Bioabsorbable cardiac stents

Predicting degradation rates in vitro

Blockages or narrowing in the arteries of the heart are often alleviated using metal stents. Traditionally, stents are fabricated from mesh and remain in the body permanently or until removed through further surgical intervention.

Permanent foreign material, however, may contribute to recurring blockages and complicate follow-up treatment.

Biodegradable materials, most notably iron, have been investigated to develop non-permanent stents. Currently, no in vitro model exists that can accurately predict realistic degradation rates, the result of which can lead to expensive animal tests for in vivo testing.

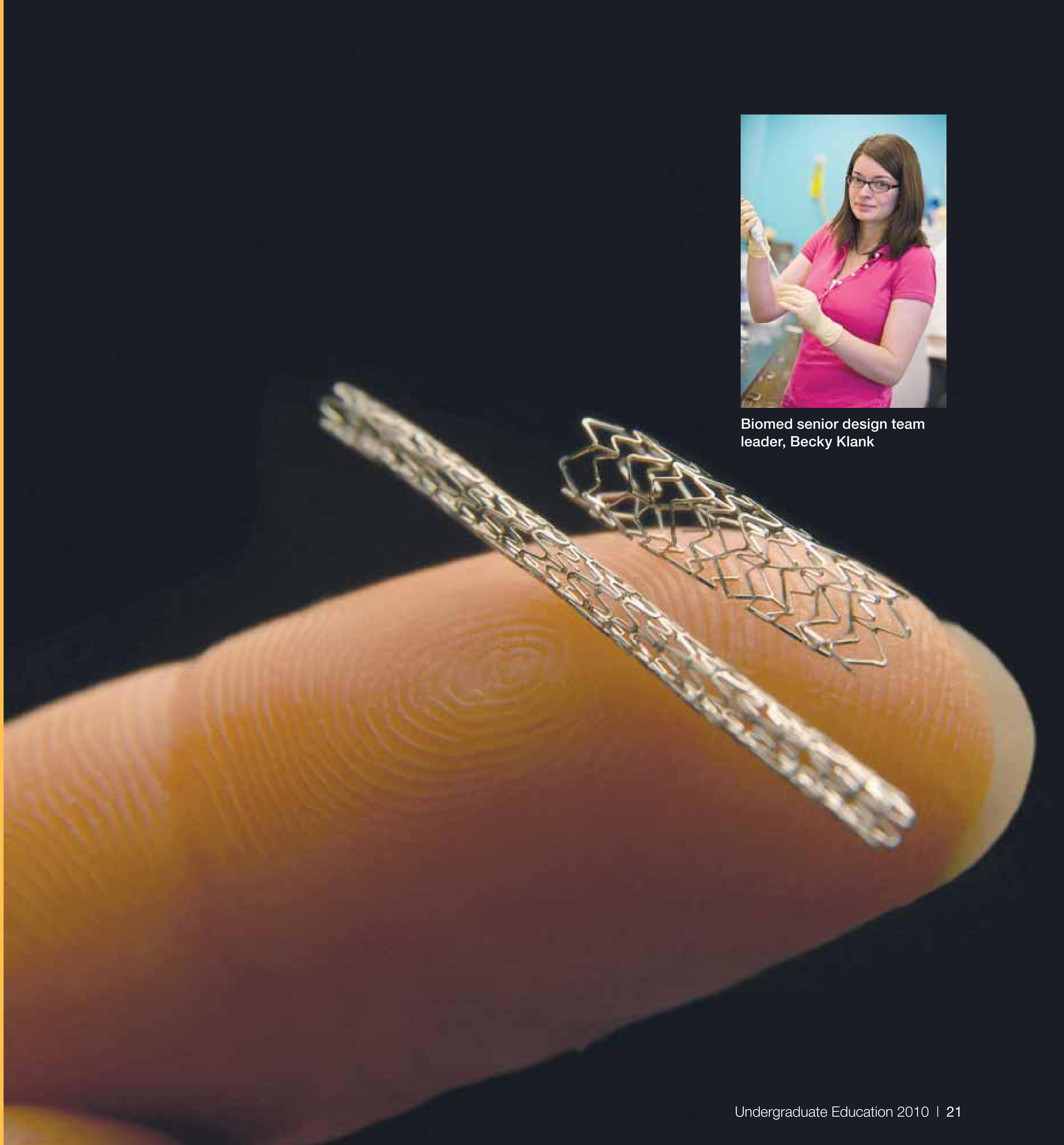
In a project sponsored by Boston Scientific, a senior design team at Michigan Tech developed an in vitro testing method to more accurately predict in vivo degradation rates. The team's method is inexpensive and easily reproducible.

"Our project was very open-ended. We were basically instructed to design a model for the degradation of stents with the understanding that previous lab experiments had not created results that correspond to what actually happens in the body," explains biomedical engineering student Becky Klank. "The body is so complex that it left our group with a plethora of options to investigate."

Most challenging, according to Klank, was interpreting exactly what the sponsor wanted them to do, and identifying exactly which aspects of the project were most important to pursue.

"The most rewarding part for me has been to see our sponsors' response to our hard work," she adds. "Even before the project's completion, our sponsors were giddy with excitement over our preliminary results. Naturally, they had several more questions they wanted answered and gave our group even more options on where to direct our attention."

The most valuable lesson learned was the importance of flexibility. "The further we progressed, the more we had to change our initial ideas and assumptions about what was important."



Biomed senior design team leader, Becky Klank