

**Development of a birdcage resonator for the 3T System
for various absorption regions**

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Purpose: The purpose of this study was to design and build an optimized birdcage resonator configuration with a low pass filter, which would facilitate the acquisition of high-resolution 3D-images of small animals.

Methods and Materials: The birdcage resonator with 12-element structures was built, in order to ensure B1 homogeneity over the image volume. The diameter and length of each element of a birdcage resonator are as follows: (1) diameter 13cm, length 22cm, (2) diameter 15cm, length 22cm, (3) diameter 17cm, length 25cm. The simulation of birdcage resonators was conducted by XFDTD and their images were obtained in 3T MR system (Medinum, FSE pulse sequence).

Results: The B-field distribution and SAR of the 15cm diameter-birdcage resonator was simulated, and the ratio of the tangerine to the birdcage resonator accounts for approximately 27%. The Q factor was 53.2 and the SNR was 150.7. Second, at the same birdcage resonator, the ratio of the orange is approximately 53%. The SNR and the Q parameter which was 212.8, 91.2, respectively.

Conclusion: The present study demonstrated that if birdcage resonators have the same forms, SNR could be different depending on the size of an object, especially when the size of an object to that of coil is approximately 40~80%, the former is bigger than the latter. Therefore, when the size of an object to be observed is smaller than that of coil, the coil should be manufactured in accordance with the size of an object in order to obtain much more excellent images.

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