

Research of The University of Akron

Organometallic Pharmaceutical Candidates to Treat Infections and Cancer

Silver-based compounds have long been known in medicine, although their use to treat infections has largely been eliminated with the advent of modern antibiotics. However, there has been renewed interest in the use of silver for its broad-spectrum antimicrobial activity. Recently, the use of silver-based compounds in medicinal applications has gained additional favor, as they are therapeutically effective without the severity of side effects caused by other active metals.

Cutting-edge research on silver-based pharmaceutical candidates has been conducted by Dr. Wiley J. Youngs and his team at The University of Akron. They have identified silver n-heterocyclic carbene complexes which have shown efficacy in treating bacterial lung infections, pneumonia, and cystic fibrosis. The first US patent application, US 2007/0021401, on *Metal Complexes of N-Heterocyclic Carbenes as Radiopharmaceuticals and Antibiotics* was published in early 2007, with several related inventions currently pending.

The University has assisted Youngs in the commercialization of his technology through a start-up venture known as Akron Research Commercialization Corporation. Their first product offering in 2007, coined Silvamist™, is an inhaled pharmaceutical candidate for the treatment of respiratory disorders and lung infections. The company is currently in the process of applying for Investigational New Drug (IND) status for Silvamist™ with the FDA.

For continued research and development in this area, an academic and industry Center for Silver Therapeutics Research has been established and headquartered at The University of Akron. Subsequent early-stage research has shown that some of these silver-based complexes also demonstrate utility as chemotherapeutic anticancer agents.

This potentially breakthrough research has identified specific silver complexes which are active against breast and ovarian cancer cell lines. In addition, these compounds offer the advantage of reduced toxicity over other potent anticancer drugs such as the platinum-based, cisplatin. Cisplatin is the chemotherapeutic agent used to successfully treat Lance Armstrong's testicular cancer, and helped support his amazing recovery from advanced stages of metastatic cancer.

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Faculty Inventions and Patents at UA

- Polymer science (88)
- Medical (50)
- Information technology (24)
- Nanotechnology (23)
- Advanced materials (19)
- Biotechnology (7)
- Chemical technology (6)
- Environmental (6)
- Energy (3)
- Security (3)



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Research at UA

As the public research university of northern Ohio, The University of Akron is connected to the community and to industry, using research as the driver for finding meaningful solutions to advance the region.

162 – number of active UA patents
6,300,000 – 2006 licensing revenue, leading to a statewide first place ranking in rate of return for technology commercialization
1 – worldwide ranking in patents issued per research dollar spent, according to a five year study by the Milken Institute
24,800 – number of UA students, under the tutelage of 735 full-time faculty members
16 – percentage of UA's \$51.7 million 2007 research expenditures funded by industry, the national average is 5 percent

For more information on The University of Akron's faculty inventors listed above, visit www.uakron.edu/research.

About The Faculty Inventor



Dr. Wiley Youngs is a Professor of Chemistry and Integrated BioSciences at The University of Akron. He is also Director of the Center for Silver Therapeutics Research and Director of the X-Ray Crystallographic Facility. He is actively involved in the research, development, and commercialization of antibacterial and antimicrobial pharmaceutical candidates based on organometallic compounds of silver. Such compounds have shown excellent efficacy in laboratory trials, and are currently undergoing clinical trials for the treatment of cystic fibrosis.

Invention Information

Title: Metal Complexes of N-Heterocyclic Carbenes as Radiopharmaceuticals and Antibiotics

Patent Application Number: [US2007/0021401](#)

Published: 01/25/2007

Title: Macrocyclic Metal Complexes for Their Use as Anticancer Agents

Patent Application Number: [WO2006/138357](#)

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