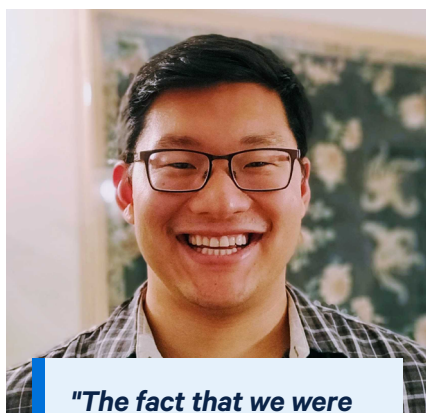


Crownlands builds a four-million-cell atlas from minimally invasive tissue to fuel Alzheimer's target discovery



"The fact that we were able to build a resource of this magnitude in less than a year with a small team is a testament to the force multiplier Flex Apex can be."

**– Kevin Zhu, PhD,
Co-Founder of Crownlands**

A breakthrough for non-invasive human neuronal sample access

For decades, Alzheimer's researchers have been working a puzzle with most of the pieces missing—forced to study a living disease in dead tissue. Understanding disease progression and finding therapeutic targets in

living tissue at the cellular level requires access to neurons from living donors across disease stages.

"In other disease areas, longitudinal sampling of disease-relevant tissue has helped drive mechanistic discovery," says Kevin Zhu, PhD, Co-Founder and Head of Discovery at Crownlands, an emerging biotechnology company that focuses on developing precision medicines for neurodegenerative and CNS diseases. "But this has not been possible in neuroscience because repeated brain biopsies are simply not viable at scale," he explains.

Without access to disease-relevant human samples, disease-relevant insights are hard to come by. But Crownlands has achieved a breakthrough for human neuronal sample access with their new Gateway platform, which leverages a proprietary medical device to enable minimally invasive collection of olfactory epithelium from living donors. In their recent preprint, Crownlands scientists demonstrate the tissue mediating our sense of smell contains many different brain cell populations, including neurons and glia. These cells capture key features of brain biology and, importantly, Alzheimer's disease-associated signals.

Gateway changes what's been possible. For the first time, researchers can follow neuronal disease progression in living donors, longitudinally.

Gateway opens the door to olfactory neuron profiling via Flex Apex

The Gateway platform is powerful because it provides routine access to a typically inaccessible clinical sample and it unlocks that sample at the single cell level. To make the most of fragile human samples coming from multiple donors and locations, the Crownlands team integrated single cell profiling into their workflow with Flex Apex. "We needed a workflow that could stabilize sensitive clinical samples from multiple collection sites and convert them into high-quality single-neuron profiles on a large scale," says Dr. Zhu.

Crownlands created a dataset that brought together olfactory neuronal samples from over 200 living human donors, including samples from individuals with Alzheimer's, Parkinson's, and other

neurodegenerative conditions, totaling four million single cells. “The atlas includes mature olfactory neurons, glia, immune, and epithelial cell populations, and a developing neuronal lineage,” explains Dr. Zhu. This cellular diversity is powerful validation of the high data quality and breadth of brain biology they could capture from fixed samples.

Just the beginning for large-scale translational neuroscience research

What’s next? The Crownlands team is making their four-million-cell Gateway dataset freely available for the neuroscience community to explore via the Chan Zuckerberg Initiative’s CZ CELLxGENE platform. They’ve also built a natural language research agent to easily

ask questions about the data. Now anyone can explore specific genes, pathways, and cell types in samples that reflect the differences between living, healthy, and disease states, while establishing hypotheses for further study.

“By generating large-scale longitudinal datasets from patients with Alzheimer’s, Parkinson’s, and other neurodegenerative diseases, we aim to create a data foundation for target discovery, biomarkers, clinical trial design, and therapies,” says Dr. Zhu.

AI will play an essential role in realizing this vision. Large-scale, high-quality, single cell data from human clinical samples—like the Gateway dataset—can train AI models to narrow and prioritize targets, identify molecular signatures that distinguish early from late-stage disease, characterize subtypes, and simulate disease progression and drug response. The tools to finally solve the puzzle of

neurodegenerative diseases like Alzheimer’s exist. What’s been missing is the data foundation to power them. Crownlands is building it by pairing innovative sample collection with single cell analysis.

The Gateway-generated dataset is freely accessible to the scientific community at [CELLxGENE](#). You can also find the Crownlands research agent at [chat.crownlands.com](#), and their [preprint here](#).

Explore Flex Apex →

AI and 10x →

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