



Dr. Daniel Boyd and members of his research team.

DR. DANIEL BOYD: BUILDING TOMORROW'S TECHNOLOGY, TODAY

Imagine a tiny marble of glass, smaller than a grain of table salt, and finer than a strand of human hair. Now imagine that it can treat cancer.

Dr. Daniel Boyd, in Dalhousie's Department of Applied Oral Sciences and the School of Biomedical Engineering, is working to bring this very technology to market. As a globally recognized inventor of several biomaterial technologies, Dr. Boyd's work focuses on investigating and developing pioneering glass compounds that can treat a wide range of diseases in areas including oncology, dentistry and orthopaedics.

"Glass is one of the most underrated materials on the planet when it comes to applications in medicine and dentistry," Dr. Boyd explains. "We've found that we can make glass materials that can do things like destroy tumours, bond with bone to repair fractures, and target the source of sensitivity in your teeth. With this material available to us scientists, it is our duty to develop new breakthrough technologies that harness the power of glass materials."



Dr. Boyd has been working tirelessly over the past fifteen years to harness the power and versatility of glass to improve human health. Spending his evenings and weekends raising critical funds, Dr. Boyd has recently launched three medical device companies dedicated to this mission.

Dr. Boyd's first company, ABK Biomedical, is developing novel glass technologies that can treat liver cancer by selective internal radiation, and that can also treat the symptoms associated with benign tumors such as uterine fibroids. One technology uses tiny glass microspheres – similar in size to table salt particles – to block the blood supply to tumours, causing the tumours to starve and disappear without surgery. Another uses unique microspheres to selectively deliver radiation inside a tumour, accurately delivering high doses right where it's needed, without damaging adjacent tissues. These microspheres are also imageable, meaning they can be seen on X-Ray and MRI scans to allow for precise delivery and monitoring of treatment.

With offices in Halifax and California, and a local research facility in Bayers Lake, Nova Scotia, ABK Biomedical is commercializing these technologies and is advancing them at a rapid pace. Currently, the team is actively developing these projects for clinical use and has already engaged with some of the world's largest clinical centres for cancer care. Soon, Dr. Boyd and ABK Biomedical will be able to bring these breakthrough imageable microspheres to market for selective cancer treatment, across the globe.

Through another company, IR Scientific, Dr. Boyd and his colleagues are developing breakthrough technologies for dental care. With hypersensitivity being a major oral health problem all around the world, the team is working to treat this issue using novel glass compounds, and has already garnered interest from several international partners looking to collaborate.

"None of this would be possible without my colleagues in Dalhousie's Faculty of Dentistry," says Dr. Boyd. "Dalhousie is a hot bed of groundbreaking ideas, and together, we are translating these ideas into meaningful technology, industry and treatments."

Looking ahead to the future, Dr. Boyd is committed to the reality that when people across the globe think of Nova Scotia and Dalhousie University, they think of world-leading biomedical glass technologies. Here at home, he also hopes his work can continue to be a powerful force that helps retain research talent in Atlantic Canada through unique job opportunities for graduates, while also contributing significantly to the local economy.

Stopping at nothing, Dr. Boyd's next endeavour is to build a lab at Dalhousie to execute on other research projects in the queue, including the development of a novel technology for the treatment of osteoarthritis. With support from DMRF donors, the Biomaterials Innovation Labs at Dalhousie can become possible, enabling the development of new revolutionary technologies.

"When I see that we can positively impact a patient's health through our work, there isn't anything I won't do to achieve that goal. I don't care how long it takes or how hard that road is. As scientists, we have the privilege of looking at tomorrow's technology, today. It is our duty and responsibility to get these technologies to patients."

– DR. DANIEL BOYD

Associate Professor in the Department of Applied Oral Sciences and School of Biomedical Engineering, Dalhousie University

