**Table 4. Relative Organ Weight (Percent Body Weight) or Tissue Volume for Dairy Cows in Breeds of Jersey and Holstein**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Jersey** | | | **Holstein** | | | **t test** |
|  | **Mean** | **SD** | **Number of Animals** | **Mean** | **SD** | **Number of Animals** | **p** |
| Adrenal Glands | 0.008 | 0.003 | 346 | 0.004 | 0.001 | 350 | 2.4E-90\* |
| Blood | 4.33 | 0.88 | 346 | 4.52 | 0.92 | 350 | 0.00544\* |
| Brain | 0.09 | 0.01 | 346 | 0.07 | 0.01 | 350 | 1E-107\* |
| GI Tract |  |  |  |  |  |  |  |
| Reticulum | 0.33 | 0.08 | 346 | 0.19 | 0.05 | 350 | 1E-118\* |
| Rumen | 2.08 | 0.42 | 346 | 1.02 | 0.21 | 350 | 3E-117\* |
| Omasum | 1.18 | 0.30 | 346 | 0.66 | 0.16 | 350 | 3E-192\* |
| Abomasum | 0.50 | 0.11 | 346 | 0.29 | 0.08 | 350 | 1E-106\* |
| Intestines |  |  |  |  |  |  |  |
| Small Intestine | 1.37 | 0.32 | 346 | 0.82 | 0.20 | 350 | 2E-112\* |
| Large Intestine | 1.01 | 0.25 | 346 | 0.55 | 0.14 | 350 | 1E-129\* |
| Heart | 0.38 | 0.06 | 346 | 0.37 | 0.07 | 350 | 0.19742 |
| Kidneys | 0.22 | 0.05 | 346 | 0.25 | 0.05 | 375 | 1.9E-17\* |
| Liver | 1.35 | 0.28 | 346 | 1.31 | 0.27 | 375 | 0.0555 |
| Lungs | 0.69 | 0.16 | 346 | 0.70 | 0.14 | 350 | 0.60003 |
| Pancreas | 0.09 | 0.02 | 346 | 0.08 | 0.02 | 350 | 1.4E-07\* |
| Spleen | 0.18 | 0.04 | 346 | 0.16 | 0.04 | 350 | 1.7E-18\* |
| Thyroid | 0.008 | 0.003 | 346 | 0.004 | 0.002 | 350 | 2.6E-97\* |
| Thymus | 0.04 | 0.02 | 346 | 0.02 | 0.01 | 350 | 1.7E-32\* |
| Mammary Gland (non-lactating) | 1.67 | 0.74 | 13 | 1.77 | 0.38 | 10 | 0.65921 |
| Mammary Gland (lactating) | 3.14 | 0.50 | 7 | 3.20 | 0.79 | 15 | 0.83425 |

Note: \* indicates significant differences between the two breeds with p < 0.05. Data were extracted from studies by Andrew et al. (1994) and Matthews et al. (1975). Please refer to the Excel Table A1 Tab “Tissue Vol Comp Summary” in **Supporting Information** for details about these data.

**Table 5. Relative Organ Weight (Percent Body Weight) or Tissue Volume for Beef Cattle in Breeds of Angus and Hereford**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Angus** | | | **Hereford** | | | **t test** |
|  | **Mean** | **SD** | **Number of Animals** | **Mean** | **SD** | **Number of Animals** | **p** |
| Adipose Tissue | 22.20 | 1.63 | 14 | 14.00 | 3.53 | 3 | 0.0013\* |
| Small Intestine | 1.12 | 0.10 | 33 | 1.06 | 0.14 | 16 | 0.1334 |
| Heart | 0.44 | 0.04 | 47 | 0.43 | 0.06 | 24 | 0.3427 |
| Kidneys | 0.22 | 0.03 | 47 | 0.23 | 0.04 | 24 | 0.1125 |
| Liver | 1.19 | 0.11 | 47 | 1.06 | 0.15 | 24 | 0.0002\* |
| Lungs | 0.88 | 0.12 | 47 | 0.76 | 0.16 | 24 | 0.0012\* |
| Spleen | 0.16 | 0.03 | 33 | 0.24 | 0.06 | 8 | 0.0014\* |

Note: \* indicates significant differences between the two breeds with p < 0.05. Data are from studies by DiCostanzo et al. (1991), Early et al. (1990), Hansard et al. (1953), Jenkins and Ferrell (1997), Keane (2011), Shahin and Berg (1985a), and Sharman et al. (2013). For details about these data, please refer to the Excel Table A1 Tab “Tissue Vol Comp Summary” in **Supporting Information**.

**Table 6. Relative Organ Weight (Percent Body Weight) or Tissue Volume for Male and Female Beef Cattle**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Male** | | |  | **Female** | | | **t test** |
|  | **Mean** | **SD** | **Number of Animals** | | **Mean** | **SD** | **Number of Animals** | **p** |
| Body Weight (kg) | 419.00 | 46.90 | 1172 | | 369.00 | 58.00 | 506 | 8.1E-61\* |
| Adipose Tissue | 11.30 | 4.46 | 193 | | 22.20 | 6.77 | 14 | 1.2E-08\* |
| Heart | 0.42 | 0.08 | 556 | | 0.41 | 0.08 | 389 | 0.0056\* |
| Kidneys | 0.21 | 0.04 | 786 | | 0.22 | 0.04 | 371 | 2.7E-08\* |
| Liver | 1.26 | 0.20 | 853 | | 1.11 | 0.13 | 401 | 4.3E-52\* |
| Lungs | 0.92 | 0.25 | 482 | | 0.66 | 0.26 | 419 | 5.7E-48\* |
| Pancreas | 0.09 | 0.02 | 318 | | 0.07 | 0.02 | 229 | 9.4E-35\* |
| Spleen | 0.19 | 0.06 | 476 | | 0.12 | 0.04 | 219 | 4.5E-54\* |

Note: \* indicates significant differences between the two sexes with p < 0.05. Data for this table are from 33 studies (Bourg et al., 2012; De Paula et al., 2013; DiCostanzo et al., 1991; Early et al., 1990; Faulkner et al., 1989; Fernandez et al., 1996; Fiems et al., 1993; Fitzsimons et al., 2014; Fonseca et al., 2017; Garrett et al., 1968; Jenkins & Ferrell, 1997; Long et al., 2010; Long et al., 2012; McEvoy et al., 1998; Moloney, Allen, Ross, Olson, & Convey, 1990; Moseley et al., 1992; Murphy & Loerch, 1994; Olivares et al., 2019; Remling et al., 2017; Robelin, 1981; Robertson et al., 1967; Rumsey et al., 1996; Sainz & Bentley, 1997; Sainz et al., 1995; Schlegel et al., 2006; Shahin & Berg, 1985b; Sprinkle et al., 1998; Swanson & Poffenbarger, 1979; Swett et al., 1933; Talton et al., 2014; Terry et al., 1990; Velazco et al., 1997; Wood et al., 2013). Please refer to the Excel Table A1 Tab “Tissue Vol Comp Summary” in **Supporting Information** for more details.

**Table 7. Relative Organ Weight (Percent Body Weight) or Tissue Volume for Calves**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Mean** | **SD** | **Number of Animals** | **Number of Studies** | **References** |
| Adrenal Glands | 0.007 | 0.002 | 7 | 1 | 1 |
| Adipose Tissue | 6.95 | 1.96 | 112 | 3 | 2-4 |
| Blood | 6.91 | 0.37 | 52 | 5 | 5-9 |
| Bone | 13.29 | 4.06 | 76 | 2 | 2, 3 |
| Brain | 0.54 | 0.14 | 7 | 1 | 1 |
| GI Tract | 5.47 | 3.61 | 148 | 5 | 3, 4, 10-12 |
| Stomachs | 2.22 | 0.69 | 315 | 7 | 3, 10-15 |
| Reticulorumen | 1.23 | 0.59 | 279 | 6 | 10-15 |
| Omasum | 0.38 | 0.17 | 279 | 6 | 10-15 |
| Abomasum | 0.38 | 0.08 | 286 | 7 | 1, 10-15 |
| Intestines | 2.39 | 1.47 | 146 | 5 | 1, 3, 10-12 |
| Small Intestine | 1.15 | 0.64 | 110 | 4 | 1, 10-12 |
| Large Intestine | 0.53 | 0.20 | 110 | 4 | 1, 10-12 |
| Heart | 0.51 | 0.13 | 228 | 9 | 1, 3, 4, 7, 10, 16-19 |
| Kidneys | 0.39 | 0.07 | 119 | 6 | 1, 3, 4, 7, 14, 16 |
| Liver | 2.87 | 0.36 | 475 | 12 | 1, 3, 4, 7, 10, 12, 14, 16-18, 20 |
| Lungs | 1.23 | 0.29 | 195 | 5 | 1, 4, 7, 10, 16 |
| Muscle | 33.90 | 1.61 | 76 | 2 | 2, 3 |
| Pancreas | 0.08 | 0.00 | 93 | 1 | 10 |
| Spleen | 0.26 | 0.07 | 192 | 6 | 1, 3, 7, 10, 17, 22 |
| Thyroid | 0.03 | 0.01 | 7 | 1 | 1 |
| Thymus | 0.23 | 0.09 | 13 | 3 | 1, 17, 21 |
| Rest of Body | 27.34 |  |  |  |  |

Note: The studies involved in the relative organ weight calculations are: 1. Sanglid et al. (2000); 2. Santos et al. (2013); 3. Morgan et al. (1969); 4. Gill et al. (1987); 5. Waldern et al. (1963); 6. Hansard et al. (1953); 7. Hansard (1956); 8. Rhodes et al. (1991); 9. Conard et al. (1958); 10. Mader et al. (2009); 11. Lineweaver and Hafez (1969); 12. Taylor-Edwards et al. (2011); 13. Cozzi et al. (2002); 14. Kristensen et al. (2007); 15. Khan et al. (2011); 16. Martin et al. (2010); 17. Stabel et al. (1993); 18. Williams et al. (1987); 19. Manohar et al. (1982); 20. Fernandez et al. (1996); 21. Biolatti et al. (2005); 22. Settlemire et al. (1964).

**Table 9. Relative Organ Weight (Percent Body Weight) or Tissue Volume for Swine**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Mean | SD | Number of Animals | Number of Studies | References |
| Adrenal Glands | 0.005 | 0.001 | 111 | 3 | 1-3 |
| Adipose Tissue | 15.44 | 2.65 | 244 | 6 | 4-9 |
| Blood | 4.12 | 0.46 | 302 | 5 | 1, 8, 10-12 |
| Bone | 10.70 | 0.92 | 166 | 2 | 6, 8 |
| Brain | 0.22 | 0.18 | 37 | 1 | 13 |
| GI Tract |  |  |  |  |  |
| Stomach | 0.61 | 0.09 | 2069 | 17 | 11, 14-29 |
| Intestines | 3.69 | 0.64 | 140 | 2 | 11, 30 |
| Small Intestine | 2.19 | 0.39 | 626 | 18 | 1, 8, 14-19, 21, 22, 24, 25-29, 31, 32 |
| Large Intestine | 1.47 | 0.39 | 282 | 11 | 1, 14, 15, 17-19, 21, 22, 25, 27, 28 |
| Caecum | 0.20 | 0.03 | 135 | 5 | 16, 17, 19, 20, 29 |
| Colon | 1.68 | 0.24 | 59 | 3 | 19, 20, 33 |
| Heart | 0.37 | 0.07 | 2555 | 28 | 1, 8, 10, 11, 13-17, 20-29, 31, 34-41 |
| Kidneys | 0.37 | 0.11 | 3261 | 32 | 1, 3, 8-10, 13-17, 19-29, 31, 34-37, 39-44 |
| Liver | 2.04 | 0.33 | 4992 | 39 | 1-3, 8-17, 19-29, 31, 33-46 |
| Lungs | 0.90 | 0.20 | 419 | 10 | 10, 11, 15, 17, 24, 25, 29, 38, 39, 41 |
| Muscle | 36.32 | 2.66 | 110 | 3 | 6, 19, 34 |
| Pancreas | 0.15 | 0.11 | 421 | 10 | 1, 8, 15, 16, 21, 22, 27-29, 33, 37, 47 |
| Spleen | 0.20 | 0.06 | 3817 | 23 | 1, 8, 10, 12, 14, 16, 17, 21-25, 27-29, 3, 34, 37, 39, 41-45 |
| Thyroid | 0.011 | 0.010 | 158 | 6 | 3, 17, 20, 35, 37, 46 |
| Thymus | 0.28 | 0.03 | 8 | 1 | 1 |
| Skin | 5.28 | 0.81 | 166 | 2 | 6, 8 |
| Rest of Body | 19.29 |  |  |  |  |

Note: The studies involved in the relative organ weight calculations are: 1. Kerr et al. (2003); 2. Wise et al. (1993); 3. Stahly and Cromwell (1979); 4. Doornebal et al. (1986); 5. Hood and Allen (1977); 6. Quinious and Noblet (1995); 7. O’Hea and Leveille (1969); 8. Ruusunen et al. (2007); 9 Shelton et al. (2004); 10. Hansard (1956); 11. Wiseman et al. (2007); 12. Johnson et al. (2015); 13. Mitchell et al. (2001); 14. Tranquilli et al. (1982); 15. Phuc and Hieu (1993); 16. Agyekum et al. (2012); 17. Kaensombath (2013); 18. Miller and Ullrey (1987); 19. Pond et al. (1989); 20. Velayudhan et al. (2017); 21. Chen et al. (1999); 22. Chen et al. (1995); 23. Cliplef and McKay (1993); 24. Critser et al. (1995); 25. Kaensombath and Lindberg (2012); 26. Pond et al. (1988); 27. Koong et al. (1982); 28. Koong et al. (1983); 29. Yen et al. (1991); 30. Adeola and King (2006); 31. Moughan et al. (1990); 32. Cera et al. (1988); 33. Jin et al. (1994); 34. Anugwa et al. (1989); 35. Lee and Woyengo (2018); 36. Rehfeldt et al. (2008); 37. Smit and Beltranena (2017); 38. Chiba (1994); 39. Boleman et al. (1995); 40. Owen et al. (2001); 41. Wang et al. (2011); 42. Brudevold and Southern (1994); 43. Weaver et al. (2013); 44. Ludeen et al. (1983); 45. Tischendorf et al. (2002); 46. Schone et al. (1996); 47. Owsley et al. (1986).

**Table 10. Relative Organ Weight (Percent Body Weight) or Tissue Volume for Male Swine**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Mean** | **SD** | **Number of Animals** | **Number of Studies** | **References** |
| Adrenal Glands | 0.005 | 0.001 | 55 | 2 | 1,2 |
| Adipose Tissue | 14.93 | 2.61 | 122 | 4 | 3-6 |
| Blood | 3.85 | 0.25 | 104 | 3 | 1, 6, 7 |
| Bone | 8.60 | 0.76 | 86 | 2 | 4, 6 |
| GI Tract |  |  |  |  |  |
| Stomach | 0.66 | 0.11 | 324 | 10 | 6-15 |
| Intestines | 3.74 | 0.40 | 60 | 1 | 7 |
| Small Intestine | 1.68 | 0.28 | 273 | 10 | 1, 8-16 |
| Large Intestine | 1.57 | 0.40 | 183 | 7 | 1, 8-10, 12, 14, 15 |
| Caecum | 0.15 | 0.02 | 27 | 2 | 1, 13 |
| Heart | 0.34 | 0.05 | 377 | 14 | 1, 6-8, 10-19 |
| Kidneys | 0.38 | 0.10 | 1566 | 16 | 1, 2, 6, 8-20 |
| Liver | 1.76 | 0.23 | 246 | 19 | 1, 2 , 5-21 |
| Lungs | 0.80 | 0.17 | 200 | 6 | 7, 8, 11, 12, 18, 19 |
| Muscle | 38.46 | 2.70 | 79 | 3 | 4, 9, 17 |
| Pancreas | 0.15 | 0.13 | 297 | 7 | 1, 6, 10, 14, 15, 21, 22 |
| Spleen | 0.20 | 0.05 | 765 | 11 | 1,6,8,10-12,14,15,17,18,20 |
| Thyroid | 0.008 | 0.001 | 24 | 1 | 1 |
| Thymus | 0.28 | 0.03 | 8 | 1 | 1 |
| Skin | 4.47 | 0.82 | 86 | 2 | 4, 6 |
| Rest of Body | 21.38 |  |  |  |  |

Note: The studies involved in the tissue volume calculations are: 1. Kerr et al. (2003); 2. Wise et al. (1993); 3. Hood and Allen (1977); 4. Quinious and Noblet (1995); 5. O’Hea and Leveille (1969); 6. Ruusunen et al. (2007); 7. Wiseman et al. (2007); 8. Kaensombath (2013); 9. Pond et al. (1989); 10. Chen et al. (1999); 11. Critser et al. (1995); 12. Kaensombath and Lindberg (2012); 13 Pond et al. (1988); 14. Koong et al. (1982); 15. Koong et al. (1983); 16. Moughan et al. (1990); 17. Anugwa et al. (1989); 18. Boleman et al. (1995); 19. Chiba (1994); 20. Cliplef and McKay (1993); 21. Jin et al. (1994); 22. Owsley et al. (1986). Only data from male swine were used in the calculation in this table.

**Table 11. Relative Organ Weight (Percent Body Weight) or Tissue Volume for Female Swine**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Mean** | **SD** | **Number of Animals** | **Number of Studies** | **References** |
| Adrenal Glands | 0.005 | 0.001 | 42 | 1 | 1 |
| Adipose Tissue | 13.00 | 3.06 | 40 | 2 | 2, 3 |
| Blood | 3.76 | 0.28 | 80 | 2 | 3, 4 |
| Bone | 10.73 | 1.00 | 40 | 2 | 2, 3 |
| GI Tract |  |  |  |  |  |
| Stomach | 0.63 | 0.11 | 131 | 3 | 4-6 |
| Intestines | 3.47 | 0.40 | 60 | 1 | 4 |
| Small Intestine | 1.44 | 0.31 | 116 | 4 | 5-8 |
| Large Intestine | 1.04 | 0.17 | 42 | 2 | 5, 8 |
| Heart | 0.36 | 0.05 | 196 | 6 | 3-8 |
| Kidneys | 0.35 | 0.11 | 1318 | 8 | 1,3,5-10 |
| Liver | 1.89 | 0.28 | 1002 | 8 | 1, 3-8, 10 |
| Lungs | 0.90 | 0.19 | 119 | 2 | 4, 6 |
| Muscle | 34.09 | 2.37 | 19 | 1 | 2 |
| Pancreas | 0.10 | 0.02 | 12 | 1 | 5 |
| Spleen | 0.21 | 0.07 | 492 | 4 | 5, 6, 9, 10 |
| Uterus | 3.28 | 0.84 | 42 | 1 | 1 |
| Ovary | 0.011 | 0.002 | 42 | 1 | 1 |
| Corpora Lutea | 0.005 | 0.001 | 42 | 1 | 1 |
| Skin | 5.07 | 0.85 | 40 | 2 | 1, 3 |
| Rest of Body | 22.14 |  |  |  |  |

Note: The studies involved in the relative organ weight calculations are: 1. Wise et al. (1993); 2. Quinious and Noblet (1995); 3. Ruusunen et al. (2007); 4. Wiseman et al. (2007); 5. Moughan et al. (1990); 6. Chen et al. (1999). Only data from female swine were used in the calculation in this table.

**Table 12. Relative Organ Weight (Percent Body Weight) or Tissue Volume for Market-Age Swine**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Mean** | **SD** | **Number of Animals** | **Number of Studies** | **References** |
| Body Weight (kg) | 92.5 | 4.0 | 5521 | 26 | 1-26 |
| Adrenal Glands | 0.005 | 0.001 | 79 | 2 | 1, 2 |
| Adipose Tissue | 17.42 | 2.66 | 124 | 4 | 3-6 |
| Blood | 3.45 | 0.54 | 176 | 3 | 5, 7, 8 |
| Bone | 14.31 | 1.19 | 88 | 2 | 4, 5 |
| GI Tract |  |  |  |  |  |
| Stomach | 0.58 | 0.08 | 1811 | 11 | 7, 9-18 |
| Intestines | 3.01 | 0.30 | 72 | 1 | 7 |
| Small Intestine | 1.26 | 0.23 | 300 | 10 | 9-13, 15-19 |
| Large Intestine | 1.35 | 0.32 | 132 | 6 | 9-13, 18 |
| Caecum | 0.14 | 0.02 | 39 | 2 | 16, 17 |
| Colon | 0.94 | 0.10 | 3 | 1 | 16 |
| Heart | 0.35 | 0.05 | 2101 | 16 | 5, 7, 9, 12-24 |
| Kidneys | 0.37 | 0.10 | 2812 | 17 | 1, 2, 5, 6, 9, 11-17, 19, 20, 22-24 |
| Liver | 2.01 | 0.25 | 4421 | 21 | 1, 2, 5-9, 11-20, 22-26 |
| Lungs | 0.77 | 0.14 | 275 | 7 | 7, 9, 15, 17, 18, 22, 24 |
| Muscle | 42.63 | 3.29 | 24 | 2 | 11, 20 |
| Pancreas | 0.12 | 0.03 | 112 | 4 | 12, 13, 17, 18 |
| Spleen | 0.21 | 0.06 | 3488 | 10 | 8, 9, 12-15, 17, 20, 22, 25 |
| Skin | 6.82 | 0.82 | 88 | 2 | 4, 5 |
| Rest of Body | 7.95 |  |  |  |  |

Note: The studies involved in the relative organ weight calculations are: 1. Wise et al. (1993); 2. Stahly and Cromwell (1979); 3. Hood and Allen (1977); 4. Quinious and Noblet (1995); 5. Ruusunen et al. (2007); 6. Shelton et al. (2004); 7. Wiseman et al. (2007); 8. . Johnson et al. (2015); 9. Kaensombath (2013); 10. Miller and Ullrey (1987); 11. Pond et al. (1989); 12. Chen et al. (1999); 13. Chen et al. (1995); 14. Cliplef and McKay (1993); 15. Critser et al. (1995); 16. Pond et al. (1988); 17. Yen et al. (1991); 18. Phuc and Hieu (1993); 19. Moughan et al. (1990); 20. Anugwa et al. (1989); 21. Rehfeldt et al. (2008); 22. Boleman et al. (1995); 23. Owen et al. (2001); 24. Chiba (1994); 25. Tischendorf et al. (2002); 26. Schone et al. (1996). The calculation of swine relative organ weights in this table was based on data from swine with reported mean body weight of 92.5 kg ranging from 65 to 160 kg.