

Researcher Profile: Anne Hocking, PhD

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are associated with different phases of wound repair. They will also determine whether wounds with impaired healing are associated with different metabolic programs than wounds with normal healing.

Dr. Hocking is also working with Dr. Brooke Russell at ECM Technologies, LLC and Dr. Elizabeth Cosgriff-Hernandez at Texas A&M University to develop a novel wound dressing that will accelerate healing of chronic wounds. This dressing incorporates an engineered bacterial collagen-mimetic protein into a biodegradable hydrogel. The bacterial collagen-mimetic protein has the triple helical structure characteristic of native mammalian collagens but lacks collagen's arrays of cell adhesion, cytokine binding, and enzyme cleavage sites, which allows directed engineering to specify functional activity. For the wound dressing, the bacterial collagen-mimetic protein has been engineered to recruit specific cell types that promote wound healing. The wound dressing is also novel because of the use of hydrogel microspheres instead of hydrogel sheets, which are difficult to fit to deep or irregularly shaped wounds. In contrast, hydrogel microspheres provide a gel-like dressing that can conform to wound shape. Dr. Hocking and her colleagues recently received funding from the

US National Institutes of Health to evaluate their wound dressing in a diabetic mouse model of impaired wound healing. They will determine whether the wound dressing accelerates wound closure and increases wound vascularity. They will also assess the effect of the dressing on both the inflammatory response to injury and scar formation.

Dr. Hocking also has ongoing collaborations with Drs. Nicole Gibran and Saman Arbabi, Professors in the Division of Trauma, Burn and Critical Care Surgery, investigating hypertrophic scar formation after burn injury. To date, there is no therapeutic intervention known to prevent these disfiguring scars, which are red, raised, itchy and contracted. This lack of preventative therapies has devastating consequences for a patient's quality of life. Dr. Gibran's team is determining whether there is a genetic predisposition to hypertrophic scarring whereas Dr. Arbabi's team is studying whether controlling local inflammation in the wound prevents hypertrophic scarring.

Taken together, these projects represent an exciting opportunity to translate findings in the laboratory into novel therapeutic interventions that will greatly improve medical and surgical care of patients with chronic wounds or burns.

Unfamiliar Territory by Shane Morrison, MD

Plastic Surgery resident Shane Morrison recounts his trip to procure a liver with Transplant Surgery Fellow, Amir Azar.

Alaska was our destination. It would be my first visit to the great icy wilderness that I envisioned lies north of the Puget Sound and the intervening evergreen islands too innumerable to name. Summer was turning to fall, and the clear night sky speckled with ever-morphing clouds separated the violet and marigold hue of the setting sun from the vast darkness above. It was rumored that the Northern Lights may greet us – their twirling and glittering green appendages spread wide to embrace our oncoming plane. I smiled with anticipation.

Adrenaline supplemented with a late-night drip coffee helped my eyelids open back up after a lingering blink as they sought to make up for the sleep debt compiled in surgical residency. I felt a growing excitement at the idea of arriving in unfamiliar territory on a mission to help free our patient from a life-threatening illness, and was reminded of Thoreau's own excitement at leaving the troughs of society behind to sustain himself off of the wilderness of Walden's land. Our taxi arrived, and, dressed uniformly in baby blue scrubs we stepped in, leaving behind a

family anxiously awaiting our return and the gift we would bring that was only realized through death.

The sound of the accelerating plane on the tarmac had its usual effect on me, and I was asleep before cruising altitude. I awoke shortly before landing, noting how miniscule the fluorescence of our destination city was compared to Seattle's. The streets were



Drs. Shane Morrison (left) and Amir Azar boarding flight to Alaska

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Unfamiliar Territory

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Drs. Martin Montenovo and Shane Morrison

bare aside from a solitary moose chewing dew-covered grass on the side of the road.

The burst of warm air and the screech of sliding doors welcomed us into a quiet and unpopulated emergency room; much different from the hallways where we trained, which regularly overflowed with more patients than available beds. Like any unfamiliar visitor, we wandered around the hospital looking for the operating rooms, too early in the morning for an information center to guide us.

Large birch doors with red banners stating “Authorized Personnel Only” were our last obstacles separating us and the operating rooms. Brief introductions by staff eager to meet the surgeons from our transplant center preceded our switch into the new, pale green scrubs. As we walked into the hallway in clean attire, I tucked my shirt in and gave a final pull on my chartreuse drawstrings to snug the pants around my waist. A blue cap with breathable mesh on top and a white mask prone to fogging my glasses finalized my surgical attire as we stepped into the operating room.

Scrub technicians and circulating nurses scurried about as instruments were set up and fluids hung. In the corner, a technician crushed bags of frozen saline with a hammer. The ice slurry was loaded into two separate containers, each the awaiting host of an intraabdominal organ. We were given a sheaf of documents summarizing the last days of our donor’s life in a set of vitals and labs; we looked for any red numbers signaling abnormalities and potential harm to the organs. A solitary paragraph summarized the donor’s hospital stay – brain death from complications of a respiratory illness. As we selected our gloves, we nodded to the circulator that we were ready for the donor – the labs were satisfactory.

The case was different than what I had seen to this point in residency – there was no meeting of the patient in the waiting room or the family at bedside. Intubated and sedated, the donor was wheeled on a stretcher through the operating room doors; the anesthesiologist intermittently pumping a bag connected to her endotracheal tube to assure oxygenation. Transfer of the donor to the operating table signaled us to scrub in. I distracted myself by looking at the different cleansing solutions available, making sure to avoid the betadyne and the yellow film it leaves behind.

We entered the operating room using only our backs and feet to prop the doors open. Drops of water ran from our hands to our elbows and onto the floor, our scrub tops and pants dotted with water from the high pressure of the scrub facet. We dried ourselves with green towels matching our scrubs, then we were gowned and gloved. The transplant surgery fellow, Amir Azar, instructed me that I was on the chest while he did the abdomen. I had never opened a chest before, but tonight I would be responsible for sawing the sternum open and exposing the heart before we procured the liver. The patient was draped and our pre-operative checklist was shorter than normal due to the nature of the case. The family had asked us to pray before beginning operation, and as I bowed my head I thought of the immeasurable gift our donor offered, knowing I would be one of the last people to see our donor’s heartbeat.

On the return flight I took a photo of my feet perched on the seat in front of me with the interior of the jet as the backdrop. “On a Lear jet back from Alaska,” I texted my friend. Our arrival in Seattle meant another patient’s hope for a new life free from cancer and liver failure, a family allowed more time with a loved one, and a few hours of sleep for me before our next flight for organ procurement.