

Endoscopic measurement device to monitor tumor growth in vivo

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Function:

Our goal is to devise a method for measuring the size (ideally volume) of tumors by looking at pictures of tumors within a rat's colon taken with an endoscope. This must be done without harming the animal or destroying the tumor. This will allow our clients to better research colon cancer with an animal model.

Client Requirements:

- Find volume of tumor
- Can't harm the animal
- Can't harm the tumor
- Budget of \$1000 to build
- Less than \$100 per measurement
- Animals can remain in clean room
- Clients have to be able to use any software necessary in our design

Design Requirements:

1, Physical and Operational Characteristics

a. Performance Requirements:

- Usable up to ten times per day

b. Safety:

- Biologically compatible materials

- No danger of parts breaking off
- No sharp edges ideally
- c. Accuracy and Reliability:
 - Measure volume consistently with under 5% error
- d. Life in Service
 - Must be operational for daily use for 5 years
- e. Shelf Life:
 - The shelf life would be the same as the shelf life of the endoscope and the computer
- f. Operating Environment:
 - Within a rat or mouse colon in an oncology lab
- g. Ergonomics:
 - No more challenging or uncomfortable than using an endoscope
- h. Size:
 - Any device would have to fit in a 2.2-2.5 mm (5 french) working channel
 - Programming should be limited to be a reasonable file size for a personal laptop
- i. Weight
 - Light weight enough for one person to hold and maneuver comfortably
- j. Materials
 - Aluminum shaft used as a cover for the scope probe
- k. Aesthetics, Appearance, and Finish:
 - Programming would need a simple enough GUI for our clients to be able to use without much programming background

2. Production Characteristics

- a. Quantity: 1 deliverable

b. Target Product Cost: Less than \$1000

3. Miscellaneous

a. Standards and Specifications: Adhere to any standards for animal testing

b. Customer/Patient related concerns: Cannot harm rat or user either by shock or physical damage

c. Competition: Nothing currently available that deals exactly with this problem. Some things deal with facets of the problem but nothing covers it all.