Notes and Conventions

Cow: Green
Human: Blue
Mouse: Red
Pig: Black
Rat: Purple

Using the following parameters for Alexandrakis calculations:

<table>
<thead>
<tr>
<th>lambda(nm)</th>
<th>HbO2 molar extinction(1/cm/M)</th>
<th>Hb molar extinction(1/cm/M)</th>
<th>HbO2 absorption (1/cm)</th>
<th>Hb absorption (1/cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>590</td>
<td>14400.8</td>
<td>28324.4</td>
<td>77.12800558</td>
<td>151.7002167</td>
</tr>
<tr>
<td>610</td>
<td>1506</td>
<td>9443.6</td>
<td>8.065855814</td>
<td>50.57816465</td>
</tr>
<tr>
<td>630</td>
<td>610</td>
<td>5148.8</td>
<td>3.267046512</td>
<td>27.57601488</td>
</tr>
<tr>
<td>650</td>
<td>368</td>
<td>3750.12</td>
<td>1.970939535</td>
<td>20.08494502</td>
</tr>
</tbody>
</table>

Also, please note that Jacques citations can be ambiguous about the species from which a data point is taken.
Adipose $\mu_a$

Human: Bashkatov 2011
- Citing Salomatina 2006
  - Integrating sphere, inverse Monte Carlo method
- Citing Bashkatov 2005
  - Integrating sphere, inverse adding-doubling method

Mouse: Alexandrakis 2005
  - Previously used in SARRP Red Journal article

Rat: Bashkatov 2011
- Citing Bashkatov 2005
  - Integrating sphere, inverse adding-doubling method

Cow: Kienle 1996
- Spatially Resolved Absolute Diffuse Reflectance
Adipose $\mu_s'$

Cow: Kienle 1996
- Spatially Resolved Absolute Diffuse Reflectance

Rat: Bashkatov 2011
- Citing Bashkatov 2005
  - Integrating sphere, inverse adding-doubling method

Mouse: Alexandrakis 2005

Mouse: Wang 2015
- Citing Jacques 2013
  - Previously used in SARRP Red Journal article

Human: Bashkatov 2011
- Citing Salomatina 2006
  - Integrating sphere, inverse Monte Carlo method
- Citing Bashkatov 2005
  - Integrating sphere, inverse adding-doubling method

Human: Jacques 2013
- Citing Salomatina 2006 (Fat)
- Citing Salomatina 2006 (Adipocytes)
- Citing Simpson 1998
- Citing Peters 1990
Heart $\mu_a$

Mouse: Alexandrakis 2005
- Citing Swartling 2003

Mouse: Wang Ge 2006 for range 650-700 nm
- Citing Alexandrakis 2005 for formula
- No citation for $\mu$ for Hb, HbO$_2$, H$_2$O

Human: Sandell 2011
- Citing Dimofte 2009
  - Reported as range 0.03 to 1.55 cm$^{-1}$, not standard deviation
  - Eight patients, properties determined before and after PDT by analysis of diffuse reflectance spectra
- Citing Dimofte 2010
  - Reported as range 0.12 to 0.18 cm$^{-1}$, not standard deviation
  - Five patients, properties determined before and after PDT by analysis of diffuse reflectance spectra
Heart $\mu_s'$

**Human: Sandell 2011**
- Citing Dimofte 2009
  - Reported as range 17.56 to 75.06 cm$^{-1}$, not standard deviation
  - Eight patients, properties determined before and after PDT by analysis of diffuse reflectance spectra
- Citing Dimofte 2010
  - Reported as range 5.22 to 90.8 cm$^{-1}$, not standard deviation
  - Five patients, properties determined before and after PDT by analysis of diffuse reflectance spectra

**Mouse: Alexandrakis 2005**
- Citing Swartling 2003

**Mouse: Wang Ge 2006 for range 650 – 750 nm**
- Citing Alexandrakis 2005 for formula
Kidney $\mu_a$

Mouse: Alexandrakis 2005
- Citing Solonenko 2002

Mouse: Wang Ge 2006 for range 650-700 nm
- Citing Alexandrakis 2005 for formula
- No citation for $\mu$ for Hb, HbO$_2$, H$_2$O
Kidney $\mu_s'$

- **Alexandrakis 2005**: Citing Solonenko 2002
- **Wang Ge 2006 for range 650-700 nm**: Citing Alexandakis 2005 for formula
- **Note: likely to be error**
  - $(41700 \text{ mm}^{-1}) (650)^{1.51} = 2.359 \text{ mm}^{-1} = 23.6 \text{ cm}^{-1}$
  - $(41700 \text{ mm}^{-1}) (700)^{1.51} = 2.109 \text{ mm}^{-1} = 21.1 \text{ cm}^{-1}$
Liver $\mu_a$

![Graph showing absorbance vs. wavelength for different species](image)

**Liver**
- Cow: Cheong 1990
  - Citing Karagiannes 1989

**Human**
- Cheong 1990
  - Citing Andreola 1988
  - Citing Marchesini 1989

**Mouse**
- Alexandrakis 2005

**Pig**
- Cheong 1990
  - Citing Wilson 1986

**Mouse**
- Cheong 1990
  - Citing Parsa 1989
  - See figure to right for hump around 550 nm

**Mouse**
- Wang Ge 2006
  - Citing Alexandrakis 2005

**Cow**
- Kienle 1996

**Human**
- Sandell 2011
  - Citing Wang HW 2003, 2005
  - Reported as range 1.15 to 1.56 cm$^{-1}$, not standard deviation

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Fig. 1

Average value of $\mu_a$ over the 350-2200-nm wavelength range. Vertical bars represent one standard deviation and appear at 200-nm intervals for clarity.
Liver $\mu_s'$

- **Human:** Sandell 2011
  - Citing Wang HW 2003, 2006
  - In situ measurement in PDT patients
  - Reported as range 21.6 to 30.4 cm$^{-1}$, not standard deviation

- **Mouse:** Wang Ge 2006 for range 650-700 nm
  - Citing Alexandakis 2005 for formula
  - Note: likely to be error
    - $(629 \text{ mm}^{-1}) (650)^{-1.05} = 0.7 \text{ mm}^{-1} = 7 \text{ cm}^{-1}$
    - $(792 \text{ mm}^{-1}) (700)^{-1.05} = 0.648 \text{ mm}^{-1} = 6.48 \text{ cm}^{-1}$

- **Pig:** Cheong 1990
  - Citing Wilson 1986
  - PDT study

- **Cow:** Cheong 1990
  - Citing Karagiannes 1989

- **Human:** Jacques 2013
  - Citing Parsa 1989

- **Mouse:** Alexandakis 2005

- **Cow:** Kienle 1996
Lung $\mu_a$

Human: Cheong 1990
- Citing Marchesini 1989 ▲
- Integrating sphere, goniophotometry
- Citing Andreola 1988 ●

Mouse: Alexandrakis 2005 ●
- Citing Beek 1997, Srinivasan 2003

Mouse: Wang Ge 2006 for range 650-700 nm ■
- Citing Alexandrakis 2005 for formula

Human: Sandell 2011
- Citing Dimofte 2009 □
- Reported as range 0.16 to 1.36 cm$^{-1}$, not standard deviation
- Citing Dimofte 2010 ◆
- Reported as range 0.49 to 0.88 cm$^{-1}$, not standard deviation
Lung $\mu_s'$

**Human:** Sandell 2011
- Citing Dimofte 2009
  - Reported as range $1.07$ to $83.81$ cm$^{-1}$, not standard deviation
- Citing Dimofte 2010
  - Reported as range $21.14$ to $22.52$ cm$^{-1}$, not standard deviation

**Mouse:** Alexandrakis 2005
- Citing Beek 1997, Srinivasan 2003

**Mouse:** Wang Ge 2006
- Citing Alexandrakis 2005 for formula
Stomach $\mu_a$

Mouse: Wang Ge 2006 for range 650-700 nm
- Citing Alexandrakis 2005 for formula
- Note: possible error
- No citation for $\mu$ for Hb, HbO$_2$, H$_2$O

Human: Welch 2011
- Citing Thueler 2003
  - Spatially resolved diffuse reflectance
  - ±1.4, ±0.7, ±0.5 at 542 nm, 600 nm, 650 nm, respectively

Mouse: Alexandrakis 2005
- Citing Thueler 2003
Stomach $\mu_s'$

Mouse: Wang Ge 2006 for range 650-700 nm
- Citing Alexandrakis 2005 for formula
- Note: likely to be error
  - $(792\ mm^{-1})(650)^{0.97} = 1.48\ mm^{-1} = 14.8\ cm^{-1}$
  - $(792\ mm^{-1})(700)^{0.97} = 1.38\ mm^{-1} = 13.8\ cm^{-1}$

Mouse: Alexandrakis 2005
- Citing Thueler 2003

Human: Welch 2011
- Citing Thueler 2003
- Spatially resolved diffuse reflectance
  - $\pm 3.5, \pm 2.0, \pm 1.0$ at 542 nm, 600 nm, 650 nm, respectively
## Summary

<table>
<thead>
<tr>
<th>λ (nm)</th>
<th>Alexandrakis</th>
<th>SARRP Red Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adipose</td>
<td>Heart</td>
</tr>
<tr>
<td>590</td>
<td>0.431</td>
<td>6.65</td>
</tr>
<tr>
<td></td>
<td>12.900</td>
<td>11.60</td>
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<td>0.050</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>12.270</td>
<td>10.10</td>
</tr>
</tbody>
</table>

* SARRP abdomen $\mu_a$ from Alexandrakis 2005, abdomen $\mu_s'$ from Jacques 2013

** SARRP tumor $\mu_a$ and $\mu_s'$ from Honda 2011
## Main Sources


