# Research Week 2023

# Cardiac function in a mouse model of carcinoid disease

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## Keywords

Carcinoid, carcinoid heart disease, carcinoid syndrome, disease models- mice, mice- inbred BALB/c, liver neoplasms

## Abstract

### Goals of the Study/Hypothesis:

Carcinoid tumors are neuroendocrine tumors which release prostaglandins and biogenic amines that can impact the cardiovascular system.1 In consequence, patients with metastatic disease can develop carcinoid syndrome characterized by flushing, tachycardia and syncope. The physiologic mechanisms that contribute to this hemodynamic instability are not well understood. Therefore, our study sought to establish a mouse model of carcinoid tumor metastasis that could be used to assess cardiovascular function.

### Materials & Methods:

Anesthetized (3-5% isoflurane in 100% O2), BALB/c nude mice underwent injection of 107 BON1 neuroendocrine tumor cells (n=6) or vehicle (n=3) into the spleen.2 Mice were monitored for 8 weeks to allow the development of carcinoid disease. During this period, stable 10-minute EKG tracings were recorded in anesthetized mice every two weeks and assessed for heart rate and EKG irregularities. At 8 weeks, arterial blood was collected via cardiac puncture. Liver, heart, and blood vessel tissue samples were obtained. Livers were grossly assessed for metastases.

### Results:

Assessment of the EKG tracings showed that 84% (11/13) of BON mice exhibited EKG irregularities at ≥1 time point during tumor development. In contrast, vehicle mice had no abnormalities throughout. At Week 8, mean heart rate was also elevated in BON1 mice (506±30bpm) compared to vehicle (441±12bpm, p=0.01). Upon tissue collection, all BON mice showed seed tumors in the liver and color changes in the spleen, which were not observed in vehicle mice.

### Conclusions:

The presence of EKG changes, elevated heart rate and visible tumors in BON mice confirm the efficacy of this carcinoid tumor model. Additional tissue analysis will be performed to further describe the tumor burden and cardiovascular characteristics of this model. Future model development will determine if

elevating the BON1 cell dose and/or extending the duration of tumor development further impacts cardiovascular function.

## References:

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