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Imaging data reveals nanomedicines in lungs

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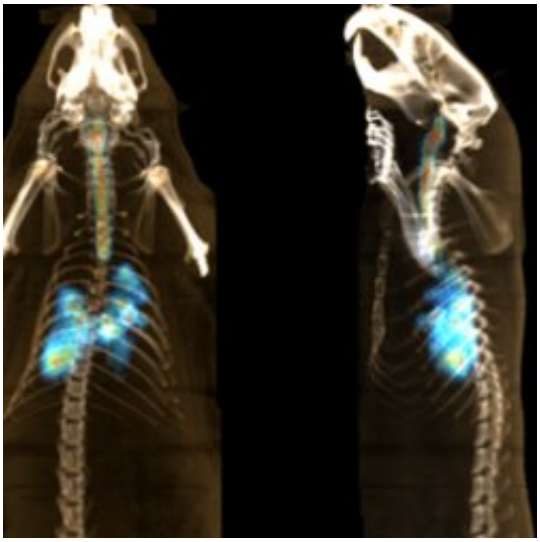

Credit: PneumoNP-CIC BiomaGUNE

The PneumoNP project aims at developing new inhaled nanotherapeutic formulations to combat lung infection. The novel drug is comprised of an antibiotic carried by a nanoparticle. For this project, Spanish researchers from CIC BiomaGUNE track the location of the therapeutic particles in rat airways.

The use of nanoparticles in formulations is anticipated to lengthen the residence time of the drug in lungs. Indeed, it is expected to slow down and control the release of the active molecules. This prevents rapid metabolism and fast clearance. So, the therapeutic effects are expected to increase. Besides, the delivery by inhalation contributes to diminish

undesired toxicological and off-target side effects. The results obtained in imaging experiments are essential to establish the appropriate dosage to be used in therapeutic experiments with infected animals and to predict therapeutic efficacy.

The researchers have developed labeling methods to incorporate different radionuclides to the nanocarrier and the antibiotic. Thanks to the different physical properties of the radionuclides, they visualize the spatiotemporal distribution of the nanocarrier and the antibiotic separately. To achieve that they also used complementary in vivo imaging modalities.

From imaging experiments, relevant information can be determined quantitatively by using only few experimental animals and extremely refined procedures. The percentage of administered dose that reaches the lungs is important to assess the efficacy of the aerosol delivery method. The researcher looks also for the regional distribution of the antibiotic and the nanocarrier within the lungs. With the spatiotemporal imaging, they evaluated the residence time of the active drug and the nanocarrier in the lungs.

Provided by CORDIS