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Modified Aminoglycoside Based Polymers

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Inventors

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Invention Description

Gene delivery systems include both viral and non-viral carriers. The use of cationic polymers, such as aminoglycosides, as non-viral carriers has seen increased interest mainly due to their ease of synthesis, robust nature and gene delivery efficacies. Unfortunately, cationic polymers are also known for low gene expression and toxicity. Because of their great potential utility in gene delivery, there is a need for modified cationic polymers that overcome these limitations.

Researchers at the Arizona State University have developed modified aminoglycoside polymers for the binding and delivering of non-viral nucleic acids to cells. These polymers can also form micelles, further enabling their use in applications such as drug delivery, combined drug and gene delivery and imaging studies. Gene delivery properties of these polymers were evaluated in multiple types of cancer cells including PC3, PC3-PSMA and 22RV1. The transfection efficacies were found to be many times higher than the unmodified parent cationic polymers as well as polyethyleneimine, which was used as a standard.

These modified polymers can be used as efficient gene delivery vectors for *in vitro* as well as *in vivo* studies, and they can be used in drug delivery and imaging applications. Such wide utility makes them potentially very valuable.

Potential Applications

- Non-viral nucleic acid delivery
  - Can be used for *in vivo* or *in vitro* studies
- Drug delivery
- Combined drug delivery and gene delivery
- Transgene Expression
- Imaging studies

Benefits and Advantages

- Higher transfection profiles as compared to unmodified parent polymers
- High serum stability even at very high serum concentrations
- Drugs were loaded with a loading capacity of 11-13%
- Simple method of preparation
- Water soluble
- Low cellular toxicities & immunogenicities
- Increased utility via generation of micelles
- Cost effective

Intellectual Property Status:

Patent Pending

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