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Synthesis of Novel Aromatic Quinols for Colon and Renal Cancers
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Introduction

 Colon Cancer
- The third most common cancer in the USA
- More than 1 million Americans currently living with colon cancer
- 148,810 new cases expected in 2010
- 50,000 deaths annually

 Renal Cancer
- Approximately 58,000 people diagnosed in USA annually
- Seventh most common cancer and tenth most common cause of cancer-related death in men
- A disease of the kidneys in which cells grow uncontrollably and form a tumor

 Risk Factors
- Smoking
- Gender, race, and age
- Nutrition and weight
- Hypertension
- Overuse of certain medications

 Application

 Aromatic quinols have demonstrated in vitro antitumor activity
- Abnormal tyrosine protein kinase (PTKs) cause many human cancers
- Aromatic quinols shown to be PTK inhibitors
- They have longer half-lives
- Rapid bioactivity

 Grignard Reaction
- The addition of an organomagnesium halide to a ketone or aldehyde to form a tertiary or secondary alcohol

 Examples of Aromatic Quinols

 Aromatic quinols have demonstrated GI50 values at 0.36 μM, 0.46 μM and 0.74 μM respectively
- GI50 values indicate 50% of cancerous cell growth inhibition at the specified concentrations

 Reaction Scheme

 Scheme 1. Preparation of 4,4-dimethoxy-2,5-cyclohexadien-1-one

 Scheme 2. Preparation of 4-hydroxy-4-phenyl-2,5-cyclohexadien-1-one

 NMR Spectroscopy of Quinone

 NMR Spectroscopy of Aromatic Quinol

 Proposed Mechanism

 FT-IR Spectroscopy

 Suggested Mechanism

 Future Work

 Future research should incorporate various protecting groups, such as cyclic ketals or thio-ketals, to avoid the directing effects of methoxy substituents which are known to result in syntheses of unexpected products.

 References


 Conclusion

 FT-IR, 1H, and 13C spectroscopic data indicate that the synthesized molecule didn't match the desired product
- The suggested mechanism is consistent with the data from spectroscopy and reported references
- Formation of the unexpected product may be due to the resulting thermodynamic stability of the aromatic α electron system over the diene product

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Figure 1. Facts related to colorectal and renal cancers

Figure 2. Three heteroaromatic quinols showing antitumor activity.