casey R, Maguire A, Tosetto M, Butler CT, Conroy E, Reynolds AL, Sheahan K, O'Donoghue D, Gallagher WM, Fennelly D, Kennedy BN and O'Sullivan J. Preclinical validation of Quininib as a novel anti-angiogenic drug for colorectal cancer. Scientific Reports. 2016 Oct 14;6:34523.

Butler CT, Reynolds AL, Tosetto M, Dillion ET, Guiry P, Cagney G, O'Sullivan J and Kennedy BN. A Quininib Analogue and Cysteinyl Leukotriene Receptor Antagonist Inhibits VEGF-Independent Angiogenesis and Exerts an Additive Anti-angiogenic Response with Bevacizumab. Journal of Biological Chemistry 2016 Dec 29.



Zebrafish: a model to screen anti-angiogenic small molecule drugs. Intersegmental vessels in zebrafish, number and structure of vessels indicated.



Collaborator/Funding Agencies