Online supporting material

$$R_1 = \frac{{}^{56}h_{nat} \cdot n_{nat} + {}^{56}h_A \cdot n_A + {}^{56}h_B \cdot n_B + {}^{56}h_C \cdot n_C}{{}^{54}h_{nat} \cdot n_{nat} + {}^{54}h_A \cdot n_A + {}^{54}h_B \cdot n_B + {}^{54}h_C \cdot n_C} \qquad (1)$$

$$R_2 = \frac{{}^{56}h_{nat} \cdot n_{nat} + {}^{56}h_A \cdot n_A + {}^{56}h_B \cdot n_B + {}^{56}h_C \cdot n_C}{{}^{57}h_{nat} \cdot n_{nat} + {}^{57}h_A \cdot n_A + {}^{57}h_B \cdot n_B + {}^{57}h_C \cdot n_C} \qquad (2)$$

$$R_3 = \frac{{}^{56}h_{nat} \cdot n_{nat} + {}^{56}h_A \cdot n_A + {}^{56}h_B \cdot n_B + {}^{56}h_C \cdot n_C}{{}^{58}h_{nat} \cdot n_{nat} + {}^{58}h_A \cdot n_A + {}^{58}h_B \cdot n_B + {}^{58}h_C \cdot n_C} \qquad (3)$$

The total circulating iron is the sum of the circulating natural iron and of the circulating isotopic labels:

$$n_{nat} + n_A + n_B + n_C = N_{tot} \qquad (4)$$

Equations (1), (2), (3) and (4) can be rearranged in the following form:

$$\left(R_1 \cdot {}^{54}h_{nat} - {}^{56}h_{nat}\right) \cdot n_{nat} + \left(R_1 \cdot {}^{54}h_A - {}^{56}h_A\right) \cdot n_A + \left(R_1 \cdot {}^{54}h_B - {}^{56}h_B\right) \cdot n_B + \left(R_1 \cdot {}^{54}h_C - {}^{56}h_C\right) \cdot n_C = 0$$

$$\left(R_2 \cdot {}^{57}h_{nat} - {}^{56}h_{nat}\right) \cdot n_{nat} + \left(R_2 \cdot {}^{57}h_A - {}^{56}h_A\right) \cdot n_A + \left(R_2 \cdot {}^{57}h_B - {}^{56}h_B\right) \cdot n_B + \left(R_2 \cdot {}^{57}h_C - {}^{56}h_C\right) \cdot n_C = 0$$

$$\left(R_3 \cdot {}^{58}h_{nat} - {}^{56}h_{nat}\right) \cdot n_{nat} + \left(R_3 \cdot {}^{58}h_A - {}^{56}h_A\right) \cdot n_A + \left(R_3 \cdot {}^{58}h_B - {}^{56}h_B\right) \cdot n_B + \left(R_3 \cdot {}^{58}h_C - {}^{56}h_C\right) \cdot n_C = 0$$

$$n_{nat} + n_A + n_B + n_C = N_{tot}$$

After substitution (i.e. a_{11} for ($R_1 \cdot {}^{54}h_{nat} - {}^{56}h_{nat}$)), the set of equations can be written as:

$$a_{11} n_{nat} + a_{12} n_A + a_{13} n_B + a_{14} n_C = b_1$$
$$a_{21} n_{nat} + a_{22} n_A + a_{23} n_B + a_{24} n_C = b_2$$
$$a_{31} n_{nat} + a_{32} n_A + a_{33} n_B + a_{34} n_C = b_3$$
$$a_{41} n_{nat} + a_{42} n_A + a_{43} n_B + a_{44} n_C = b_4$$

Supplemental Figure 1: Calculation of iron absorption. The measured isotopic ratios R_i can be expressed in the form of equations (1), (2) and (3), where n_m are the amounts in mol of the natural iron (m=nat), the ^{54}Fe (m=A), ^{57}Fe (m=B) and ^{58}Fe (m=C) labels circulating in the blood, respectively, and $^{j}h_m$ is the isotopic abundance in % mol in the natural iron and the isotopic labels, with j being the mass number of the respective iron isotope.