

CORRECTION



Correction to: Oxygenation Status of Malignant Tumors vs. Normal Tissues: Critical Evaluation and Updated Data Source Based on Direct Measurements with pO₂ Microsensors

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Published online: 14 September 2021
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Correction to: Applied Magnetic Resonance
<https://doi.org/10.1007/s00723-021-01383-6>

Unfortunately, the Table 6 was published incorrectly in the online published article. The correct Table 6 is given below.

The original article can be found online at <https://doi.org/10.1007/s00723-021-01383-6>.

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Table 6 Oxygen partial pressures directly assessed with polarographic pO_2 microensors or fluorescence-based microensors in human tissues and organs ($FIO_2 = 0.21\%$, resting and ambient temperature conditions)

Organ, tissue	Grand mean pO_2 [mmHg]	Remarks	References
<i>1. Respiratory system</i>			
Inspired air	156	At sea level	
Tracheal lumen	145–150	Moist air	
Bronchial lumen	115–145		
Alveolar space	100–109		
Lung parenchyma	43	Peribronchial tissue	[94, 95]
Carotid bodies		Controversial data (Acker et al. [96]): 0–15 mmHg (both studies with polarographic 25–90 mmHg microelectrodes)	[97]
Outer layers	68		
Deeper layers	42		
<i>2. Cardiovascular system</i>			
Arterial blood	77–98 (at rest)		[94, 98]
Mixed venous blood	~40	Progressive decrease with age	[94]
Aortic wall	~52		[99]
Luminal layers	70–75		
Media (central)	20–25		
Adventitia	55–55		
Myocardium	16–25		
Subpericardial	18–26		
Subendocardial	10–17	pO_2 decline upon long-term hypertension	[100–102]
<i>3. Feto-maternal unit</i>			

Table 6 (continued)

Organ, tissue	Grand mean pO ₂ [mmHg]	Remarks	References		
Umbilical vein	~30	Measurements at term/delivery (blood gas analyses together with pH and pCO ₂)	[103]		
Umbilical artery	~19				
Intervillous space (placenta)	~50				
Uterine artery	98				
Uterine vein	33				
<i>4. Skin, subcutis and breast</i>					
Skin	25–35	Zonal differences	[104] [104] [105] [105] Vaupel and Thomsen (unpublished) [106] Vaupel and Thomsen (unpublished)		
Critical limb ischemia	5–8				
Limbs venous diseases	15				
Epidermis	8				
Subepidermal layer	35				
	~35				
	~50				
Dermis	45–55				
Deep dermis/subcutis	42–44				
	~80				
	32	Skin surface temperature: ~33 °C Skin surface temperature: ~40 °C Skin surface temperature: ~34 °C Skin surface temperature: ~40.5 °C Rising pO ₂ with increasing dermal depth 2 days after abdominal surgery 10 days after abdominal surgery	[107]		
Postoperative healing of skin wounds	35				
Subcutis	38–47				
Pubic region	52–55				
Abdominal wall (lean vs. obese)	54 vs. 43				
Upper arm (lean vs. obese)	54 vs. 47				
Breast	65				
				Conflicting results with different techniques (summarized by [108])	[56]
					[53, 76]

Table 6 (continued)

Organ, tissue	Grand mean pO_2 [mmHg]	Remarks	References
Fibrocystic disease	67		[53]
<i>5. White adipose tissue</i>			
Lean persons	54	Conflicting results with different techniques (reviewed by [108])	[109–112]
Obese persons	43		
<i>6. Urinary system</i>			
Kidney	31	Zonal differences (functional differences)	[91]
Superficial outer cortex vs. cortex	70 vs. 50		[113]
Glomerulus	~55		[114]
Outer medulla	38		[113]
Inner medulla	10–15	Hypoxic fraction ≤ 2.5 mmHg; ~10%	[115]
Urinary bladder	43		[116]
<i>7. Endocrine System</i>			
Islets of Langerhans (pancreas)	40–45		[117]
Suprarenal glands	55		[93]
<i>8. Gastro-intestinal tract</i>			
Intestinal tissue	58	Different anatomical and functional entities	[92, 94]
Mucosa, oral	52		
Gastric	55–60		
Small bowel	61	Luminal pO_2 decline along the length of the GI-tract; EPR technique [94]	[118]
Large bowel	58		
Rectum	51		[82]
<i>9. Upper abdominal organs</i>			
Pancreas, exocrine	30–40		[94, 119, 120]
Liver	30–40	Zonal differences with differences in functions	[82, 94, 121]

Table 6 (continued)

Organ, tissue	Grand mean pO ₂ [mmHg]	Remarks	References
Periportal zone	45–50		
Centrilobular zone	15–20		
Spleen	68	Organ with open and closed circulation Aspiration, blood gas analyses	[122]
<i>10. Reproductive system</i>			
Uterus, lumen	15–20		[94]
Myometrium	10–20	HF2.5 = 5%	[123]
Cervix	~40	HF2.5 = 5–10%	[58]
Leiomyoma	1	HF2.5 = 17% (Immunohistochemistry: HIF-negative ¹⁾)	[123]
Prostate	26		[74]
<i>11. Skeleton, skeletal muscle</i>			
Bone, cortical	31		[124]
Hematopoietic marrow	22–54		[94]
Adipose marrow	26	Blood gas analyses after aspiration	
Periosteum	15–45		
Articular cartilage	~10		
Synovial fluid	10–45		
Skeletal muscle, resting	27–32		
Exercise	~10	HF2.5 = 5–10%	[98]
Hypovolemic shock	4	HF2.5 = 40%	[125]
PAOD	6–7	HF2.5 = ~30%	[104]
		PAOD = peripheral art. occlusive disease	[126]
<i>12. Brain</i>			
Gray matter	28–36	Zonal differences with different functions	[94, 127, 128]

Table 6 (continued)

Organ, tissue	Grand mean pO_2 [mmHg]	Remarks	References
Occlusion of cerebral artery	≤ 5	Mean pO_2 decreases with brain depth	
White matter	10–15		
Hypothalamus	10–15		
Midbrain	5		
Pons	2–3		
<i>I3. Eye</i>			
Choroid	60	Functional compartments with different functions	[129,130]
Vitreous humor	15–25		
Choroid-retinal border (relative depth = 100%), outer retina	60		
Vitreous-retinal border (relative depth = 0%), inner retina	15–25	pO_2 changes with differing physiological functions (e.g., light vs. dark adaptations)	
pO_2 sink at retina depth of 70–80%	0–10		
Lens	25–65		[131]
Aqueous humor	~70		
Cornea	125–30		
Lacrimal fluid	~130		

Updated human data, whenever available. *Note:* pO_2 is the driving force for O_2 diffusion in the body. For earlier reviews see [8, 92–94]

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