

Table S5 The amino acid usage ratio of mitochondria to nuclei genes in some animal genomes

| aa | D. R | D.M | G.G | M.M | R.N | H.S | P.T | Average |
|-----|------|------|------|------|------|------|------|---------|
| Met | 2.15 | 2.77 | 2.03 | 3.10 | 2.75 | 2.60 | 2.67 | 2.58 |
| Trp | 2.71 | 2.72 | 2.38 | 2.23 | 2.31 | 2.20 | 2.13 | 2.38 |
| Ile | 1.72 | 2.00 | 1.75 | 2.20 | 2.23 | 1.97 | 1.98 | 1.98 |
| Phe | 1.66 | 2.49 | 1.61 | 1.67 | 1.63 | 1.58 | 1.57 | 1.74 |
| Leu | 1.67 | 1.82 | 1.83 | 1.54 | 1.55 | 1.70 | 1.73 | 1.69 |
| Thr | 1.35 | 0.84 | 1.75 | 1.50 | 1.55 | 1.71 | 1.81 | 1.50 |
| Tyr | 1.08 | 1.49 | 1.00 | 1.23 | 1.27 | 1.38 | 1.47 | 1.27 |
| Asn | 0.79 | 1.17 | 0.85 | 1.20 | 1.25 | 1.23 | 1.21 | 1.10 |
| His | 1.01 | 0.79 | 1.18 | 0.95 | 1.01 | 0.96 | 0.92 | 0.98 |
| Ala | 1.39 | 0.61 | 1.08 | 0.90 | 0.89 | 0.96 | 0.91 | 0.96 |
| Gly | 1.05 | 0.97 | 0.90 | 0.87 | 0.85 | 0.83 | 0.83 | 0.90 |
| Pro | 1.02 | 0.63 | 1.07 | 0.86 | 0.84 | 0.90 | 0.87 | 0.89 |
| Ser | 0.74 | 0.84 | 0.93 | 0.92 | 0.94 | 0.86 | 0.87 | 0.87 |
| Val | 0.92 | 0.84 | 0.68 | 0.70 | 0.68 | 0.78 | 0.75 | 0.76 |
| Gln | 0.52 | 0.36 | 0.49 | 0.45 | 0.49 | 0.50 | 0.52 | 0.48 |
| Lys | 0.39 | 0.41 | 0.39 | 0.47 | 0.47 | 0.45 | 0.43 | 0.43 |
| Asp | 0.42 | 0.34 | 0.35 | 0.41 | 0.39 | 0.37 | 0.38 | 0.38 |
| Arg | 0.36 | 0.64 | 0.33 | 0.30 | 0.30 | 0.29 | 0.28 | 0.36 |
| Glu | 0.38 | 0.33 | 0.35 | 0.35 | 0.36 | 0.33 | 0.34 | 0.35 |
| Cys | 0.33 | 0.58 | 0.32 | 0.30 | 0.33 | 0.24 | 0.22 | 0.33 |

The ratio is calculated by dividing the usages of amino acids in mitochondria by the usages in nucleic genome. The animals represented by D. R, D. M, G. G, M. M, R.N, H.S and P.T are *Danio rerio*, *Drosophila melangaster*, *Gallus gallus*, *Mus musculus*, *Rattus norvegicus*, *Homo sapiens* and *Pan troglodytes*, respectively.