# InSyTe FLECT/CT Application Spotlight

*Hypertension, antisense oligonucleotide imaging*

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**Title:** In vivo hypotensive effect of aminosilanol-based nanocomposites bearing antisense oligonucleotides
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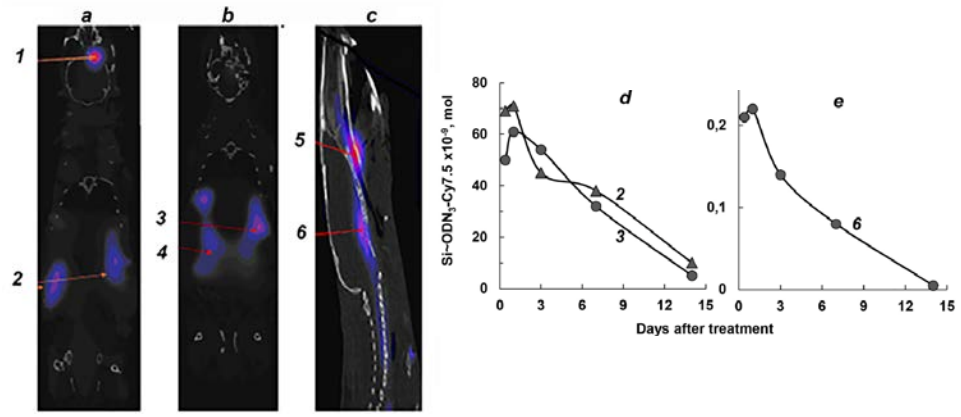
**Keywords**: Hypertension, antisense oligonucleotide, nanocomposites

**Summary:** The search for new approaches to prevent and treat stress-induced hypertension, or high blood pressure, is of great interest due to undesirable side effects of current short-acting, small molecule-based drugs. One approach is to target hypertensive genes (i.e. ACE1, AT1A) using nucleic acid (NA)-based drugs such as antisense oligonucleotides (ODN) that bind complementary sites of target RNA and inhibit its function. These NA-based treatment regimens are promising because of their long-lasting action and minimal side effects. Delivery of these NA-based drugs to their genetic targets has been explored using nanoparticle-based delivery vehicles. In this study, a compound comprised of a silica nanoparticle and ODN was developed and evaluated for its hypotensive effects. This Si-ODN nanocomposite was designed to target the hypertension related genes ACE1, AT1A, and ADRB1. The effect of these Si-ODN nanocomposites was studied in an rat model of hypertension (ISIAH rats) and the biodistribution of the nanocomposites after administration in SPF SCID mice.




(a) and (b) show biodistribution after retroorbital administration, while (c) shows biodistribution after inhalation. Distribution over time plotted in the kidney and liver (d) and brain (e) from FLECT data.

**InSyTe FLECT/CT Spotlight**: Using the InSyTe FLECT/CT, the research team obtained in vivo biodistribution images of the ACE1 targeting Si-ODN nanocomposites labeled with Cy7.5 in SPF SCID mice. Scans were performed for mice treated with the Si-ODN nanocomposites via different administration routes (retroorbital vs. inhalation) over a 15 day period. Distribution of fluorescence was assessed in different organs with the mice, with a time course of distribution plotted in the kidney, liver, and brain to show the long-lasting effect of the administered nanocomposite.