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Liposomal drug delivery: nanotechnology comes of age with targeted medicines

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Application of nanotechnology in drug delivery systems has provided new avenues for the engineering of materials with molecular precision.

ESSAY

Liposomal drug delivery is one type of nanotechnology currently in clinical use.

Liposomes are microscopic spheres composed of a phospholipid outer layer and aqueous inner layers capable of encapsulating aqueous drugs. Drugs are gradually released from the inner layer while the body absorbs the nontoxic outer layer.

The GIST

• The medical-legal professional should become familiar with this method of drug delivery and its growing usage.

Drugs that benefit most from a liposomal carrier are those with unfavorable pharmacokinetic (absorption, distribution, metabolism and excretion), biodistribution or toxicity profiles.

Liposomes have a natural ability to target cancer. The liposome delivers the chemotherapeutic agent preferentially to the disease site, thus reducing the side effects of the toxic drug while protecting sensitive tissue from drug exposure.

The ability of liposomes to control drug release rates allows them to function as sustained release systems. This has particular benefit in post-operative pain management. Epidural analgesia involves the use of an indwelling epidural catheter that can interfere with mobility and increases the risk of infection. Extended-release epidural morphine (EREM) is a liposomal formulation for epidural use and provides 48 hours of pain relief without the indwelling catheter.

Now that several liposomal formulations are available and have clinical approval, the pathway is open for other drugs to be considered for this novel system. •

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