

biological view

The Deepwater Horizon Story

Guillette said they know if a developing embryo is exposed to certain compounds that will alter its development and in many – if not most – cases, will establish a predisposition for disease. “We are now collecting data. It took us a year to establish and validate our assays and approaches for use with crude oil and its fractions and the surfactants used during the oil spill. Early data suggests that there are components of crude oil – dispersant mixtures that are obesogenic – driving the fate of stem cells toward fat cells. Work over the next year or two will further these initial observations.”

Though the *DWH* spill provided the impetus for the current research, which is funded by the BP/The Gulf of Mexico Research Initiative, the results will go far beyond the spill.

“It accelerates the work in this area and fosters the science,” he said of the *DWH* spill research. “Here’s a component we use every day, and it’s forcing us to look in very different ways, at an oil spill, and because of its scale, because it was so massive, it demanded a massive response. There are tankers that hit shoals every day and spill 100,000 gallons of oil, and everybody goes ‘well that’s just modern society.’ But the fact is that oil has an impact on those systems and quite bluntly, we don’t understand them. We still don’t understand all the ramifications of Exxon Valdez, which was ‘just’ an oil spill off the Alaskan coast.”

Another beneficial effect is how the *DWH* research was put together so that scientists from different areas were encouraged to collaborate. Guillette said in his past 30 years

experience as a scientist, he has found the greatest discoveries take place at the interfaces of science fields. When this kind of complex problem presents itself, that’s where the solutions will appear. The *DWH* spill is requiring people with different skill sets to work together to try and understand the impacts.

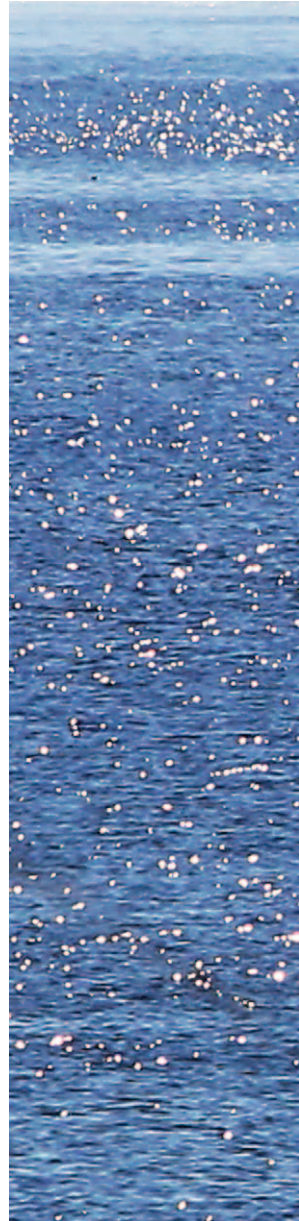
“Chemists can fractionate oil, but they can’t do what we do with those fractions in our engineered cells. By working together, we’re actually going to make much bigger discoveries, and that’s the model of the HML. All of the faculty members who are a part of the central mission of HML are, in fact, interested in that interface between environment and health. Whether it’s chemists, biologists, molecular biologists or managers who are trying to understand how you manage food or the other resources that the state is going to use, that’s how it all links together. That’s the bigger picture.”

Spyropoulos agrees, noting the wealth of individuals with warehouses of data, samples and technology at HML. “There’s a huge amount of measurements on toxic exposures in different regions and sentinel organisms. I can go and talk to a host of HML partners involved in water, sediment and marine organism tissue acquisition, contaminant analysis and fractionation, and they can tell me what I need to know. For example, if organisms in those areas carry such contamination. I can go to HML partners that have been conducting health assessments on coastal dolphins and get cells from individual dolphins that have been tracked since 2005.”

“We have partners who can measure heavy metals, including the obesogen Trybutyltin used in antifouling paint – people who can measure these compounds with world expertise. If I want to make sense of huge amounts of data on mixtures of components of crude oil and dispersant, I can access HML partners’ ‘Machine Learning Tools.’”

Guillette said all these researchers are tied together by the marine environment, where sentinel organisms, such as alligators and dolphins, reveal important clues about human health and the growing field of epigenetics. It’s why a place such as HML, with such diverse groups, has such cohesion. They all are tied together by a similar mantra.

“The mantra that we always have is, ‘if it’s not healthy for this organism living out there, it’s probably not healthy for us. If it’s not healthy for their kids, it’s probably not healthy for our kids.’ Now, is it always a one-to-one relationship? Of course not, but a red flag is a red flag. So if we’re seeing something going on in the environment, we have to ask is there something going on in ourselves?”



Though there’s a wide breadth of researchers at HML, the group holds a central mission of improving the quality of the marine environment and discovering the interconnections with human health.