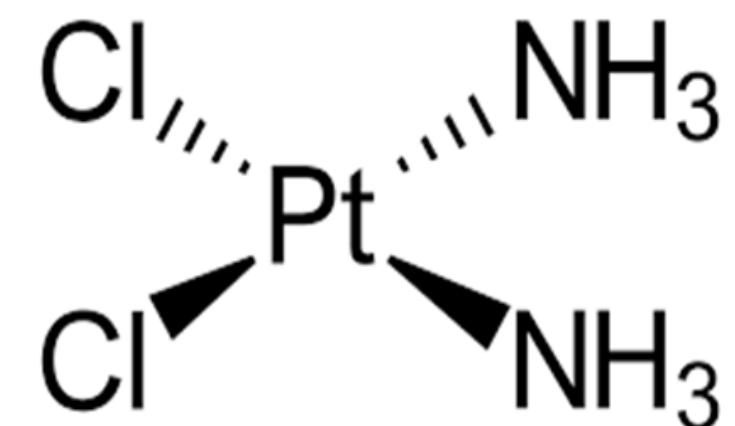


# Comparison of Cisplatin vs Carboplatin in the Treatment of Cancer

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## Cisplatin



- Cisplatin is the oldest member of its platinum-based group. It has a square planar geometry with a complex of diamminedichloroplatinum(II) and arranges in a cis position.
- Cisplatin is effective in the apoptosis of cancer cells because the Cl ions have the ability to leave the central platinum ion and are replaced with aqua ligands, or diamminediaquaPt(II) that are able to bind with the DNA.
- This process has been proven to be effective killing cancer cells but is also associated with a high toxicity because of its ability to kill healthy cells as well as cancerous cells.

### Research Goals

- Show how both cisplatin and carboplatin work in the treatment of cancer.
- Conduct a comparison between the effectiveness and toxicity rates of the two agents cisplatin and carboplatin when used on different types of cancers in patients.

### Bladder Cancer

A study was completed by Bellmunt J et al. to compare the effects of two chemotherapies, M-CAVI and M-VAC.

**M-CAVI**  
contains  
methotrexate,  
carboplatin, and  
vinblastine

**M-VAC**  
contains methotrexate,  
vinblastine, doxorubicin,  
and cisplatin

Patients in this trial with incurable advanced bladder cancer were given either M-CAVI or M-VAC. This trial resulted in a 39% response rate for patients given the M-CAVI treatment and a 52% response rate for patients given M-VAC treatment.

While toxicity rates were seen to be lower in patients who received M-CAVI treatment, the response rate in treating the cancer was significantly higher in the M-VAC treatment, helping to prove that cisplatin is the superior agent when treating bladder cancer.

## Introduction

Cisplatin and Carboplatin are two platinum-based agents and are the most widely used agents for the treatment of cancer in the field of oncology.

These agents have the ability to crosslink with DNA, more specifically its purine bases, and cause an issue in the DNA's ability to repair. This process causes damage to the DNA in the cells and eventually leads to the apoptosis, or cell death, of the cancerous cells.

When comparing these two agents, a question arises of which one is the more effective option when looking at the treatment of cancer. Shown are some studies that give evidence leading to one agent to be superior to the other in specific cases.

### Small Cell Lung Cancer

A study was conducted by Hellenic Cooperative Oncology Group to compare the effects of the two agents when using etoposide combined with either cisplatin or carboplatin.

Patients received 100mg/m<sup>2</sup> of etoposide combine with either 300mg/m<sup>2</sup> of carboplatin or 50mg/m<sup>2</sup> of cisplatin.

#### Response Rates:

##### Cisplatin and etoposide

- 73% overall with limited diseases
- 50% overall with extensive diseases

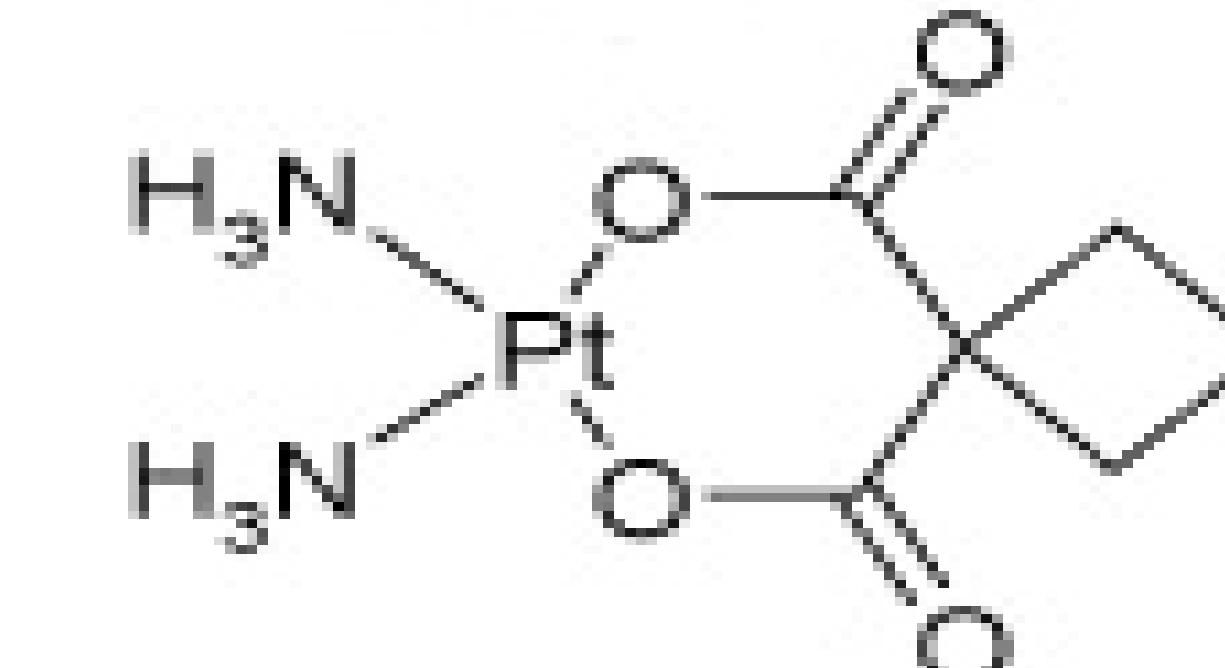
Toxicity rates were also seen to be distinctly lower in the carboplatin treatment, including effects of leukopenia, neurotoxicity and nephrotoxicity.

This study helps to prove that carboplatin can be used as a replacement for cisplatin when comparing effectiveness and toxicity in the treatment of small cell lung cancer.

## Conclusions

Cisplatin was the main agent used in the treatment of cancer in the field of oncology for decades. Since the discovery of carboplatin, there is now an alternative option to replace cisplatin and strive to keep the effectiveness of the treatment while helping to reduce the toxic effects it brings. This is proven to work in many cancer treatments but has also been proven to be ineffective in some, resulting in cisplatin being the superior agent for treatment.

## Carboplatin



- Carboplatin is a second-generation platinum-based agent that has been proven to work similarly to cisplatin.
- Carboplatin differs in structure from Cisplatin by replacing the two chloride ligands around the central platinum ion with bidentate dicarboxylate ligands.
- The process by which carboplatin stops the growth of cancer cells is the same as cisplatin, except in this agent the bidentate dicarboxylate ligands leave the platinum ion, giving it the ability to bind with DNA.
- Carboplatin is said to have less of a toxic effect because of the amount of hydrolysis needed is reduced.

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