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FULL PAPERS

含阴离子$[Mo(V)O_2(O_2C_6H_4)_2]^{3-}$、$[Mo(V)_{0.5}W(VI)_{0.5}O_2(O_2C_6H_4)_2]^{2.5-}$、$[W(VI)O_2(O_2C_6H_4)_2]^{2-}$的配合物与ATP的作用及切割DNA抗癌抗肿瘤活性

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摘要 合成了配合物 $(NH_3CH_2CH_2NH_2)_3[Mo(V)O_2(O_2C_6H_4)_2]$(**1**), $(NH_3CH_2CH_2NH_2)_{2.5}[Mo(V)_{0.5}W(VI)_{0.5}O_2(O_2C_6H_4)_2]$(**2**) 和 $(NH_3CH_2CH_2NH_2)_2[W(VI)O_2(O_2C_6H_4)_2]$(**3**)，测定了其晶体结构，研究了其与ATP的作用以及切割DNA和抗癌抗肿瘤活性。研究发现当配合物从晶体溶于水溶液中时其钼的氧化还原状态不发生改变，而钨却从原来的正六价还原为正五价。在水溶液中ATP能促进钼和钨从M(V)氧化为M(VI)从而促进配合物的水解。配合物的小白鼠动物活体实验表明：配合物**1**呈优秀的抗S_{180}活性，而且在同等实验条件下较著名抗癌药物环磷酰胺呈更优秀的药效，但配合物2与3呈较低的药效。研究还发现：该系列配合物的抗癌抗肿瘤药效正比于其切割DNA活性以及其在溶液中的水解程度。

关键词 *cis*-Mo(V)=O, *cis*-$Mo(V)_{0.5}W(VI)_{0.5}$=O, *cis*-W(VI)=O,邻苯二酚,ATP,切割DNA,抗癌抗肿瘤

分类号

Interactions with ATP, DNA Cleavage and Anti-tumor Activities of Complexes with Anions $[Mo(V)O_2(O_2C_6H_4)_2]^{3-}$, $[Mo(V)_{0.5}W(VI)_{0.5}O_2(O_2C<$

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Abstract $(NH_3CH_2CH_2NH_2)_3[Mo(V)O_2(O_2C_6H_4)_2]$ (**1**), $(NH_3CH_2CH_2NH_2)_{2.5}[Mo(V)_{0.5}W(VI)_{0.5}O_2(O_2C_6H_4)_2]$ (**2**) and $(NH_3CH_2CH_2NH_2)_2[W(VI)O_2(O_2C_6H_4)_2]$ (**3**) were synthesized, structurally characterized by X-ray diffraction analysis, and studied on their interactions with ATP, their DNA cleavage activities and antitumor properties. The redox state of molybdenum was not changed on going from crystal to aqueous solutions in complexes **1** and **2**, while tungsten underwent reduction from W(VI) to W(V) in complexes **2** and **3**. ATP promoted the oxidation of both molybdenum and tungsten from M(V) to M(VI) and the hydrolysis of catecholate ligands in solution consisting of ATP and the complexes. Complex **1** possesses fairly good activity to DNA cleavage and against tumor S_{180} in mice, and is more effective than the control drug cyclophosphamide under the identical conditions. However, complexes **2** and **3** exhibited marginal effectiveness. The effectiveness of anti-tumor of the complexes was related positively to their DNA cleavage activities and their hydrolysis of catecholate ligands.

Key words *cis*-dioxo-molybdenum(V) *cis*-dioxo-molybdo(V)tungsten(VI) *cis*-dioxo-tungsten (VI) catechol adenosine triphosphate DNA cleavage antitumor

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