What journalists need to know about protein restriction and healthy aging

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Food and nutrition studies can be difficult to report on, often arriving with uncertainty, nuance, and pressure for quick headlines. These briefings are designed for journalists, breaking down what the research actually shows and providing clear context to support accurate coverage.

A new study found a link between restricting protein intake and a longer lifespan. This result may generate headlines, but it needs careful context. Here are the key points journalists should consider.

Quick summary

A new narrative review brought together research on protein restriction and restriction of individual amino acids across human studies and experimental organisms, including mice, rats, flies, and yeast. The review found that protein restriction can improve aspects of metabolic health and extend lifespan in several experimental organisms, while restricting certain amino acids — particularly methionine, isoleucine and valine — can produce some similar effects.

However, evidence in humans remains limited. Human studies included in the review have generally examined short-term metabolic outcomes, such as changes in blood glucose, insulin sensitivity and body weight, rather than lifespan or long-term healthy ageing. Therefore, the review does **not** show that eating less protein makes people live longer or establish that people should reduce their protein intake for longevity.

What do the results mean?

The review suggests that restricting protein or certain amino acids can influence biological processes involved in metabolism and ageing. However, **the evidence that protein restriction extends lifespan comes predominantly from laboratory organisms**, including rodents, flies and yeast. The effects are also not identical across organisms: the review notes variation according to biological sex and animal strain.

The strongest evidence for lifespan extension comes from these experimental models, not humans.

Human studies discussed in the review have mainly found short-term changes in metabolic markers such as insulin sensitivity, blood glucose and FGF21, a hormone involved in the metabolic response to protein restriction. They have not shown that people live longer because of reducing protein intake.

This distinction is important because improvements in metabolic markers do not automatically mean that a person will age more slowly, develop fewer age-related diseases or live longer. For example, improved insulin sensitivity may be beneficial for metabolic health, but this study cannot tell us whether that ultimately translates into a longer lifespan. Establishing effects on ageing and longevity would require much longer-term human research. The review therefore provides a biological framework for understanding how protein restriction might influence ageing and discusses priorities for future research, rather than providing evidence for recommending that people reduce their protein intake to live longer. The authors themselves emphasise that the optimal amount of protein remains uncertain and that individual protein needs differ.

There is also a potential trade-off, particularly with ageing. Protein is essential for maintaining muscle and other tissues, and adequate protein intake can be particularly important in older adults. The review discusses evidence linking adequate or higher protein intake with better muscle-related outcomes and lower risk of sarcopenia or frailty in some older populations.

Overall, the findings are better understood as raising questions about whether **the amount and amino acid composition of protein influence healthy ageing**, rather than establishing that “less protein is better.”

To keep in mind if reporting

- **This is a review, not a new human trial:** it brings together findings from many different experiments and observational studies rather than following one group of people or testing one protein intake.
- **The lifespan findings are mainly from laboratory organisms (including flies and rodents):** this does not establish that the same effect occurs in humans. Statements such as “eating less protein makes you live longer” would go beyond the evidence.
- **Human studies mainly measure short-term (days or weeks) metabolic outcomes:** improvements in glucose regulation, insulin sensitivity or FGF21 are not the same as demonstrating slower ageing, less disease or greater longevity.
- **There is no established amount of protein people should restrict to increase longevity:** none of the human studies establish an intake level that extends human lifespan and there remains unknowns about the optimal levels of protein intake.
- **Be cautious when reporting, as protein restriction may be unsuitable for some groups with higher protein needs:** restricting protein or specific amino acids could be harmful for pregnant women, growing children, people restricting calories, people recovering from injuries, and older adults who already have inadequate protein intake. They also note that people who exercise may have higher protein needs or may be able to eat higher protein intakes without the same potential metabolic risks.
- **Current dietary guidance has not changed:** existing European and international recommendations continue to focus on eating enough protein to meet physiological needs.

What is the current scientific consensus on the topic?

Authority	Position on protein intake and health
European Food Safety Authority (EFSA)	EFSA's Population Reference Intake for protein is 0.83 g/kg body weight/day for adults, including older adults. EFSA's reference value is intended to cover the needs of nearly all healthy people; it is not a longevity target and EFSA does not recommend protein restriction as an anti-ageing intervention.
World Health Organization (WHO)	WHO's current healthy-diet guidance states that protein providing around 10–15% of total energy intake is generally sufficient for adults, while emphasising an overall varied and balanced diet. WHO does not currently recommend reducing protein or specific amino acids as a strategy to extend lifespan.
European Society for Clinical Nutrition and Metabolism (ESPEN)	For older people, ESPEN recommends at least 1.0 g protein/kg body weight/day, individually adjusted for nutritional status, physical activity, disease and tolerance. Amounts of around 1.0–1.2 g/kg/day have been suggested for healthy older adults, with higher amounts potentially needed during illness.

In depth

What the study showed

The review synthesises research using widely varying levels of dietary protein and individual amino acids.

The studies summarised by the authors include experiments in mice, rats and flies in which lower-protein diets repeatedly increased lifespan, although effects varied according to species, strain and sex.

The review proposes **six interconnected hallmarks of protein restriction**:

1. improved metabolic health (how well the body regulates energy, blood sugar and fats);
2. altered nutrient-sensing pathways (how cells detect and respond to available nutrients);
3. reduced cellular senescence (when ageing or damaged cells stop dividing but remain active);
4. changes in mitochondrial function (how well cells produce and manage energy);
5. epigenetic modifications (changes in how genes are switched on or off without changing the DNA sequence); and
6. healthier ageing (maintaining health and function as we age).

One proposed mechanism involves **FGF21**, a hormone that increases when dietary protein is restricted. In animal models, higher FGF21 levels have been involved in effects such as increased energy use, lower body weight and changes in how the body handles blood sugar and fats. Another pathway involves **mTORC1**, a system inside cells that senses the availability of nutrients, including amino acids, and helps determine whether cells prioritise growth or maintenance. Protein restriction can reduce the activity of this system in experimental studies, which may encourage cells to spend less energy on growth and more on maintenance processes, including breaking down and recycling damaged or unnecessary cell components.

The type of amino acid being restricted may also matter. The review highlights three essential amino acids, methionine, isoleucine and valine, because restricting them individually has produced some of the same changes in metabolism and ageing seen when overall protein intake is reduced.

Human findings are more limited and come mainly from small, short-term studies. These include:

- Low-protein interventions lasting several weeks have resulted in lower body weight or body fat and improvements in how the body regulates blood sugar and responds to insulin, the hormone that helps control blood sugar.
- Restricting sulfur-containing amino acids, which include methionine, for eight weeks increased FGF21 and reduced body weight and levels of leptin, a hormone involved in regulating appetite and energy balance. Two short studies investigated restricting branched-chain amino acids (BCAAs: leucine, isoleucine and valine). Restricting them by 75% for seven days reduced their levels in the blood and improved the body's response to insulin, while another intervention lasting four weeks found improvements in blood sugar and insulin regulation and changes in biological processes involved in the body's response to protein restriction.
- Overall, the review brings together evidence from animal, human and laboratory research to propose a framework for how protein restriction **might** influence ageing and to identify questions for future research. It supports further investigation into whether the *amount of protein people eat and the particular amino acids it contains* influence healthy ageing, but it does not establish that people should restrict protein or particular amino acids to improve health or live longer.

What the study did not show

- **Any cause-and-effect relationship between protein restriction and human longevity:** no human trial reviewed here demonstrates that protein restriction extends lifespan. The strongest lifespan evidence comes from experimental organisms.
- **Generalisability beyond the populations studied:** human interventions were generally short and involved selected groups such as lean men or people with metabolic conditions. Their findings cannot automatically be applied to all healthy adults, older adults, children, pregnant women or physically active people.
- **A single biological mechanism responsible for the effects in humans:** The review discusses FGF21, mTORC1, GCN2, autophagy, senescence, mitochondrial function and epigenetic pathways, but much of the causal mechanistic evidence comes from animal or cellular research.
- **That all protein should be reduced:** different amino acids appear to have different effects, and the review does not establish that reducing every source of protein would produce the same outcome.
- **An optimal protein intake for healthy ageing:** the authors explicitly identify this as an unresolved question and note that protein requirements differ according to factors including age, nutritional status, physical activity, pregnancy, growth and recovery from injury.
- **That older adults would benefit from eating less protein:** some older people already have insufficient protein intake, and protein restriction could worsen this. Existing evidence also supports adequate protein intake for preserving muscle and physical function with ageing.
- **A single quantitative estimate of the benefits or harms of protein restriction:** this is a narrative review that discusses findings from different studies rather than statistically combining their results. It therefore cannot tell us the overall size of the potential benefits or harms of protein restriction.

How the research was done

- **Sample:** there was no single participant sample. This was a review drawing on studies in humans alongside experiments in mice, rats, flies, worms, yeast and cultured cells.
- **Data:** published research on overall dietary protein restriction and restriction or supplementation of individual amino acids. Evidence included observational human studies, short-term human intervention trials, animal feeding experiments and mechanistic cellular research.
- **Primary outcomes & how measured:** the studies covered a broad range of outcomes, including lifespan and frailty in laboratory animals; body weight and adiposity; glucose and insulin regulation; energy expenditure; circulating metabolites and hormones such as FGF21; nutrient-sensing pathways including mTORC1 and GCN2; mitochondrial function; cellular senescence; and epigenetic changes.
- **Design:** broad narrative review of protein and amino acid restriction in ageing rather than a new clinical study or pooled meta-analysis. Its framework is organised around six proposed hallmarks of protein restriction and around evidence for individual essential and non-essential amino acids.

EUFIC resources available

What are Proteins and What is Their Function in the Body?
Explains what proteins and amino acids are, why the body needs them and how much protein adults need according to EFSA reference values.

Plant-based protein: all you need to know to get enough of it
Provides practical information on plant sources of protein and meeting protein requirements through plant-based diets.

What are dietary reference values (DRVs) used for?
Explains how EFSA's dietary reference values are developed and how nutrient reference values, including those for protein, should be interpreted.

Plant-based protein sources for vegans and vegetarians
Provides examples of protein-rich plant foods and explains how varied plant-based diets can meet protein needs.

Media enquiries

For interview requests, background information or additional materials, please contact EUFIC's media team at media@eufic.org or EUFIC's Media Manager.

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