Cystobactamides – novel antibacterials against gram-negative pathogens

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Challenge

Infectious diseases caused by bacterial pathogens remain a major health issue, not only restricted to developing countries. In highly industrialized countries, the effects of globalization and the emergence of bacterial resistance contribute to their epidemiologic relevance. According to the European Center for Disease Control and Prevention, pathogenic bacteria from the species Klebsiella pneumoniae and Escherichia coli that display combined resistance against 3rd generation Cephalosporins, Fluoroquinolones and Aminoglycosides are on the rise. Even Carbapenem, the last resort in such cases, may prove to be futile as Klebsiella is able to develop resistance against it as well. New and innovative approaches are needed to tackle this problem.

Technology

Provided are Cystobactamides, a group of newly discovered natural products isolated from Cystobacter spec., that show strong antibacterial activity against E.coli and other gram-negative bacteria in the submicromolar range. Results from in vitro assays indicate that Cystobactamides target the bacterial gyrase, interfering with DNA replication. Only limited cross-resistance was detected. No cytotoxic activity was recognized in standard cell culture assays. The basic structure of the Cystobactamides provides a new scaffold for the generation of innovative antibiotic drugs to combat infections with gram-negative and gram-positive pathogens. The natural compound is available in sufficient amounts for further development by an established fermentative production process which can readily be optimised for large scale production by biosynthetic engineering. In addition chemical synthesis from building blocks is established. Altogether these favourable properties qualify the new compounds for further development.

Commercial Opportunity

Cystobactamides are offered for licensing or co-development.

Developmental Status

Results from in-vitro assays are available.

Patent Situation

Further Reading