From left: Philip Band, Mary Cowman and Hans-Georg Wisniewski.

The Power of Collaboration

NYU and Poly Create the Perfect Fit in Biochemistry

The title, "HA-TSG-6," may not sound compelling, but the characters and discovery involved certainly are.

In October 2007, Poly's Mary Cowman, professor of biochemistry and director of the Othmer Institute for Interdisciplinary Studies, was reviewing the manuscript of a research paper co-written with NYU's Dr. Hans-Georg Wisniewski and Dr. Philip Band, when a movie began to play in her head. The movie's stars were those of the paper: hyaluronan (HA), a carbohydrate polymer used primarily in ophthalmology and arthritis treatments, and TSG-6, a protein molecule that has shown anti-inflammatory qualities in the laboratory, but is not yet used medically.

Cowman, Wisnieski and Band were preparing the paper for publication as preliminary data in a proposal to the National Institutes of Health for a grant to continue its research on interactions between hyaluronan and TSG-6. "When my mind flashed on the scene of the two molecules working together to release the anti-inflammatory portion of a blood plasma protein," explains Cowman, "I realized that the potential medical applications of our work was so unique that maybe we should hold back on submitting the paper and look into patenting our invention."

Their invention, for which they now hold a provisional patent, is for a stable compound of hyaluronan and TSG-6 in which the complementary benefits of each join to form a new biomedical material: HA-TSG-6. The material has the potential to improve treatments of arthritic diseases, control painful post-surgical tissue adhesions, coat artificial joints and other solid biomaterials to make the body accept them better, and reduce topical wound inflammation.

According to Band, who spent 20 years in the biotech industry before recently returning to NYU where he began his research career, hyaluronan is a $1 billion worldwide industry. Naturally, the competition to create new hyaluronan-based therapeutics is fierce.

A standout discovery requires extensive knowledge of hyaluronan, which Band and Cowman have, and inventive research. Enter TSG-6, a more recently discovered protein that Wisniewski began studying shortly after his NYU colleague Dr. Jan Vilcek first cloned it.

"There are probably less than five groups in the world that work on and with TSG-6 independently," says Wisniewski. Among Wisniewski and Vilcek's findings is a critical characteristic of TSG-6 to this current collaboration: it is a hyaluronan-binding protein.

While the overlapping characteristics of hyaluronan and TSG-6 have been known for some time, it wasn't until Band became interested in the protein and introduced Wisniewski to Cowman that a true collaboration was born. Band met Cowman in the early 1980s at Biomatrix, Inc., a company founded by hyaluronan pioneer Dr. E. A. Balazs, who Dr. Cowman had previously worked with as a postdoctoral fellow at Columbia University.

"Our initial focus" explains Wisniewski, "was on science, to combine different methodologies and techniques to do research that is at the interface of protein- and glyco-biochemistry."

Cowman has authored numerous papers on hyaluronan and believes that the team's efforts to do basic science in the lab and share their respective expertise could lead to "a new generation of hyaluronan products."

Over the next year, Wisniewski, Cowman and Band will refine their work as they formalize their patent filings and refine product prototypes. Their intention is to interest pharmaceutical, biotech, and medical device companies in licensing the rights to the patent, thus providing the funding they need to continue their promising research.

Band says that during his years in biotech, he has seen similar stories of researchers being on the cusp of commercializing their discovery, but, in the end, the pieces just didn't come together. What's different about HA-TSG-6? "The people," says Band. "It's one thing to make a discovery; it's another to know what to do with it."

The story of HA-TSG-6, according to Cowman, "is an illustration of the potential of the Poly-NYU merger to create important new development opportunities. When two realms of expertise come together, one plus one can sometimes equal three."

It's also a model for how collaborations between Poly and NYU can leverage the world-class reputations of both institutions to more effectively take ideas and inventions out of the lab and into the commercial marketplace.