identify a small localized lesion with a high ^{18}F-FDG uptake [28]. However, because of the different coupling efficiency between the scintillators and optical fibers, the sensitivity variation among the reported positron detectors was more than 3:1 and this impeded the application of centroid algorithm. With the help of micro-fabrication techniques we could make repeatable and precise positron probes having uniform sensitivity. The gain variation of PSPMT channels can be compensated by calibration. In future studies we will apply the centroid algorithm using the improved detectors to help identify a small localized lesion with a high ^{18}F-FDG uptake.

In our *ex vivo* study, the ambient gamma background collected by the two beta-shielded detectors was in the noise level. However, this gamma background level could be much higher in *in vivo* imaging condition where the surrounding tissue would have significant ^{18}F-FDG uptake and produce gamma photons. We anticipate that the gamma subtraction will be needed in future *in vivo* study and the effectiveness of the subtraction will be tested.

Two major system design modifications are needed for fitting the intraoperative hybrid probe to a standard laparoscope accessory port of 5-12.5 mm diameter for *in vivo* evaluation of the ovary. The longitudinal distance of the current hybrid probe used in the reported study was more than 15 mm and the total width was more than 5mm. This relatively large size of the probe is the result of the optical fibers exiting the probe in the orthogonal arrangement as shown in Fig. 1(f), which makes it difficult to fit the entire probe within a 5-12.5 mm laparoscope accessory port. We are currently working on new designs that will allow the probe fit into a 5-12.5 mm laparoscope port for future *in vivo* evaluation during minimally invasive surgery.

Summary

In this report, the potential role of a prototype intraoperative probe combining positron detection and OCT imaging for ovarian cancer detection and characterization was evaluated using 18 *ex vivo* ovaries of various pathologic conditions. Positron count rates of 7.5/8.8-fold higher were found between malignant ovaries and abnormal/normal ovaries. OCT imaging of malignant and abnormal ovaries revealed many detailed morphologic features that could be potentially valuable for evaluating local regions with high metabolic activities and detecting early malignant changes of the ovary.

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