

[British Council global](#)

[The British Council](#)

Voices

FameLab: Understanding the causes of bile duct liver cancer

by [Michael Smout](#)

June 5, 2014

'Liver cancer is extremely prevalent in people whose staple diet is uncooked fish that harbour the parasitic liver worm, *Opisthorchis viverrini*.' Photo by A J Cann on Flickr under Creative Commons licence.

Why does south-east Asia have such a high prevalence of bile duct liver cancer? Dr Michael Smout of James Cook University, winner of science communication competition [FameLab](#) in Australia, explains the link between the deadly disease and a parasitic worm found in uncooked fish. Michael is competing at the [FameLab international final](#) in Cheltenham on 3-5 June 2014.

Throughout south-east Asia, there is a strikingly high prevalence of bile duct liver cancer, which kills more than 20,000 people every year in Thailand alone. Liver cancer is extremely prevalent in people from Laos and north-east Thailand, whose staple diet is uncooked fish that harbour the parasitic liver worm, *Opisthorchis viverrini*. There is no known stronger link between a parasite and a cancer than that between

Opisthorchis and bile duct cancer.

Approximately 17 per cent of people infected by the worm develop liver cancer. This is remarkable when compared with other cancer-causing pathogens. Human Papilloma Virus, for example, causes cancer in less than one per cent of infected individuals. The mechanisms by which the parasite causes cancer are complex, but one process is the secretion of molecules (or ‘worm spit’) into the liver bile ducts. This worm spit causes cells to multiply quickly and uncontrollably.

Unregulated cell growth is a key stage in the initiation of many cancers. Our research team (including teams from James Cook University, Australia; Khon Kaen University, Thailand; and George Washington University, USA) used advanced molecular techniques to investigate the worm spit and identified a worm molecule named granulin. This molecule is similar to a human growth hormone associated with aggressive and deadly cancers of the brain, breast, colon and liver. By making worm granulin in the laboratory, we have found that it is not just a potent human cell growth stimulator, it also induces wound healing through as yet unknown mechanisms.

Why the parasitic worm makes this growth hormone is unknown, but we suspect that it reduces damage to its human host by healing the wounds it causes while feeding on the liver. In the short term, this would be beneficial to the human host, but the repeated wounding and healing over decades can lead to liver cancer and death. Investigating how the worm spit sends novel, wound-healing signals in human cells will help us understand how this parasite causes such a devastating form of cancer.

Our future work is two-fold. First, we aim to develop treatments or a vaccine to prevent deadly liver cancer, saving the lives of millions of impoverished patients infected with liver worms throughout south-east Asia. Second, we believe an in-depth understanding of *Opisthorchis viverrini* and its deadly spit could lead to new treatments for non-healing wounds, which are an increasing problem with smokers, diabetics and an ageing population.

[FameLab](#) aims to discover charismatic, up-and-coming scientists who can inspire people to see the world from a new perspective. The competition is the brainchild of The Times Cheltenham Science Festival and is delivered by the British Council in 25 countries.