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## Ruthenium Complexes Aimed at Chagas' Disease

The parasite *Trypanosoma cruzi* causes Chagas' disease, a major health problem in Latin America. The disease is transmitted by insects, blood transfusion and maternal infection to the foetus. The poorest environments suffer most. Debilitating illness leads to later death. Transmission is attacked by vector insect control and blood screening. Drug treatment (usually Nifurtimox™ and benznidazole) is used for acute, early, indeterminate and congenital cases. As *T. cruzi* antigens can stimulate autoimmunity, immunisation is not possible.

Nifurtimox™ is inefficient at treating the chronic stage of the disease and has undesirable side effects. To counter this, semicarbazones derived from 5-nitrofurfural have been synthesised and show activity against *T. cruzi*. The compounds generate nitro anion radicals, which may be the cause of their activity.

Earlier work has shown metal complexes of some antitrypanosomal drugs (imidazole and thiazole derivatives) are more active against *T. cruzi* than the free ligands. As there are similarities between metal drugs displaying antitumour and trypanocide activity, ruthenium complexes with antitrypanosomal ligands have been synthesised. However, ruthenium semicarbazones have received less attention for this use (1).

Now, in a further attempt to produce complexes that combine the antitrypanosomal activities of both the metal and ligand, researchers at the Universidade de São Paulo, Brazil, Universidad de la República, Uruguay, and Universidad Nacional de La Plata and Instituto IFLP, Argentina, have synthesised new Ru(II) complexes (2). The complexes have general formula,  $[\text{Ru}^{\text{II}}\text{Cl}_2(\text{DMSO})_2\text{L}]$  (DMSO = dimethylsulfoxide; L = 5-nitro-2-furaldehyde semicarbazone (L1), *N*<sup>4</sup>-*n*-butyl-5-nitro-2-furaldehyde semicarbazone (L2) and 3-(5-nitrofuryl)acroleine semicarbazone (L3)). The complexes have been characterised and crystal and molecular structures of the L1 and L2 complexes determined. The Ru atom in both crystals is in a similar octahedral environment, equatorially coordinated to the semicarbazone molecule, acting as a bidentate ligand through the N and O atoms. Work to evaluate the activity of these Ru complexes on the proliferation of *in vitro* *T. Cruzii* cultures is underway.

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