AbstractID: 12766 Title: Characterization of mouse mammary glands by measuring T2*: a comparison of SV40Tag and FVB/N mice

Purpose: An improved understanding of T2* in normal breast and intraductal cancer could lead to improvements in diagnostic accuracy. This study characterizes T2* in both a preclinical model of breast/mammary cancer (SV40Tag) and in healthy (FVB/N) mice. At ~12 weeks, C3(1)SV40Tag mice develop mammary in situ neoplasms (MIN) that resemble ductal carcinoma in situ (DCIS) in women. **Method and Materials:** Eight SV40Tag and six FVB/N mice were imaged using a 9.4T Bruker magnet. Respiratory gated multi-gradient echo pulse sequences were used to measure T2* with equivalent TR ~1000ms, minimum TE of 1.5ms, 9 echoes at 3ms spacing. Generally, T2* was calculated by fitting the MRI signal intensity to a single exponential decay function. However, when fat was present, a modulus of complex double exponential decay function was needed. **Results:** For SV40Tag mice, T2* of muscle, lymph node, and tumor can be calculated from a single exponential function. T2* of normal mammary gland (NMG) and MIN need to be extracted from the modulus of complex function due to the fatty signal. Conversely, for FVB/N mice, all T2* can be calculated from single exponential function. On average muscle, tumor and MIN water components have similar T2* values (~15ms), but lymph node and NMG water components have slightly smaller T2* values (~9.5ms). The fat in NMG and MIN have the smallest T2* values (~3.8ms). In addition, NMG in SV40Tag is fattier than in FVB/N mice (57% vs. 12%, $p<0.0001$) for the selected ROIs. **Conclusion:** To accurately determine T2*, it is necessary to separate water/fat in fat-rich mammary glands. In this pilot study, MIN lesions exhibit a larger separation between the long and short T2* values in comparison to NMG. Additionally, SV40Tag mice exhibit a higher percentage fat in NMG ROIs due to genetic differences.