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Commentary

Comment on 'Imaging tumor hypoxia by magnetic resonance methods'

I enjoyed reading the paper of Pacheco-Torres et al.[1] The authors have provided pO_2 values of some human organs and a few cancerous tissues. Using pO_2 values, a new perspective can be assessed.

In Figure 1, we plotted the T1 against the pO_2 in six healthy tissue and three neoplastic tissue (Table 1) and yielded a good correlation ($R^2 = 0.74$). The T1 values are abstracted from Damadian et al[2]. The neoplastic tissue not

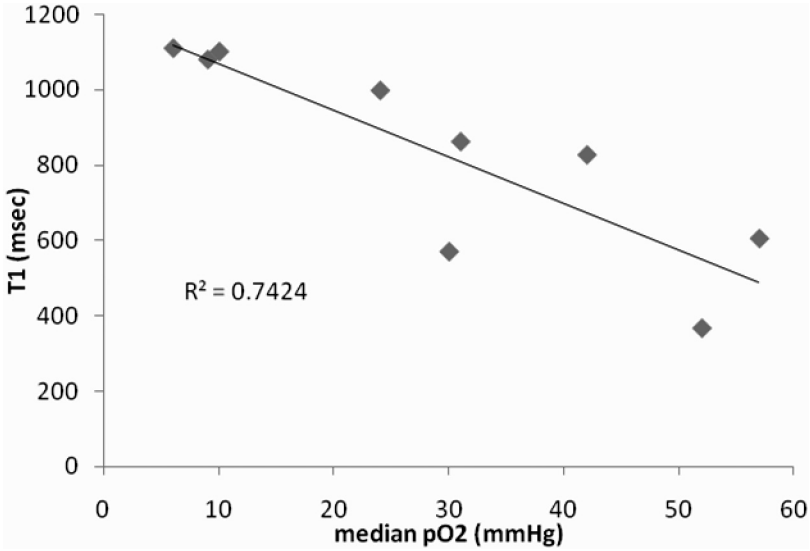


Figure 1. Correlation between water proton spin lattice relaxation time and median oxygen tension

Table 1. *Median pO_2 values along with organ weight, and spin lattice relaxation time (T1) in normal and neoplastic tissues*

Healthy tissues	Organ weight (g)	T1 (ms)	Median pO_2 (mm Hg)
Breast	280	367	52
Brain	1,400	998	24/27 (Avg. 25)
Cervix		827	42
Kidney	330	862	31
Liver	1,800	570	30
Pancreas	100	605	57
Neoplastic tissue			
Breast cancer		1,080	3/15 (Avg. 9)
Cervix cancer		1,101	10
Prostate cancer		1,110	2/10 (Avg. 6)

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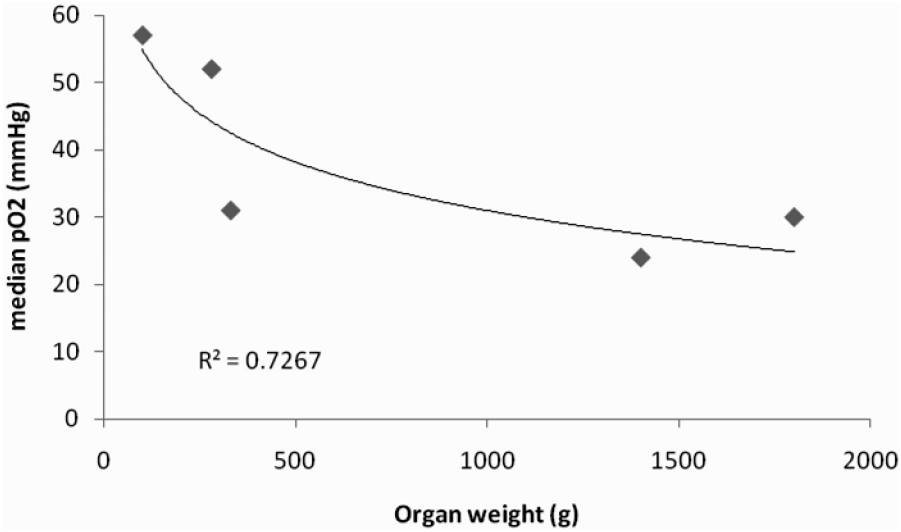


Figure 2. Correlation between median oxygen tension and organ weight.

only has low pO_2 values but also has higher T1 value. This is consistent with the findings of Akber[3] and O'Connor et al[4].

In Figure 2, we plotted the pO_2 values with organ weight and yielded a good correlation of 0.72. Akber[5] showed that T1 correlates well with organ weight in human organs as well as in animal organs.

It is indeed interesting to note that T1 and pO_2 yield a linear relationship[3]. The T1 value of the whole organ would provide a base value of pO_2. Changes in T1 value in an organ would provide a sensitive index of the onset of hypoxia. For example, in normal breast tissue, the T1 value is 367 ms and pO_2 value is 52 mm Hg, whereas in neoplastic breast tissue the T1 value is 1,080 ms and pO_2 value is 9 mm Hg. In three cancerous tissues (Table 1), they yielded higher T1 value than any normal organs. It is also interesting to note that as the organ weight increases by assembling many cells of different functions, pO_2 decreases (Figure 2).

Respectfully submitted

Syed F. Akber, PhD, DABR
Radiological Physicist
Cleveland, Ohio, USA

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