An iconoclast thrives in pursuit of knowledge

While exploring inflammation in the brain, Dr. Lyanne Schlichter finds the art in science

Judy Gerstel

Even before you arrive at neuroscientist Dr. Lyanne Schlichter's lab on the seventh floor of the Krembil Research Institute at Toronto Western Hospital, you see her work – her artwork, that is.

It's showcased on banners and elevator doors throughout the Krembil lobby.

One of the banners welcoming visitors to the three-year-old, ultramodern building reads, *Relentless*.

That succinctly sums up what the institute is all about in its pursuit of knowledge about the brain and how that can translate into cutting-edge health care.

But it's also a perfect description of Dr. Schlichter.

She's a Krembil senior scientist investigating the role of inflammation in the brain and is supervising research teams focusing on stroke, brain cells and electrophysiology, which is the field where she began her science career.

And she's relentless in going wherever her curious mind and honed instincts lead her, whether or not that makes her an iconoclast, which it almost always does.

The artwork is just one example of where her fertile mind takes her.

About six years ago, she was choosing images her trainees had captured on the microscope to include in papers they were publishing.

"What I suddenly realized was that these were so beautiful, it was a shame to just file away the ones we didn't use. So I thought, 'Why not have an art show?'"

She hung 36 very large pictures in a show she called *The Brain and Its Glue* at a coffee shop in Toronto's Cabbagetown neighbourhood, where she occasionally went to write papers, near her home.

Both her brain cell and spinal tissue art has been used in the corridors and elevator panels of the Krembil building.

Inflammation, the result of injury to the spinal cord and the brain, including stroke, is what occupies Dr. Schlichter's mind much of the time.

"I decided to start working on brain immune cells, the microglia," she says, "because almost nothing was known about them. And there was huge resistance to recognizing their role. They were considered the garbage collectors of the brain, clearing out dead cells and debris. So I received zero support and a lot of backlash," she says. "At first, granting agencies weren't interested in supporting the research. Some had never heard of microglia. But I persisted. What a battle! But we've done very well since then."

Now, she notes, 25 years later, "there's immense interest in microglia. They're implicated in every acute disorder of the brain."

It's the confounding aspect of immune cells and the inflammation they can cause in the brain that intrigues and challenges her. Is the inflammation helpful or harmful?

"The immune cells are double-faced," she explains. "They can go terribly wrong and attack the body. The question is, 'Why are these cells doing bad things in the body when the immune system is there to protect you?'"

That question is driving Dr. Schlichter's research, which also touches on diseases such as arthritis and cancer in which inflammation is, more and more, regarded as a key factor.

"There's not a simple explanation," she says. "But I believe there are two flavours of immune cells."

"The innate cells, like microglia, respond instantly; they're sensitive to any invader or damage (for example, bacteria) and they're ready to attack at once," says Dr. Schlichter.

"The adaptive cells, including lymphocytes," she explains, "are slower to act. They need to talk a lot back and forth." Lymphocytes are small white blood cells that play a large role in defending the body against disease. Dr. Schlichter and her team are exploring how these immune cells work in the brain: "How they function, how active they are, how they eat debris, how they interact with neurons and other cells in the petri dish."

She's also researching preclinical models of stroke, both brain hemorrhages and ischemic strokes.

"I'm looking at how inflammation develops in time and space from the site of the damage, what the cells are experiencing and how they are reacting."

Her job, as she sees it, is "to characterize the inflammation, so we have a better idea of how people can design treatment for the harmful effects of brain inflammation such as killing neurons or damaging the blood-brain barrier."

Understanding of stroke and inflammation has "boomed in the last 25 years," she says, "but hemorrhagic stroke is still grim. Fifty per cent of people die within the first year."

"This," she says, referring to her lab, her work and possibly what possesses her, "is about reducing damage and aiding recovery after stroke." ■