

## 評価対象論文リスト(要因:たんぱく質摂取、アウトカム:死亡)

評価判定日:2025/2/26

### ①既存の系統的レビュー・メタ解析・統合解析

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| 1 | Qi XX, Shen P. Associations of dietary protein intake with all-cause, cardiovascular disease, and cancer mortality: A systematic review and meta-analysis of cohort studies. <i>Nutrition, Metabolism and Cardiovascular Diseases</i> . 2020;30(7):1094-1105. doi:10.1016/j.numecd.2020.03.008         |
| 2 | Naghshi S, Sadeghi O, Willett WC, Esmailzadeh A. Dietary intake of total, animal, and plant proteins and risk of all cause, cardiovascular, and cancer mortality: systematic review and dose-response meta-analysis of prospective cohort studies. <i>BMJ</i> . July 2020;m2412. doi:10.1136/bmj.m2412 |
| 3 | Ma Y, Zheng Z, Zhuang L, et al. Dietary macronutrient intake and cardiovascular disease risk and mortality: a systematic review and dose-response meta-analysis of prospective cohort studies. <i>Nutrients</i> . 2024;16(1):152. doi:10.3390/nu16010152   |
| 4 | Chen Z, Glisic M, Song M, et al. Dietary protein intake and all-cause and cause-specific mortality: results from the Rotterdam Study and a meta-analysis of prospective cohort studies. <i>Eur J Epidemiol</i> . 2020;35(5):411-429. doi:10.1007/s10654-020-00607-6                                    |
| 5 | Bajracharya R, Katzke V, Mukama T, Kaaks R. Effect of iso-caloric substitution of animal protein for other macro nutrients on risk of overall, cardiovascular and cancer mortality: prospective evaluation in epic-heidelberg cohort and systematic review. <i>Nutrients</i> . 2023;15(3):794.         |

### ②日本人個別研究(ランダム化比較試験、コホート研究、症例対照研究、横断研究などの個別疫学研究)

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| 6  | Budhathoki S, Sawada N, Iwasaki M, et al. Association of animal and plant protein intake with all-cause and cause-specific mortality in a japanese cohort. <i>JAMA Intern Med</i> . 2019;179(11):1509. doi:10.1001/jamainternmed.2019.2806  |
| 7  | Kurata H, Meguro S, Abe Y, et al. Dietary protein intake and all-cause mortality: results from The Kawasaki Aging and Wellbeing Project. <i>BMC Geriatr</i> . 2023;23(1):479. doi:10.1186/s12877-023-04173-w  |
| 8  | Kurihara A, Okamura T, Sugiyama D, et al. Vegetable protein intake was inversely associated with cardiovascular mortality in a 15-year follow-up study of the general japanese population. <i>J Atheroscler Thromb</i> . 2019;26(2):198-206. doi:10.5551/jat.44172                          |
| 9  | Katagiri R, Yamaji T, Sawada N, Iwasaki M, Inoue M, Tsugane S. Total, animal, and plant protein intake and pneumonia mortality in the Japan Public Health Center-based Prospective Study. <i>The American Journal of Clinical Nutrition</i> . 2022;115(3):781-789. doi:10.1093/ajcn/nqab411 |
| 10 | Sauvaget C, Nagano J, Hayashi M, Yamada M. Animal protein, animal fat, and cholesterol intakes and risk of cerebral infarction mortality in the adult health study. <i>Stroke</i> . 2004;35(7):1531-1537. doi:10.1161/01.STR.0000130426.52064.09  |
| 11 | Nagata C, Wada K, Tamura T, et al. Dietary intakes of glutamic acid and glycine are associated with stroke mortality in japanese adults ., <i>The Journal of Nutrition</i> . 2015;145(4):720-728. doi:10.3945/jn.114.201293   |

### ③有力な研究

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| 12 | Song M, Fung TT, Hu FB, et al. Association of animal and plant protein intake with all-cause and cause-specific mortality. <i>JAMA Intern Med</i> . 2016;176(10):1453. doi:10.1001/jamainternmed.2016.4182 |
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# All-cause mortality

## ■コホート研究(コホートのプール解析含む)

| Reference                 |   |                  | Study subjects |                    |                    |                 |                                    | Category         | Number among cases       | Relative risk (95%CI or p) | P for trend      | Confounding variables considered | Magnitude of association |                    |   |      |   |
|---------------------------|---|------------------|----------------|--------------------|--------------------|-----------------|------------------------------------|------------------|--------------------------|----------------------------|------------------|----------------------------------|--------------------------|--------------------|---|------|---|
| Author                    | Title   | Year             | Study period   | Number of subjects | Source of subjects | Event followed  | Number of incident cases or deaths |                  |                          |                            |                  |                                  |                          | Participant's race |   |      |   |
| Sanjeev Budhathoki et al, | Association of Animal and Plant Protein Intake with All-cause and Cause-specific Mortality in a Japanese Cohort | 2019             | 5-2016         | 70696              | JPHC study         | All-cause death | 12381                              | Japanese         | Total protein (%energy)  |                            |                  |                                  |                          | 0.63               | - |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q1                       | 2888                       | 1.00 (reference) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q2                       | 2517                       | 0.95 (0.89-1.01) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q3                       | 2361                       | 0.93 (0.86-1.00) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q4                       | 2218                       | 0.92 (0.84-0.99) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q5                       | 2397                       | 0.99 (0.90-1.09) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Animal protein (%energy) |                            |                  |                                  |                          |                    |   | 0.93 | - |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q1                       | 2730                       | 1.00 (reference) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q2                       | 2447                       | 0.91 (0.85-0.97) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q3                       | 2444                       | 0.95 (0.88-1.02) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q4                       | 2348                       | 0.97 (0.89-1.05) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Plant protein (%energy)  |                            |                  |                                  |                          |                    |   | 0.01 | ↓ |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q1                       | 2738                       | 1.00 (reference) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q2                       | 2475                       | 0.89 (0.83-0.95) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    |                 |                                    |                  | Q3                       | 2427                       | 0.88 (0.82-0.95) |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Q4              | 2320                               | 0.84 (0.77-0.92) |                          |                            |                  |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Total protein   |                                    |                  |                          |                            | 0.96             | -                                |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Q1              | 1180                               | 1.00 (reference) |                          |                            |                  |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Q2              | 1016                               | 0.93 (0.84-1.03) |                          |                            |                  |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Q3              | 988                                | 0.96 (0.86-1.08) |                          |                            |                  |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Q4              | 931                                | 0.94 (0.83-1.06) |                          |                            |                  |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Animal protein  |                                    |                  |                          |                            | 0.96             | -                                |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Q1              | 1097                               | 1.00 (reference) |                          |                            |                  |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Q2              | 997                                | 0.91 (0.83-1.01) |                          |                            |                  |                                  |                          |                    |   |      |   |
|                           |   |                  |                |                    |                    | Q3              | 1017                               | 0.95 (0.85-1.06) |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q4                        | 980   | 0.97 (0.86-1.10) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Plant protein             |   |                  |                |                    | 0.59               | -               |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q1                        | 1096  | 1.00 (reference) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q2                        | 1066  | 1.02 (0.92-1.13) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q3                        | 970   | 0.99 (0.88-1.11) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q4                        | 991   | 1.04 (0.91-1.19) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Total protein             |   |                  |                |                    | 0.75               | -               |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q1                        | 707   | 1.00 (reference) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q2                        | 606   | 0.91 (0.80-1.04) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q3                        | 554   | 0.84 (0.72-0.98) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q4                        | 542   | 0.90 (0.76-1.06) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Animal protein            |   |                  |                |                    | 0.87               | -               |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q1                        | 672   | 1.00 (reference) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q2                        | 607   | 0.90 (0.79-1.03) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q3                        | 563   | 0.89 (0.77-1.03) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q4                        | 577   | 0.99 (0.84-1.17) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Plant protein             |   |                  |                |                    | 0.002              | ↓               |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q1                        | 666   | 1.00 (reference) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q2                        | 609   | 0.84 (0.73-0.96) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q3                        | 574   | 0.77 (0.66-0.90) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| CVD mortality             |   |                  |                |                    | 0.002              | ↓               |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |
| Q4                        | 547   | 0.70 (0.59-0.83) |                |                    |                    |                 |                                    |                  |                          |                            |                  |                                  |                          |                    |   |      |   |

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|--|--|--|--|--|--|--|--|--|---------------------------------|-----|-------------------------|-------------|---|
|  |  |  |  |  |  |  |  |  | Q5                              | 629 | <b>0.73 (0.59-0.91)</b> |             |   |
|  |  |  |  |  |  |  |  |  | <b>Total protein (%energy)</b>  |     |                         |             |   |
|  |  |  |  |  |  |  |  |  | Q1                              |     | <b>1.00 (reference)</b> | <b>0.01</b> |   |
|  |  |  |  |  |  |  |  |  | Q2                              |     | <b>1.11 (0.66-1.88)</b> |             | ↓↓↓   |
|  |  |  |  |  |  |  |  |  | Q3                              |     | <b>0.67 (0.36-1.22)</b> |             |   |
|  |  |  |  |  |  |  |  |  | Q4                              |     | <b>0.44 (0.22-0.90)</b> |             |   |
|  |  |  |  |  |  |  |  |  | <b>Animal protein (%energy)</b> |     |                         |             |   |
|  |  |  |  |  |  |  |  |  | Q1                              |     | <b>1.00 (reference)</b> | <b>0.11</b> | Age, sex, skeletal muscle mass index, cardiovascular disease, cancer, education, and serum albumin levels |
|  |  |  |  |  |  |  |  |  | Q2                              |     | <b>1.05 (0.60-1.83)</b> |             | ↓   |
|  |  |  |  |  |  |  |  |  | Q3                              |     | <b>1.03 (0.58-1.83)</b> |             |   |
|  |  |  |  |  |  |  |  |  | Q4                              |     | <b>0.53 (0.26-1.05)</b> |             |   |
|  |  |  |  |  |  |  |  |  | <b>Plant protein (%energy)</b>  |     |                         |             |   |
|  |  |  |  |  |  |  |  |  | Q1                              |     | <b>1.00 (reference)</b> | <b>0.08</b> |   |
|  |  |  |  |  |  |  |  |  | Q2                              |     | <b>0.81 (0.46-1.42)</b> |             | ↓   |
|  |  |  |  |  |  |  |  |  | Q3                              |     | <b>0.75 (0.41-1.36)</b> |             |   |
|  |  |  |  |  |  |  |  |  | Q4                              |     | <b>0.58 (0.33-1.07)</b> |             |   |

■メタ解析、系統的レビュー

| Reference |       |      | Include study |                   |      |              | Design   | Category                   | Relative risk (95% CI or p)               | Weight                  | Magnitude of association |   |
|-----------|-------|------|---------------|-------------------|------|--------------|--|----------------------------|---|-------------------------|--------------------------|---|
| Author    | Title | Year | Ref No.       | First author      | Year | Study period | Study location   | Event (*Definition)        |   |                         |                          |   |
|           |       |      |               |                   |      |              | Meta-analysis of 10 cohort studies (including          | <b>All-cause mortality</b> | <b>Total protein (highest v. lowest)</b>  | <b>0.97 (0.89-1.07)</b> | <b>100</b>               | - |
|           |       |      |               |                   |      |              |  |                            | <b>Animal protein (highest v. lowest)</b> | <b>1.04 (0.95-1.14)</b> | <b>100</b>               | - |
|           |       |      |               |                   |      |              |  |                            | <b>Plant protein (highest v. lowest)</b>  | <b>0.92 (0.88-0.96)</b> | <b>100</b>               | ↓ |
|           |       |      |               | Budhathoki et al. | 2019 | 1995-2016    | Japan (JPHC study)                                     | All-cause mortality        | Total protein (highest v. lowest)         | 0.99 (0.90-1.09)        | 13.84                    | - |
|           |       |      |               |                   |      |              |  |                            | Animal protein (highest v. lowest)        | 0.98 (0.88-1.08)        | 19.87                    | - |
|           |       |      |               |                   |      |              |  |                            | <b>Plant protein (highest v. lowest)</b>  | <b>0.87 (0.78-0.96)</b> | 20.20                    | ↓ |
|           |       |      |               |                   |      |              | Meta-analysis of 6 cohort studies (including Japanese) | Cancer mortality           | Total protein (highest v. lowest)         | 0.96 (0.89-1.04)        | 100                      | - |
|           |       |      |               |                   |      |              |  |                            | Animal protein (highest v. lowest)        | 1.00 (0.93-1.07)        | 100                      | - |
|           |       |      |               |                   |      |              |  |                            | Plant protein (highest v. lowest)         | 0.96 (0.88-1.04)        | 100                      | - |
|           |       |      |               | Budhathoki et al. | 2019 | 1995-2016    | Japan (JPHC study)                                     | Cancer mortality           | Total protein (highest v. lowest)         | 1.00 (0.86-1.16)        | 24.95                    | - |
|           |       |      |               |                   |      |              |  |                            | Animal protein (highest v. lowest)        | 0.97 (0.83-1.14)        | 18.16                    | - |
|           |       |      |               |                   |      |              |  |                            | Plant protein (highest v. lowest)         | 1.04 (0.88-1.23)        | 22.92                    | - |
|           |       |      |               |                   |      |              | Meta-analysis of 8 cohort studies (including Japanese) | CVD-mortality              | Total protein (highest v. lowest)         | 1.01 (0.93-1.10)        | 100                      | - |
|           |       |      |               |                   |      |              |  |                            | <b>Animal protein (highest v. lowest)</b> | <b>1.11 (1.01-1.22)</b> | 100                      | ↑ |
|           |       |      |               |                   |      |              |  |                            | Plant protein (highest v. lowest)         | 0.90 (0.80-1.01)        | 100                      | - |
|           |       |      |               | Budhathoki et al. | 2019 |              | Japan  | CVD-mortality              | Total protein (highest v. lowest)         | 0.97 (0.80-1.18)        | 19.26                    | - |
|           |       |      |               |                   |      |              |  |                            | Animal protein (highest v. lowest)        | 0.97 (0.79-1.19)        | 14.92                    | - |
|           |       |      |               |                   |      |              |  |                            | Plant protein (highest v. lowest)         | <b>0.73 (0.59-0.91)</b> | 16.43                    | ↓ |
|           |       |      |               | Kurihara et al.   | 2018 |              | Japan  | CVD-mortality              | Plant protein (highest v. lowest)         | 0.80 (0.55-1.16)        | 7.98                     | - |
|           |       |      |               |                   |      |              | Meta-analysis of 22 cohort studies (including          | <b>All-cause mortality</b> | <b>Total protein (highest v. lowest)</b>  | <b>0.94 (0.89-0.99)</b> | <b>100</b>               | ↓ |
|           |       |      |               |                   |      |              |  |                            | <b>Animal protein (highest v. lowest)</b> | <b>1.00 (0.94-1.05)</b> | <b>100</b>               | - |
|           |       |      |               |                   |      |              |  |                            | <b>Plant protein (highest v. lowest)</b>  | <b>0.92 (0.87-0.97)</b> | <b>100</b>               | ↓ |
|           |       |      |               | Budhathoki et al. | 2019 |              | Japan (JPHC study)                                     | All-cause mortality        | Total protein (highest v. lowest)         | 0.99 (0.90-1.09)        | 13.6                     | - |
|           |       |      |               |                   |      |              |  |                            | Animal protein (highest v. lowest)        | 0.98 (0.88-1.08)        | 2.15                     | - |
|           |       |      |               |                   |      |              |  |                            | <b>Plant protein (highest v. lowest)</b>  | <b>0.87 (0.78-0.96)</b> | 9.62                     | ↓ |
|           |       |      |               |                   |      |              |  |                            | Total protein (highest v. lowest)         | 1.01 (0.73-1.40)        | 2.5                      | - |
|           |       |      |               |                   |      |              |  |                            | Total protein (highest v. lowest)         | 1.01 (0.74-1.38)        | 2.69                     | - |
|           |       |      |               | Nagata et al.     | 2015 |              | Japan (the Takatama study)                             | Stroke mortality           | Animal protein (highest v. lowest)        | 1.14 (0.72-1.80)        | 1.37                     | - |
|           |       |      |               |                   |      |              |  |                            | Animal protein (highest v. lowest)        | 1.26 (0.81-1.96)        | 1.47                     | - |
|           |       |      |               |                   |      |              |  |                            | Plant protein (highest v. lowest)         | 0.89 (0.56-1.41)        | 1.23                     | - |
|           |       |      |               |                   |      |              |  |                            | Plant protein (highest v. lowest)         | 0.81 (0.52-1.26)        | 1.33                     | - |
|           |       |      |               | Sauvaaget et al.  | 2004 |              | Japan  | CVD mortality              | <b>Total protein (highest v. lowest)</b>  | <b>0.42 (0.20-0.85)</b> | 0.58                     | ↓ |
|           |       |      |               |                   |      |              |  |                            | <b>Animal protein (highest v. lowest)</b> | <b>0.45 (0.23-0.89)</b> | 0.64                     | ↓ |
|           |       |      |               |                   |      |              |  |                            | Plant protein (highest v. lowest)         | 1.12 (0.57-2.21)        | 0.59                     | - |
|           |       |      |               | Kurihara et al.   | 2018 |              | Japan (NIPPONDATA)                                     | CVD mortality              | Plant protein (highest v. lowest)         | <b>0.86 (0.75-0.99)</b> | 8.63                     | ↓ |
|           |       |      |               |                   |      |              | Meta-analysis of 12 cohort studies                     | Cancer mortality           | Total protein (highest v. lowest)         | 0.98 (0.92-1.05)        | 100                      | - |
|           |       |      |               |                   |      |              |  |                            | Animal protein (highest v. lowest)        | 1.00 (0.98-1.02)        | 100                      | - |
|           |       |      |               |                   |      |              |  |                            | Plant protein (highest v. lowest)         | 0.99 (0.94-1.05)        | 100                      | - |

|   |   |   |   |   |   |                         |                                    |                                   |                                    |                         |      |   |
|---|---|---|---|---|---|-------------------------|------------------------------------|-----------------------------------|------------------------------------|-------------------------|------|---|
| dose-response meta-analysis of prospective cohort studies | Budhathoki et al.                             | 2019  | Japan (JPHC study)                            | Cancer mortality                          | Total protein (highest v. lowest)             | 1.00 (0.86-1.16)        | 13.6                               | -                                 |                                    |                         |      |   |
|   |   |   |   |   | Animal protein (highest v. lowest)            | 0.97 (0.83-1.14)        | 2.15                               | -                                 |                                    |                         |      |   |
|   |   |   |   |   | Plant protein (highest v. lowest)             | 1.04 (0.88-1.23)        | 9.62                               | -                                 |                                    |                         |      |   |
|   | Meta-analysis of 10 cohort studies (including | CVD-mortality   | Total protein (highest v. lowest)             | 0.98 (0.94-1.03)                          | 100   | -                       |                                    |                                   |                                    |                         |      |   |
|   |   |   | Animal protein (highest v. lowest)            | 1.02 (0.94-1.11)                          | 100   | -                       |                                    |                                   |                                    |                         |      |   |
|   |   |   | Plant protein (highest v. lowest)             | <b>0.88 (0.80-0.96)</b>                   | 100   | ↓                       |                                    |                                   |                                    |                         |      |   |
|   | Budhathoki et al.                             | 2019  | Japan   | CVD-mortality                             | Total protein (highest v. lowest)             | 0.97 (0.80-1.18)        | 19.26                              | -                                 |                                    |                         |      |   |
|   |   |   |   |   | Animal protein (highest v. lowest)            | 0.97 (0.79-1.19)        | 14.92                              | -                                 |                                    |                         |      |   |
|   |   |   |   |   | Plant protein (highest v. lowest)             | <b>0.73 (0.59-0.91)</b> | 16.43                              | ↓                                 |                                    |                         |      |   |
|   | Sauvaaget et al.                              | 2004  | Japan   | CVD mortality                             | Total protein (highest v. lowest)             | <b>0.42 (0.20-0.85)</b> | 0.41                               | ↓                                 |                                    |                         |      |   |
| Animal protein (highest v. lowest)                        |   |   |   |   | <b>0.45 (0.23-0.89)</b>                       | 1.43                    | ↓                                  |                                   |                                    |                         |      |   |
| Plant protein (highest v. lowest)                         |   |   |   |   | 1.12 (0.57-2.21)                              | 1.57                    | -                                  |                                   |                                    |                         |      |   |
| Nagata et al.   | 2015  | Japan (the Takayama Study)  | Stroke mortality                              | Total protein (highest v. lowest)         | 1.01 (0.73-1.40)                              | 1.98                    | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Animal protein (highest v. lowest)        | 1.14 (0.72-1.80)                              | 3.01                    | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Plant protein (highest v. lowest)         | 0.89 (0.56-1.41)                              | 3.13                    | -                                  |                                   |                                    |                         |      |   |
| Kurihara et al.   | 2018  | Japan (NIPPONDATA 00)   | CVD-mortality                                 | Plant protein (highest v. lowest)         | <b>0.86 (0.75-0.99)</b>                       | 14.64                   | ↓                                  |                                   |                                    |                         |      |   |
|   |   |   |   | <b>Total protein (highest v. lowest)</b>  | <b>0.97 (0.93-1.02)</b>                       | <b>100</b>              | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | <b>Animal protein (highest v. lowest)</b> | <b>1.04 (0.97-1.12)</b>                       | <b>100</b>              | -                                  |                                   |                                    |                         |      |   |
| Yibin Ma et al.   | 2024  | Dietary Macronutrient Intake and Cardiovascular Disease Risk and Mortality: A systematic review and Dose-Response Meta-Analysis of Prospective Cohort Studies   | Meta-analysis of 25 cohort studies (including | All-cause mortality                       | <b>Plant protein (highest v. lowest)</b>      | <b>0.92 (0.87-0.98)</b> | <b>100</b>                         | ↓                                 |                                    |                         |      |   |
|   |   |   |   |   | <b>Total protein (highest v. lowest)</b>      | <b>0.97 (0.93-1.02)</b> | <b>100</b>                         | -                                 |                                    |                         |      |   |
|   |   |   |   |   | <b>Animal protein (highest v. lowest)</b>     | <b>1.04 (0.97-1.12)</b> | <b>100</b>                         | -                                 |                                    |                         |      |   |
|   |   |   |   |   | Budhathoki et al.                             | 2019                    | Japan (JPHC study)                 | All-cause mortality               | Total protein (highest v. lowest)  | ?                       | ?    | - |
|   |   |   |   |   |   |                         |                                    |                                   | Animal protein (highest v. lowest) | ?                       | ?    | - |
|   |   |   |   |   |   |                         |                                    |                                   | Plant protein (highest v. lowest)  | ?                       | ?    | - |
|   |   |   |   |   | Meta-analysis of 17 cohort studies (including | Cancer mortality        | Total protein (highest v. lowest)  | 0.97 (0.91-1.03)                  | 100                                | -                       |      |   |
|   |   |   |   |   |   |                         | Animal protein (highest v. lowest) | 0.98 (0.92-1.05)                  | 100                                | -                       |      |   |
|   |   |   |   |   |   |                         | Plant protein (highest v. lowest)  | 0.98 (0.90-1.06)                  | 100                                | -                       |      |   |
|   |   |   |   |   | Budhathoki et al.                             | 2019                    | Japan (JPHC study)                 | Cancer mortality                  | Total protein (highest v. lowest)  | 1.00 (0.86-1.16)        | 13.6 | - |
| Animal protein (highest v. lowest)                        | 0.97 (0.83-1.14)                              | 2.15  | -   |   |   |                         |                                    |                                   |                                    |                         |      |   |
| Plant protein (highest v. lowest)                         | 1.04 (0.88-1.23)                              | 9.62  | -   |   |   |                         |                                    |                                   |                                    |                         |      |   |
| Meta-analysis of 17 cohort studies (including             | CVD-mortality                                 | Total protein (highest v. lowest)   | 0.98 (0.94-1.03)                              | 100                                       | -   |                         |                                    |                                   |                                    |                         |      |   |
|   |   | Animal protein (highest v. lowest)  | 1.07 (0.97-1.18)                              | 100                                       | -   |                         |                                    |                                   |                                    |                         |      |   |
|   |   | Plant protein (highest v. lowest)   | <b>0.85 (0.78-0.93)</b>                       | 100                                       | ↓   |                         |                                    |                                   |                                    |                         |      |   |
| Sauvaaget et al.  | 2004  | Japan (AHS)   | Stroke mortality                              | Animal protein (highest v. lowest)        | ?   | ?                       | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Total protein (highest v. lowest)         | 1.01 (0.73-1.40)                              | ?                       | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Animal protein (highest v. lowest)        | 1.14 (0.72-1.80)                              | ?                       | -                                  |                                   |                                    |                         |      |   |
| Nagata et al.   | 2015  | Japan (the Takayama Study)  | Stroke mortality                              | Plant protein (highest v. lowest)         | 0.89 (0.56-1.41)                              | ?                       | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Total protein (highest v. lowest)         | 0.97 (0.80-1.18)                              | ?                       | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Animal protein (highest v. lowest)        | 0.97 (0.79-1.19)                              | ?                       | -                                  |                                   |                                    |                         |      |   |
| Budhathoki et al.   | 2019  | Japan   | CVD-mortality                                 | Plant protein (highest v. lowest)         | <b>0.73 (0.59-0.91)</b>                       | ?                       | ↓                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Total protein (highest v. lowest)         | 0.97 (0.80-1.18)                              | ?                       | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Animal protein (highest v. lowest)        | 0.97 (0.79-1.19)                              | ?                       | -                                  |                                   |                                    |                         |      |   |
| Kurihara et al.   | 2018  | Japan (NIPPONDATA 00)   | CVD-mortality                                 | Plant protein (highest v. lowest)         | <b>0.86 (0.75-0.99)</b>                       | ?                       | ↓                                  |                                   |                                    |                         |      |   |
|   |   |   |   | <b>Total protein (highest v. lowest)</b>  | <b>1.05 (1.01-1.10)</b>                       | <b>100</b>              | ↑                                  |                                   |                                    |                         |      |   |
|   |   |   |   | <b>Animal protein (highest v. lowest)</b> | <b>1.05 (0.97-1.14)</b>                       | <b>100</b>              | -                                  |                                   |                                    |                         |      |   |
| Zhangling Chen et al.                                     | 2020  | Dietary protein intake and all-cause mortality and cause-specific mortality: results from the Rotterdam Study and a meta-analysis of prospective cohort studies | Meta-analysis of 6 cohort studies (including  | All-cause mortality                       | <b>Plant protein (highest v. lowest)</b>      | <b>0.93 (0.87-0.99)</b> | <b>100</b>                         | ↓                                 |                                    |                         |      |   |
|   |   |   |   |   | <b>Total protein (highest v. lowest)</b>      | <b>1.05 (1.01-1.10)</b> | <b>100</b>                         | ↑                                 |                                    |                         |      |   |
|   |   |   |   |   | <b>Animal protein (highest v. lowest)</b>     | <b>1.05 (0.97-1.14)</b> | <b>100</b>                         | -                                 |                                    |                         |      |   |
|   |   |   |   |   | Budhathoki et al.                             | 2019                    | Japan                              | All-cause mortality               | Total protein (highest v. lowest)  | 0.99 (0.90-1.09)        | ?    | - |
|   |   |   |   |   |   |                         |                                    |                                   | Animal protein (highest v. lowest) | 0.98 (0.88-1.08)        | ?    | - |
|   |   |   |   |   |   |                         |                                    |                                   | Plant protein (highest v. lowest)  | <b>0.87 (0.78-0.96)</b> | ?    | ↓ |
|   |   |   |   |   | Meta-analysis of 6 cohort studies (including  | Cancer mortality        | Total protein (highest v. lowest)  | 1.02 (0.95-1.09)                  | 100                                | -                       |      |   |
|   |   |   |   |   |   |                         | Animal protein (highest v. lowest) | 1.01 (0.94-1.08)                  | 100                                | -                       |      |   |
|   |   |   |   |   |   |                         | Plant protein (highest v. lowest)  | 0.97 (0.90-1.04)                  | 100                                | -                       |      |   |
|   |   |   |   |   | Budhathoki et al.                             | 2019                    | Japan (JPHC study)                 | Cancer mortality                  | Total protein (highest v. lowest)  | 1.00 (0.86-1.16)        | ?    | - |
| Animal protein (highest v. lowest)                        | 0.97 (0.83-1.14)                              | ?   | -   |   |   |                         |                                    |                                   |                                    |                         |      |   |
| Plant protein (highest v. lowest)                         | 1.04 (0.88-1.23)                              | ?   | -   |   |   |                         |                                    |                                   |                                    |                         |      |   |
| Meta-analysis of 6 cohort studies (including              | CVD-mortality                                 | Total protein (highest v. lowest)   | 1.08 (0.98-1.20)                              | 100                                       | -   |                         |                                    |                                   |                                    |                         |      |   |
|   |   | Animal protein (highest v. lowest)  | <b>1.09 (1.01-1.18)</b>                       | 100                                       | ↑   |                         |                                    |                                   |                                    |                         |      |   |
|   |   | Plant protein (highest v. lowest)   | 0.86 (0.73-1.00)                              | 100                                       | -   |                         |                                    |                                   |                                    |                         |      |   |
| Sauvaaget et al.  | 2004  | Japan (AHS)   | Stroke mortality                              | Animal protein (highest v. lowest)        | 0.92 (0.43-1.95)                              | ?                       | -                                  |                                   |                                    |                         |      |   |
|   |   |   |   | Kurihara et al.                           | 2018  | Japan (NIPPONDATA 00)   | CVD-mortality                      | Plant protein (highest v. lowest) | 0.80 (0.55-1.16)                   | ?                       | -    |   |

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2019

Japan

CVD-mortality

Total protein (highest v. lowest) 0.97 (0.80-1.18) ? -

Animal protein (highest v. lowest) 0.97 (0.79-1.19) ? -

**Plant protein (highest v. lowest) 0.73 (0.59-0.91) ? ↓**