**Supplementary data**

**The geometric framework reveals that a moderate-protein, high-carbohydrate intake is optimal for severe burn injury in mice**

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**Table S1, related to Fig 1.** Coefficients of the GAM associated with wound healed (%)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **D7 wound healed (%) vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.0001 | 8 | 0.0000 | 1.000 |
| s(eaten.C) | 0.0006 | 8 | 0.0001 | 0.3509 |
| s(eaten.F) | 0.0001 | 8 | 0.0000 | 0.7919 |
| s(eaten.P,eaten.C) | 0.0000 | 3 | 0.0061 | 0.8208 |
| s(eaten.P,eaten.F) | 0.00000 | 3 | 0.0000 | 0.8739 |
| s(eaten.C,eaten.F) | 1.6577 | 3 | 04.0061 | **0.0015** |
| s(eaten.P,eaten.C,eaten.F) | 0.0000 | 7 | 0.0000 | 0.9942 |
| **D14 wound healed (%) vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.0451 | 8 | 0.0059 | 0.2563 |
| s(eaten.C) | 0.7330 | 8 | 0.3423 | **0.0511** |
| s(eaten.F) | 0.0001 | 8 | 0.0000 | 0.5744 |
| s(eaten.P,eaten.C) | 0.0001 | 3 | 0.0000 | 0.5744 |
| s(eaten.P,eaten.F) | 0.6256 | 3 | 0.2807 | 0.2519 |
| s(eaten.C,eaten.F) | 0.0002 | 3 | 0.0001 | 0.3531 |
| s(eaten.P,eaten.C,eaten.F) | 0.0001 | 7 | 0.0000 | 0.6673 |
| **D21 wound healed (%) vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.0000 | 8 | 0.0000 | 0.7963 |
| s(eaten.C) | 0.9209 | 8 | 1.4473 | **0.0007** |
| s(eaten.F) | 0.0000 | 8 | 0.0000 | 0.5479 |
| s(eaten.P,eaten.C) | 0.0000 | 3 | 0.0000 | 0.5344 |
| s(eaten.P,eaten.F) | 0.0000 | 3 | 0.0000 | 1.0000 |
| s(eaten.C,eaten.F) | 0.0000 | 3 | 0.0000 | 0.8214 |
| s(eaten.P,eaten.C,eaten.F) | 0.9060 | 7 | 1.3767 | **0.0018** |
| **D28 wound healed (%) vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.0001 | 8 | 0.0000 | 0.9615 |
| s(eaten.C) | 0.6067 | 8 | 0.1927 | 0.1158 |
| s(eaten.F) | 0.2189 | 8 | 0.0350 | 0.2585 |
| s(eaten.P,eaten.C) | 0.0002 | 3 | 0.0001 | 0.3620 |
| s(eaten.P,eaten.F) | 0.0544 | 3 | 0.0188 | 0.3207 |
| s(eaten.C,eaten.F) | 0.0001 | 3 | 0.0000 | 0.4589 |
| s(eaten.P,eaten.C,eaten.F) | 0.0001 | 7 | 0.0000 | 0.7192 |

**Table S2, related to Fig 2.** Coefficients of the GAM associated with body weight loss %

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **D7 body weight loss (%) vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 3.4028 | 8 | 4.5285 | **0.0000** |
| s(eaten.C) | 0.0001 | 8 | 0.0000 | 0.5330 |
| s(eaten.F) | 0.0001 | 8 | 0.0000 | 0.5785 |
| s(eaten.P,eaten.C) | 1.2602 | 3 | 1.0819 | 0.0804 |
| s(eaten.P,eaten.F) | 0.0000 | 3 | 0.0000 | 0.6484 |
| s(eaten.C,eaten.F) | 0.0001 | 3 | 0.0000 | 0.5575 |
| s(eaten.P,eaten.C,eaten.F) | 0.0000 | 7 | 0.0000 | 0.6833 |
| **D14 body weightloss (%) vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 4.9543 | 8 | 6.8628 | **0.0000** |
| s(eaten.C) | 0.8994 | 8 | 1.1179 | **0.0014** |
| s(eaten.F) | 0.4717 | 8 | 0.0845 | 0.1053 |
| s(eaten.P,eaten.C) | 0.0000 | 3 | 0.0000 | 0.7820 |
| s(eaten.P,eaten.F) | 1.8248 | 3 | 3.1300 | **0.0004** |
| s(eaten.C,eaten.F) | 0.0000 | 3 | 0.0000 | 0.7916 |
| s(eaten.P,eaten.C,eaten.F) | 0.0001 | 7 | 0.0000 | 0.4780 |
| **D21 body weight loss (%) vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 4.1226 | 8 | 13.7396 | **0.0000** |
| s(eaten.C) | 0.0000 | 8 | 0.0000 | 0.5711 |
| s(eaten.F) | 1.7443 | 8 | 0.7821 | 0.0013 |
| s(eaten.P,eaten.C) | 0.0000 | 3 | 0.0000 | 0.7009 |
| s(eaten.P,eaten.F) | 0.7984 | 3 | 0.4181 | 0.0636 |
| s(eaten.C,eaten.F) | 0.0000 | 3 | 0.0000 | 0.8076 |
| s(eaten.P,eaten.C,eaten.F) | 0.7840 | 7 | 0.5186 | **0.0167** |
| **D28 body weight loss % vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 5.3327 | 8 | 11.7423 | **0.0000** |
| s(eaten.C) | 0.6272 | 8 | 0.2103 | 0.0785 |
| s(eaten.F) | 2.2789 | 8 | 1.3960 | 0.0003 |
| s(eaten.P,eaten.C) | 0.0001 | 3 | 0.0000 | 0.7389 |
| s(eaten.P,eaten.F) | 0.0000 | 3 | 0.0000 | 0.3140 |
| s(eaten.C,eaten.F) | 0.0000 | 3 | 0.0000 | 0.0793 |
| s(eaten.P,eaten.C,eaten.F) | 2.8733 | 7 | 1.1772 | **0.0097** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Extensor digitorum weight vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.0000 | 8 | 0.0000 | 0.6733 |
| s(eaten.C) | 0.0000 | 8 | 0.0000 | 0.7620 |
| s(eaten.F) | 0.0000 | 8 | 0.0000 | 0.5410 |
| s(eaten.P,eaten.C) | 0.0000 | 3 | 0.0000 | 0.5284 |
| s(eaten.P,eaten.F) | 0.0000 | 3 | 0.0000 | 0.4036 |
| s(eaten.C,eaten.F) | 0.2757 | 3 | 0.3288 | 0.3288 |
| s(eaten.P,eaten.C,eaten.F) | 0.0000 | 7 | 0.0000 | 0.8457 |
| **Inguinal white adipose tissue weight vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.0000 | 8 | 0.0000 | 0.3737 |
| s(eaten.C) | 0.9673 | 8 | 3.6816 | **0.0000** |
| s(eaten.F) | 0.0000 | 8 | 0.0000 | 0.7155 |
| s(eaten.P,eaten.C) | 0.0000 | 3 | 0.0000 | 0.6770 |
| s(eaten.P,eaten.F) | 0.0000 | 3 | 0.0000 | 0.5380 |
| s(eaten.C,eaten.F) | 0.9904 | 3 | 0.6161 | 0.1600 |
| s(eaten.P,eaten.C,eaten.F) | 0.8571 | 7 | 0.8571 | **0.0100** |

**Table S3, related to Fig 5.** Coefficients of the GAM associated with extensor digitorum longus muscle, inguinal white adipose tissue, brown adipose tissue, liver and spleen weight (mg/g)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Brown adipose tissue weight vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.8680 | 8 | 0.1542 | 0.2010 |
| s(eaten.C) | 0.5495 | 8 | 0.1525 | 0.1106 |
| s(eaten.F) | 0.0000 | 8 | 0.0000 | 1.0000 |
| s(eaten.P,eaten.C) | 1.4441 | 3 | 1.8650 | **0.0131** |
| s(eaten.P,eaten.F) | 0.0000 | 3 | 0.0000 | 0.4495 |
| s(eaten.C,eaten.F) | 0.0000 | 3 | 0.0000 | 0.9230 |
| s(eaten.P,eaten.C,eaten.F) | 0.0000 | 7 | 0.0000 | 0.3964 |
| **Liver weight vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.7875 | 8 | 0.4631 | **0.0221** |
| s(eaten.C) | 1.5255 | 8 | 0.7372 | **0.0066** |
| s(eaten.F) | 0.8812 | 8 | 0.9257 | **0.0013** |
| s(eaten.P,eaten.C) | 0.0000 | 3 | 0.0000 | 0.8382 |
| s(eaten.P,eaten.F) | 0.0000 | 3 | 0.0000 | 0.5948 |
| s(eaten.C,eaten.F) | 2.0765 | 3 | 2.6925 | **0.0075** |
| s(eaten.P,eaten.C,eaten.F) | 0.0000 | 7 | 0.0000 | 0.7634 |
| **Spleen weight vs macronutrient intake** | | | | |
|  | edf | Ref.df | F | p-value |
| s(eaten.P) | 0.3837 | 8 | 0.0778 | 0.1899 |
| s(eaten.C) | 0.0000 | 8 | 0.0000 | 0.5420 |
| s(eaten.F) | 0.0001 | 8 | 0.0000 | 0.4389 |
| s(eaten.P,eaten.C) | 0.0000 | 3 | 0.0000 | 0.6771 |
| s(eaten.P,eaten.F) | 0.0000 | 3 | 0.0000 | 0.4979 |
| s(eaten.C,eaten.F) | 0.0000 | 3 | 0.0000 | 0.4494 |
| s(eaten.P,eaten.C,eaten.F) | 0.32506 | 7 | 2.6510 | **0.0003** |