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In vitro antiproliferative activity of palladium(ii) thiosemicarbazone complexes and the corresponding functionalized chitosan coated magnetite nanoparticles (Article)

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Abstract

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This work reports the synthesis and characterization of palladium(ii) complexes Pd(L¹)₂ (1), Pd(L²)₂ (2), Pd(L³)₂ (3) and Pd(L⁴)₂ (4), where L¹H: 1-naphthaldehyde thiosemicarbazone; L²H: 4-phenyl-(1-naphthaldehyde)thiosemicarbazone; L³H: (2-hydroxy-1-naphthaldehyde)thiosemicarbazone; L⁴H: 4-phenyl-1-(2-hydroxy-1-naphthaldehyde)thiosemicarbazone. All four complexes show in vitro antiproliferative activity against the following human tumor cell lines: H460, DU145, MCF-7, M14, HT-29, K562, and HuTu 80. In particular Pd(L¹)₂ has the most potent activity for all the studied cell lines (IC₅₀ ~ 1 μM), with the exception of H460. Pd(L²)₂ is a promising candidate as a pharmacological agent, since it presents a significant activity and is more innocuous than cisplatin against mouse fibroblast normal cells, 3T3. Pd(L⁴)₂ is the complex which exhibits the lowest activity against the same cell line (IC₅₀ ~ 11 μM), being ten times lower than that of Pd(L¹)₂. These complexes were used to functionalize chitosan coated superparamagnetic magnetite nanoparticles with a metallic core of 11-13 nm, and the activity of these functionalized nanoparticles (NPs) against diverse human tumor cell lines was also tested. The nanoparticles functionalized with Pd(L¹)₂, Pd(L³)₂ and Pd(L⁴)₂ show antiproliferative activity against DU-145, while those with Pd(L²)₂, Pd(L³)₂ and Pd(L⁴)₂ against HuTu80. © The Royal Society of Chemistry and the Centre National de la Recherche Scientifique 2016.

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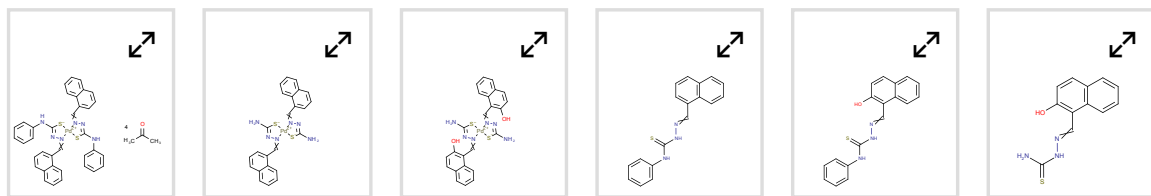
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(2 hydroxy 1 naphthaldehyde)thiosemicarbazone
1 naphthaldehyde thiosemicarbazone
4 phenyl (1 naphthaldehyde)thiosemicarbazone
4 phenyl 1(2 hydroxy 1 naphthaldehyde)thiosemicarbazone
chitosan
cisplatin
magnetite nanoparticle
palladium complex
thiosemicarbazone derivative
unclassified drug

EMTREE medical terms:

animal cell
antiproliferative activity
Article
fibroblast
human
human cell
in vitro study
mouse
nonhuman
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synthesis
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