# Radiologic-pathologic analysis of increased ethanol localization and ablative extent achieved by ethyl cellulose

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**Chart, scatter chart

Description automatically generatedSupplementary Figures**

**Chart, histogram

Description automatically generatedSupplementary Figure S1. a)** Radiodensity as a function of iohexol concentration (n=3). **b)** Radiodensity as a function of fluorescein concentration (n=3). At >5% iohexol, undissolved iohexol was visible in vials.

**Chart, waterfall chart

Description automatically generatedSupplementary Figure S2. a)** Representative histogram of a 50% ethanol-50% water mixture with the magnitude of random error depicted by the white arrow. The magnitude of the non-linearity error is depicted by the black arrow as the difference between true (blue arrow) and predicted (red arrow) radiodensity. **b)** Average radiodensity values for ethanol-water solutions (n=20 per group) depict the relationship between ethanol concentration and radiodensity, fit by a two-point normalization equation (1) calculated from pure ethanol and pure water samples shown in red to generate predicted values. The non-linearity error is quantified as the difference between the predicted (red line) and true (blue line) values and is represented by the gray shaded region. Error bars indicate the average standard deviation of the radiodensity distribution for a given ethanol concentration.

**Supplementary Figure S3. a)** Individual grayscale histograms depict the radiodensity distribution for each sample. The darkness of each bin (width, 1 HU) corresponds to the volume of tissue at a given estimated ethanol concentration. Lighter bins correspond to a larger volume. **b)** Mean pre-ablation radiodensity values for each sample; lighter bands correspond to higher radiodensities. **c)** Mean ethanol radiodensities for each treatment group shown with a grayscale, with lighter bands indicating higher radiodensities. **d)** Grayscale histograms depict the estimation of ethanol concentration distribution for each sample. The darkness of each bin (width, 1% estimated ethanol concentration) corresponds to the volume of tissue at a given estimated ethanol concentration. Lighter bins correspond to a larger volume.

A picture containing old

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**Chart, bar chart

Description automatically generatedSupplementary Figure S4.** Detection of necrotic area in a single image of tissue stained withNADH-diaphorase by a semi-automated MATLAB algorithm. Image sequence: **a)** original image, **b)** cropped image, **c)** blue channel, **d)** entropy filter, **e)** binary image, **f)** remove noise, **g)** erode, **h)** fill holes, **i)** dilate, **j)** detected sample, **k)** background removed, **l)** blue channel, **m)** binary image, **n)** remove noise, **o)** remove smaller ROIs, **p)** deselect large vasculature, **q)** detected necrosis.

**Supplementary Figure S5.** Two tissue samples, one treated with 12% EC-ethanol and one with pure ethanol (0% EC), were segmented manually in ImageJ as a ground truth for comparison to segmentation with a MATLAB algorithm. A total of 13 images were segmented between the two samples. On average, MATLAB estimated 0.0465 cm2 more than manual segmentation, with an average absolute scalar difference in necrotic area of 0.0049 cm2.

Graphical user interface, application

Description automatically generated

**Supplementary Figure 6. a-b)** Average CDFs of estimated ethanol concentration for all pre-ablation liver samples, and post-ablation 0% and 12% EC samples *ex vivo* (a) and *in vivo* (b). **c)** Average CDFs of estimated ethanol concentration for estimated ethanol concentrations greater than 100% ethanol for all *in vivo* samples. **d)** Volume in the vials, *ex vivo* samples, and *in vivo* samples with an estimated ethanol concentration >120%. **e-f)** Maximum intensity projection images for all 12% EC-ethanol (e) and pure ethanol (f) *in vivo* ablations. Ethanol concentration is indicated by the grayscale; air is red.