**The hunger games as the key to happily ever after?**

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**This file includes**

Methods

Supplementary eFigure 1 - PRISMA diagram of identified records

Supplementary eTable 1 - Summary of studies from the literature search

Supplementary eTable 2 - Summary of generation time values for species found within the literature search

References

**Methods**

To determine the generality of the predicted beneficial effects of caloric restriction (CR) on longevity across species, we conducted a literature search of peer-review publications via ISI Web of Science. We used the search terms “calori\*” AND “restriction” AND “longevity” and covered the period from 1935 to December 2021. The search resulted in 3,058 publications which were then screened, and, over several steps, certain publications removed according to a set of criteria (see eFigure 1). In the first instance, before screening, 266 publications were removed if they fell into one of the following criteria: Proceedings papers (n = 146), Editorial Material (n = 95), Meeting abstracts (n = 15), Letters (n = 4), News items (n = 5). The remaining publications (n = 2792) were then screened over two stages. In the first stage, reviews (n = 807) and books (n = 45) were removed. In the second stage the remaining 1940 publications were screened to exclude studies that did not directly test the impact of restricting calories on longevity, and studies only investigating the impact of calorie restriction mimetics (n = 1716). Once the screening was completed, 222 original studies remained (Table S1).

For each study in the literature review, we identified outcomes of calorie restriction on longevity as ‘positive’, ‘negative’, ‘no effect’, or ‘variable’: ‘positive’ described outcomes that extends longevity; ‘negative’ outcomes shorten longevity; ‘no effect’ outcomes described no extension or shortening of longevity; ‘variable’ described both extension and shortening of longevity within studies (here the general effect is unclear). We defined short-lived species as species with a mean life expectancy of less than five years. Within our review, all invertebrate species have a mean life expectancy of less than one year. Only two short-lived species live longer than one year: *Mus musculus* and *Rattus norvegicus*. To obtain mean life expectancy values for these two species, we searched the PANTHERA database (1). In the case of *Mus musculus*, the only datum available was for maximum longevity (6 years). However, for *Rattus norvegicus* no data were available. As such, we identified the maximum longevity of these two species in our literature review (4.2 years for *Mus musculus*, 4.1 years for *Rattus* norvegicus) and identified short-lived species as those with a mean life expectancy of less than 5 years. We identified the effect size of the outcomes of each study in two ways: (1) where studies explicitly stated effect sizes, we used those values; (2) for studies that did not explicitly state effect sizes, we calculated effect size from the data or figures presented in those studies. Where effect size was given within a study, this was in percentage change in longevity of the CR treatment compared to the non-CR treatment. As such, in the case of studies that did not report effect size, we calculated the percentage change in longevity of the CR treatment compared to the non-CR treatment from the data or figure presented within a study where possible. In the case of five studies on yeast, where present, the effect size was in orders of magnitude as in these cases the longevity under CR treatments increased in orders of magnitude.

To determine if there were significantly more studies where the outcomes show a positive effect of calorie restriction on longevity (lifespan extension), we analysed our data using a chi-square test on studies investigating effects of CR without interaction effects. For studies focused on the interaction of CR with other variables, we conducted a separate chi-square test to determine if there were significantly more studies showing positive effects on longevity. In both tests, where studies were not identified as having positive outcomes on longevity (‘positive’), they were grouped into a single category ‘not positive’ (*i.e.*, ‘negative’, ‘no effect’ and ‘variable’ were combined) for the analyses. To determine if species generation time had an impact on the effect size of CR, we analysed our data using a linear model with effect size set as the response variable and generation time in days as the predictor variable. Effect size was calculated as follows:

The calculation of effect size provided either a positive value, when the effect of CR resulted in an increased lifespan relative to the non-CR diet, or a negative value if the effect of CR reduced lifespan relative to the non-CR. As we were interested in effect size in general, we used absolute values of effect size in our analysis. Data analyses were performed in R version 3.6.3 (2). Generation time was defined as the mean age of reproduction or the amount of time for full population turnover; a longer generation time translates to a slower pace of life or life history speed. Values for generation time were taken from existing literature for each species which can be found in Table S2.

**eFigure 1. PRISMA diagram of identified records.**

The PRISMA diagram highlights the screening of the 3,058 records identified in the Web of Science search. Records were initially removed according to a set of criteria. Remaining records were then screened to exclude records that did not meet additional criteria.

**Records identified from Web of Science:**

(n = 3058)

**Records removed *before screening*:**

Identified as Proceedings papers (n = 147)

Identified as Editorial Material (n = 95)

Identified as Meeting abstracts (n = 15)

Identified as Letters (n = 4)

Identified as News items (n = 5)

**Records screened**

(n = 2792)

**Records excluded**

Reviews (n = 807)

Books (n = 45)

**Records screened**

(n = 1940)

**Records excluded**

Studies not directly testing impact of calorie restriction and studies testing calorie restriction mimetics (n = 1716)

**Studies included in review**

(n = 222)

**Identification of studies via Web of Science**

**Identification**

**Screening**

**Included**

**eTable 1. Summary of studies from the literature search included in the review.**

Studies investigating the effect of calorie restriction on longevity, result of a literature search in ISI Web of Science between 1935 and 2021. Life history pace indicates either fast-living (short-lived) or slow-living (long-lived) species. In the case of response to calorie restriction, *variable* indicates positive and negative effects within the same study or across studies, whilst *no effect* indicates no positive or negative effect. Effect size is given in percentage (%) or orders of magnitude (10n), as per the original source. CR = calorie restriction, Ref. = reference, NA = information not provided by the study. a Indicates studies that stated effects sizes. Where studies did not contain an estimated effect size, we calculated effect size from the studies’ available data and figures when possible.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 1 | *Drosophila melanogaster* | Fruit fly | Multiple diets of a standard nutrient mixture supplemented with a 1:1 proportion of sucrose and yeast but that varies in concentration. %sucrose:%yeast - 0%:0%, 1%:1%, 2%:2%, 3%:3%, 4%:4%, 5%:5% and 10%:10%. Varying diets tested under normoxic or hypoxic conditions | short | positive | 120 | days | y | 40% | 220% | 0.001 | experiment | 2007 | 3 |
| 2 | *Drosophila melanogaster* | Fruit fly | Multiple diets varied in dextrose and yeast concentrations (dextrose and yeast always in 1:1 concentration). %dextrose:%yeast - 5%:5% (low diet), 10%:10% (normal diet) and 15%:15% (high diet). | short | positive | 58 | days | n | NA | 30% | NA | experiment | 2007 | 4 |
| 3 | *Caenorhabditis elegans* | Nematode | Animals kept on axenic plates supplemented with high (fully fed) or low (CR) concentrations of radiation-killed bacteria. Three treatments with low and high concentrations: Constant fully fed; constant CR; shifted from fully fed to CR; shifted from CR to fully fed. Shifts between feeding regimes occurred just before reaching adulthood. No indication of high and low concentrations of bacteria given | short | positive | 70 | days | n | NA | 42% | 0.001 | experiment | 2007 | 5a |
| 4 | *Mus musculus* | Mouse | Normal/ad libitum diet, CR group gradually reduced until individuals achieved the target weight reduction of 15–18% (was comparable to an approximate 30–35% reduction in calories/per day) | short | positive | 125 | days | n | NA | 9% | NA | experiment | 2006 | 6a |
| 5 | *Mus musculus* | Mouse | Normal diet 95-kcal diet from 6 weeks old until death. CR diet 65-kcal from 6 to10 weeks old then 95-kcal after. CR groups restricted at different times; pre and post irradiation and another group restricted over whole lifetime. | short | positive | 1100 | days | y | NA | 4% | NA | experiment | 2006 | 7 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 6 | *Mus musculus* | Mouse | Normal/ad libitum diet and 45% CR diet (reduced intake in 10% weekly increments). | short | neutral | 230 | days | n | NA | 0% | 0.523 | experiment | 2006 | 8a |
| 7 | *Plecoglossus altivelis* | Ayu | Normal/ad libitum diet and 70% CR diet | short | neutral | 6 | months | n | NA | 0% | NA | experiment | 2005 | 9a |
| 8 | *Musca domestica* | House fly | Normal/ad libitum diet and 6 CR diets: 100%, 90%, 80%, 70%, 60%, and 50% of adult food consumption of normal diet | short | negative | 35 | days | n | 14.40% | 66.70% | NA | experiment | 2004 | 10 |
| 9 | *Caenorhabditis elegans* | Nematode | Normal diet of monoxenic culture, CR diet was axenic culture (supports growth of worms in absence of bacterial food). | short | positive | 100 | days | n | NA | 153% | NA | experiment | 2004 | 11a |
| 10 | *Rattus norvegicus* | Rat | Normal/ad libitum diet until after the weaning stage. After 6 weeks, ad libitum diet and 30% CR diet (140% mean daily intake of ad libitum diet every other day) | short | positive | NA | NA | n | 10.70% | 17.80% | 0.0001 | experiment | 2003 | 12a |
| 11 | *Ceratitis capitata* | Mediterranean fruit fly | Normal/ad libitum diet and 12 different CR (0% to 70% CR) | short | negative | 114 | weeks | n | NA | NA | NA | experiment | 2002 | 13 |
| 12 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and 50% CR diet | short | neutral | 100 | days | n | NA | 0% | NA | experiment | 2002 | 14a |
| 13 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and 50% CR diet | short | positive | 100 | days | n | NA | 41% | NA | experiment | 2002 | 14a |
| 14 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet | short | positive | 1300 | days | n | NA | 18% | 0.001 | experiment | 2002 | 15 |
| 15 | *Saccharomyces cerevisiae* | Yeast | Normal/ad libitum diet was 2% glucose or 100% non-essential amino acids, CR was 0.1% glucose or 0% non-essential amino acids | short | positive | 45 | generations | n | NA | 42.50% | 0.0001 | experiment | 2002 | 16 |
| 16 | *Mus musculus* | Mouse | Normal/ad libitum diet and 30% CR diet. CR was initiated over the course of successive weeks (10%, 20% and 30% CR) | short | positive | 1400 | days | n | 15% | 20% | 0.004 | experiment | 2001 | 17 |
| 17 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR die. Individuals were 508 days old at start of the experiment | short | positive | 1442 | days | n | NA | 19% | 0.0001 | experiment | 2000 | 18 |
| 18 | *Mus musculus* | Mouse | Normal/ad libitum diet and 26% CR diet. Both diets tested on a group given acidified water and on a group with non-acidified water. Individuals were 12 months old at start of the experiment | short | positive | 44 | months | y | NA | 13.80% | 0.001 | experiment | 1999 | 19a |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 19 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 25-35% CR diet. CR differed between sexes: males 25% CR and females 35% CR | short | positive | 104 | weeks | n | 14% | 22% | NA | experiment | 1998 | 20 |
| 20 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 15-25% CR diet. CR reduced over 4 weeks | short | positive | 104 | weeks | n | 28% | 33% | NA | experiment | 1998 | 20 |
| 21 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 22-26% CR diet. CR differed between sexes: males 26% CR and females 22% CR | short | positive | 2 | years | n | 6.12% | 17.50% | 0.05 | experiment | 1997 | 21 |
| 22 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 30% CR diet. Both diets tested a group of individuals exercising and a group not exercising | short | positive | 2 | years | y | 11.40% | 18.40% | 0.01 | experiment | 1997 | 22 |
| 23 | *Mus musculus* | Mouse | Normal/ad libitum diet and CR diet of 85kcal/week, 50kcal/week or 40kcal/week | short | positive | 55 | weeks | n | 4% | 40% | 0.05 | experiment | 1996 | 23 |
| 24 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet. CR was initiated over 2 weeks from 10% to 25% to 40%. Individuals were 12 months old at start of the experiment | short | positive | 42 | weeks | n | NA | 18% | NA | experiment | 1986 | 24a |
| 25 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 40% CR diet. CR was initiated over 2 weeks. Individuals were 13 weeks old at start of the experiment | short | positive | 190 | weeks | n | 12.80% | 18.40% | NA | experiment | 1994 | 25 |
| 26 | *Rattus norvegicus* | Rat | Fed ad libitum (AL) diet or 40% CR. Five treatments: 1) constant ad libitum; 2) constant CR; 3) CR initiated at 6 weeks old (AL pre 6 weeks); 4) CR initiated at 6 months old (AL pre 6 months); 5) CR between 6 weeks old and 6 months old | short | positive | 48 | months | n | NA | 22% | NA | experiment | 1985 | 26 |
| 27 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 40% CR diet. Individuals were 6 weeks old at start of the experiment | short | positive | 39 | months | n | NA | 26.50% | NA | experiment | 1992 | 27 |
| 28 | *Mus musculus* | Mouse | Normal/ad libitum diet and 60% CR diet | short | positive | 45 | months | n | 14.70% | 20% | NA | experiment | 1992 | 28 |
| 29 | *Mus musculus* | Mouse | Normal/ad libitum diet and 32% CR diet | short | positive | 39 | months | n | NA | 32.50% | 0.001 | experiment | 1991 | 29 |
| 30 | *Mus musculus* | Mouse | Normal/ad libitum diet and 32% CR diet | short | positive | 39 | months | n | NA | 43.80% | 0.001 | experiment | 1991 | 29 |
| 31 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet | short | positive | 50 | months | n | 11.40% | 24.40% | NA | experiment | 1991 | 30 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 32 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet. After 240 days, half of the calorie restricted mice were fed ad libitum | short | positive | 850 | days | n | NA | 37.50% | NA | experiment | 1947 | 31 |
| 33 | *Schizosaccharomyces pombe* | Fission yeast | Normal diet (2% glucose) and CR diet (0.5% glucose). Microgravity simulation: both diets exposed to incubation at either at 10rpm or 1rpm | short | positive | 12 | days | y | NA | 24% | 0.0001 | experiment | 2021 | 32 |
| 34 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% dextrose) and CR diet (0.5% dextrose) | short | positive | 35 | days | n | NA | NA | NA | experiment | 2021 | 33 |
| 35 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% dextrose), 0.5% dextrose CR and 0.05% dextrose CR diet | short | positive | 55 | generations | n | NA | NA | NA | experiment | 2021 | 34 |
| 36 | *Neoseiulus cucumeris* | Predatory mite | Normal diet (40 eggs/day), CR diet (10 eggs/day) and high CR diet (5 eggs/day) | short | positive | 80 | days | n | NA | 108% | 0.0001 | experiment | 2021 | 35 |
| 37 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and 50% CR diet | short | positive | 100 | days | n | NA | 19.30% | 0.01 | experiment | 2020 | 36a |
| 38 | *Saccharomyces cerevisiae* | Yeast | Normal/ad libitum diet and 70% CR diet | short | positive | 3 | days | n | NA | 75% | 0.008 | experiment | 2020 | 37a |
| 39 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and two CR diluted diets: bacteria diluted into 1X10^11/ml and 1X10^8/ml | short | positive | 50 | days | n | NA | 38.10% | 0.0001 | experiment | 2020 | 38 |
| 40 | *Mus musculus* | Mouse | Normal/ad libitum diet and 30% CR diet. Individuals were 7-8 weeks old at start of the experiment | short | positive | 700 | days | n | NA | 18.90% | 0.003 | experiment | 2019 | 39 |
| 41 | *Mus musculus* | Mouse | Normal/ad libitum diet and 30% CR diet. Individuals were 7-8 weeks old at start of the experiment | short | positive | 700 | days | n | NA | 5.30% | 0.03 | experiment | 2019 | 39 |
| 42 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 70% CR diet | short | positive | 38 | months | n | NA | 17.0% | 0.01 | experiment | 2020 | 40 |
| 43 | *Danio rerio* | Zebrafish | Normal/ad libitum diet, 25% CR diet and 50% CR diet | short | positive | 260 | days | n | NA | 43.0% | 0.001 | experiment | 2020 | 41 |
| 44 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose); two culture methods (bottle-ageing & microplate-ageing) | short | opposing | 6 | days | n | 10.0% | 42.0% | <0.05 | experiment | 2019 | 42 |
| 45 | *Mus musculus* | Mouse | Normal/ad libitum diet and CR diet | short | positive | 1400 | days | n | 19.0% | 37.5% | 0.001 | experiment | 2019 | 43a |
| 46 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and CR diet | short | positive | 31 | days | n | NA | 25.4% | 0.001 | experiment | 2019 | 44a |
| 47 | *Saccharomyces cerevisiae* | Yeast | 4% glucose diet, 2% glucose diet and 0.5% glucose diet | short | positive | 270 | hours | n | 13.0% | 41.0% | 0.01 | experiment | 2019 | 45a |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 48 | *Tetranychus urticae* | Spider mite | Normal/ad libitum diet, 33% intermittent fasting, 50% intermittent fasting, 67% intermittent fasting | short | opposing | 60 | days | y | 0% | 29.0% | 0.001 | experiment | 2019 | 46 |
| 49 | *Mus musculus* | Mouse | Normal/ad libitum diet, 30% CR diet and single-meal feeding | short | positive | 126 | weeks | n | NA | 28.0% | 0.001 | experiment | 2019 | 47a |
| 50 | *Mus musculus* | Mouse | Normal/ad libitum diet, 20% CR, 30% CR and one treatment switched from CR to ad libitum | short | positive | 85 | weeks | y | 12.0% | 24.0% | 0.001 | experiment | 2018 | 48 |
| 51 | *Microcebus murinus* | Grey mouse lemur | Normal/ad libitum diet and 30% CR diet | long | positive | 13 | years | n | NA | 50.0% | 0.03 | experiment | 2018 | 49a |
| 52 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and CR diet(s); extent of CR varied over studies in meta-analysis | short | positive | 60 | days | n | NA | 80.0% | NA | meta-analysis | 2018 | 50a |
| 53 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and CR diet(s); extent of CR varied over studies in meta-analysis | short | positive | 60 | days | n | NA | 100.0% | NA | meta-analysis | 2018 | 50a |
| 54 | *Musca domestica* | House fly | Normal/ad libitum diet and diets increasing in CR; Caloric content: Sucrose>Xylitol>Sorbitol>Mannitol>Truvia>Water | short | negative | 14 | days | n | NA | 70.0% | 0.001 | experiment | 2017 | 51 |
| 55 | *Bombyx mori* | Silkworm | Normal/ad libitum diet and reduced daily feeding diet (16 hours) | short | neutral | 1800 | hours | n | NA | 0.0% | >0.05 | experiment | 2017 | 52 |
| 56 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.4% glucose) | short | positive | 25 | days | n | NA | 170.0% | NA | experiment | 2017 | 53 |
| 57 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 15 | days | n | 45.0% | 50.0% | 0.001 | experiment | 2017 | 54a |
| 58 | *Rattus norvegicus* | Rat | Normal/ad libitum diet, 60% CR diet and 90% CR diet | short | positive | 32 | months | n | 15.0% | 19.0% | 0.001 | experiment | 2016 | 55a |
| 59 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.1% glucose) | short | positive | 14 | days | n | NA | 65.0% | 0.005 | experiment | 2016 | 56 |
| 60 | *Mus musculus* | Mouse | Normal/ad libitum diet and 30% CR diet | short | positive | 1100 | days | n | NA | 50.0% | 0.001 | experiment | 2016 | 57 |
| 61 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.2% glucose) | short | positive | 20 | days | n | NA | 30.0% | 0.0001 | experiment | 2016 | 58 |
| 62 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and 1% CR diet | short | positive | 37 | days | n | NA | 40.0% | 0.0001 | experiment | 2016 | 59a |
| 63 | *Drosophila melanogaster* | Fruit fly | Multiple diets varying in protein and lipid content; total caloric content also varied through different concentrations | short | negative | 40 | days | y | NA | NA | 0.01 | experiment | 2016 | 60 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 64 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose), CR 0.5% glucose diet and CR 0.05% glucose diet | short | positive | 70 | days | n | 22.0% | 42.0% | 0.0001 | experiment | 2015 | 61a |
| 65 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose); two culture methods (bottle-ageing & microplate-ageing) | short | positive | 100 | hours | n | NA | 10^3 | 0.001 | experiment | 2015 | 62 |
| 66 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose), CR 0.5% glucose diet and CR 0.2% glucose diet; treatments either not moved or moved to new spatial location in same diet treatment after 15 generations | short | opposing | 40 | generations | y | 5.0% | 30.0% | 0.001 | experiment | 2015 | 63a |
| 67 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 48 | generations | n | NA | 17.0% | NA | experiment | 2014 | 64 |
| 68 | *Mus musculus* | Mouse | Normal/ad libitum diet, 5% CR diet and 40% CR diet | short | positive | 1450 | days | n | 13.0% | 32.0% | <0.05 | experiment | 2014 | 65 |
| 69 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose), CR 0.5% glucose diet and CR 0.05% glucose diet | short | neutral | 50 | buds | n | NA | 0.0% | 0.11 | meta-analysis | 2014 | 66a |
| 70 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and 2% CR diet | short | positive | 500 | minutes | n | NA | 46.4% | 0.0001 | experiment | 2014 | 67a |
| 71 | *Mus musculus* | Mouse | Normal/ad libitum diet and 70% CR diet | short | positive | 176 | weeks | n | NA | 20.3% | 0.0001 | experiment | 2014 | 68a |
| 72 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.4% glucose) | short | positive | 30 | days | n | NA | 10^3 | NA | experiment | 2013 | 69 |
| 73 | *Romalea microptera* | Lubber grasshopper | Normal/ad libitum diet and CR diet; CR based on the amount ovariectomized individuals ate on ad lib diet the week before | short | positive | 120 | days | n | NA | 30.0% | 0.0001 | experiment | 2013 | 70 |
| 74 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 28 | days | n | NA | 60.0% | 0.001 | experiment | 2013 | 71 |
| 75 | *Mus musculus* | Mouse | Normal diet (92.5 kcal per week) or CR diet (74 kcal per week) | short | neutral | 152 | weeks | n | NA | 0.0% | 0.39 | experiment | 2013 | 72a |
| 76 | *Macaca mulatta* | Rhesus monkey | Normal diet and 30% CR diet. All animals were adults when CR initiated but of varying ages | long | neutral | 40 | years | n | NA | 0.0% | 0.93 | experiment | 2012 | 73a |
| 77 | *Bactrocera tryoni* | Queensland fruit fly | Multiple diets varying in protein and lipid content; total caloric content also varied through different concentrations | short | variable | 80 | days | y | NA | 0.0% | <0.05 | experiment | 2012 | 74a |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 78 | *Drosophila melanogaster* | Fruit fly | Normal diet and diets varying in sugar:protein content (high sugar:low protein, low sugar:high protein); total caloric concentration also varied through different concentrations (low and high) | short | opposing | 85 | days | y | 26.3% | 40.9% | 0.001 | experiment | 2012 | 75a |
| 79 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 52 | days | n | NA | 48.0% | 0.001 | experiment | 2012 | 76 |
| 80 | *Asobara tabida* | Parasitoid wasp | Ad lib diets varying in sucrose concentrations (0%, 20%, 40%, 80% or 100%); 40% concentration diet varying in feeding frequency (once, weekly, twice weekly, daily or ad lib) | short | opposing | 40 | days | y | 10.0% | 75.0% | 0.001 | experiment | 2011 | 77 |
| 81 | *Trichopria drosophilae* | Parasitoid wasp | Ad lib diets varying in sucrose concentrations (0%, 20%, 40%, 80% or 100%); 40% concentration diet varying in feeding frequency (once, weekly, twice weekly, daily or ad lib) | short | opposing | 90 | days | y | 9.0% | 88.0% | 0.001 | experiment | 2011 | 77 |
| 82 | *Drosophila melanogaster* | Fruit fly | Normal diet (15% yeast) and CR diet (5% yeast) | short | positive | 60 | days | y | 23.0% | 28.0% | 0.0001 | experiment | 2011 | 78a |
| 83 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% dextrose) and CR diet (0.5% dextrose) | short | positive | 43 | days | n | NA | 40.0% | 0.001 | experiment | 2011 | 79 |
| 84 | *Brachionus plicatilis* | Rotifer | Normal/ad libitum diet (daily feeding) and CR diet (feeding every other day); two environments one non-stressed (no paraquat exposure) and one stressed (exposure to 10 mM paraquat). Experiment repeated with daughters from mothers on either AL or CR diet | short | positive | 20 | days | y | 30.0% | 50.0% | 0.0001 | experiment | 2011 | 80a |
| 85 | *Podospora anserina* | Filamentous fungus | Normal diet (2% glucose), 0.2% glucose CR diet and 0.02% glucose CR diet | short | positive | 100 | days | n | 50.0% | 800.0% | NA | experiment | 2010 | 81a |
| 86 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose), CR diet (0.5% glucose) and normal diet excluding amino acids | short | opposing | 43 | generations | n | NA | 64.0% | NA | experiment | 2010 | 82 |
| 87 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and 50% CR diet | short | positive | 75 | days | n | NA | 13.0% | 0.01 | experiment | 2010 | 83 |
| 88 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 70% CR diet | short | neutral | 1065 | days | n | NA | 0.0% | 0.06 | experiment | 2010 | 84a |
| 89 | *Schizosaccharomyces pombe* | Fission yeast | Diets varying in glucose concentration (0.75%, 1%, 1.5%, 3% and 4%) | short | positive | 7 | days | n | NA | 10^4 | NA | experiment | 2010 | 85 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 90 | *Macaca mulatta* | Rhesus monkey | Normal diet and 30% CR diet. CR initiated gradual by 10% per month for three months to reach 30%. All animals were adults when CR initiated but of varying ages (young to old) | long | positive | 32 | years | n | NA | 30.0% | 0.03 | experiment | 2009 | 86 |
| 91 | *Latrodectus hasselti* | Australian redback spider | Diets varying in caloric content; low diet one fly per week, mid diet of three flies three times per week, high diet of six flies three times per week; males fed in presence or absence of females | short | negative | 20 | days | y | 33.0% | 54.0% | 0.007 | experiment | 2009 | 87 |
| 92 | *Mus musculus* | Mouse | Normal diet and CR diet; normal diet (litter size of 8 pups), CR for first 20 days of life and induced through changes in litter size (50% enlargement, 8 to 12 pups at birth) | short | positive | 1100 | days | n | NA | 18.0% | 0.0007 | experiment | 2009 | 88a |
| 93 | *Bactrocera tryoni* | Queensland fruit fly | Multiple diets varying in carbohydrate:protein ratios and concentrations; additional treatment with choice of separate sucrose and yeast diets at one of five concentrations | short | opposing | 92 | days | y | 20.0% | 50.0% | NA | experiment | 2009 | 89 |
| 94 | *Saccharomyces cerevisiae* | Yeast | Diets varying in glucose concentration (0.2%, 0.5%, 1% and 2%) | short | positive | 35 | days | n | 60.0% | 90.0% | 0.001 | experiment | 2009 | 90a |
| 95 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 50 | generations | n | NA | 37.0% | 0.04 | experiment | 2009 | 91 |
| 96 | *Anastrepha ludens* | Tephritid fruit fly | Multiple diets varying in sugar:yeast ratios and three dilution levels | short | variable | 100 | days | y | 0 | 60.0% | NA | experiment | 2009 | 92 |
| 97 | *Mus musculus* | Mouse | Normal/ad libitum diet and 30% CR diet | short | positive | 50 | months | n | 12.0% | 36.0% | 0.0001 | experiment | 2009 | 93 |
| 98 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 24 | days | n | 10.0% | 50.0% | NA | experiment | 2009 | 94 |
| 99 | *Caenorhabditis elegans* | Nematode | Diets varying in bacterial concentrations (gradient of concentrations) | short | positive | 32 | days | n | 19.0% | 40.0% | 0.0001 | experiment | 2009 | 95 |
| 100 | *Mus musculus* | Mouse | Normal/ad libitum diet (daily feeding) and CR diet (feeding every other day; approximately 10-15% reduction in daily food intake) | short | positive | 1010 | days | n | NA | 16.0% | <0.008 | experiment | 2009 | 96a |
| 101 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet (bacteria, 1.5 optical density) and CR diet (bacteria, 0.5 optical density) | short | positive | 32 | days | n | NA | 39.0% | 0.0001 | experiment | 2009 | 97a |
| 102 | *Mus musculus* | Mouse | Normal/ad libitum diet and 70% CR diet | short | positive | 1388 | days | n | NA | 42.0% | 0.01 | experiment | 2008 | 98 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 103 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 24 | hours | n | 13.0% | 49.0% | NA | experiment | 2008 | 99 |
| 104 | *Anastrepha ludens* | Tephritid fruit fly | Multiple diets varying in sugar:yeast ratios and varying in CR regimes (percentages of ad lib food) | short | opposing | 90 | days | y | 19.5% | 66.0% | 0.001 | experiment | 2008 | 100 |
| 105 | *Drosophila melanogaster* | Fruit fly | Multiple diets varying in sugar:yeast ratios | short | opposing | 70 | days | y | NA | NA | NA | experiment | 2008 | 101 |
| 106 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet | short | positive | 131 | days | n | NA | 13.2% | 0.024 | experiment | 2008 | 102a |
| 107 | *Saccharomyces cerevisiae* | Yeast | Glucose, galactose, raffinose and glycerol/ethanol diets varying in concentration from 0.2-3.0% | short | opposing | 36 | hours | n | 40.0% | 100.0% | 0.04 | experiment | 2008 | 103 |
| 108 | *Kluyveromyces lactis* | Yeast | Glucose, galactose, raffinose and glycerol/ethanol diets varying in concentration from 0.2-3.0% | short | negative | 36 | hours | n | 40.0% | 95.0% | 0.04 | experiment | 2008 | 103 |
| 109 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 150 | hours | n | 10^2 | 10^3 | NA | experiment | 2008 | 104 |
| 110 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and CR diet (bacterial deprivation), individuals moved from normal diet to CR diet (and vice versa) at different ages; treatments initiated at two temperatures (20°C and 38°C) | short | positive | 54 | days | y | 14.0% | 70.0% | 0.0001 | experiment | 2008 | 105 |
| 111 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and CR diet (bacterial deprivation after 4th day of adulthood) | short | positive | 44 | days | n | 23.0% | 51.0% | 0.0001 | experiment | 2008 | 106a |
| 112 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and CR diet (bacterial deprivation after 4th day of adulthood) | short | opposing | 71 | days | n | 4.0% | 41.0% | 0.73-0.0001 | experiment | 2008 | 106a |
| 113 | *Caenorhabditis elegans* | Nematode | Multiple diets varying in glucose concentration (0.05%, 0.5%, 1%, 2%, 10% and 20%) | short | positive | 36 | days | n | 15.0% | 80.0% | NA | experiment | 2008 | 107 |
| 114 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 30% CR diet | short | positive | 215 | weeks | n | 0.0% | 22.7% | <0.05 | experiment | 2008 | 108a |
| 115 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2%) and CR diet (0.5%) using glucose and 9 alternative monosaccharide carbon sources | short | positive | 25 | days | n | NA | 10^5 | NA | experiment | 2007 | 109 |
| 116 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet of live bacteria and CR diet of growth-arrested bacteria | short | positive | 40 | days | n | NA | 31.0% | 0.0001 | experiment | 2007 | 110 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 117 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet | short | positive | 48 | months | n | NA | 24.0% | 0.0001 | experiment | 2007 | 111a |
| 118 | *Drosophila melanogaster* | Fruit fly | Several diets increasing in concentration (concentrations differed for each diet but all were increasing from an initial low, CR, concentration); diets were sugar, agar and several yeast options with various quality | short | opposing | 75 | days | n | 10.0% | 40.0% | 0.0001 | experiment | 2007 | 112 |
| 119 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 55 | generations | n | NA | 23.0% | NA | experiment | 2007 | 113 |
| 120 | *Elosa worallii* | Rotifer | Normal/ad lib diet (1.5mg C/l) and CR diet (0.15mg C/l); CR diets applied for different lengths of time (days) with one permanent CR diet | short | positive | 26 | days | y | 0.0% | 47.0% | 0.01 | experiment | 2007 | 114a |
| 121 | *Cephalodella acidophila* | Rotifer | Normal/ad lib diet (1.5mg C/) and CR diet (1.5mg C/) | short | negative | 8 | days | n | NA | 56.0% | 0.001 | experiment | 2007 | 114a |
| 122 | *Podospora anserina* | Filamentous fungus | Normal/ad libitum diet and CR diet (100-fold reduction in glucose); fungus with plasmid strain and fungus without plasmid strain given diets | short | opposing | 700 | hours | y | 10.0% | 45.0% | NA | experiment | 2007 | 115 |
| 123 | *Saccharomyces cerevisiae* | Yeast | Diets varying in glucose concentration (0.05%, 0.5% and 2%) | short | positive | 50 | generations | n | 10.0% | 30.0% | NA | experiment | 2007 | 116a |
| 124 | *Drosophila melanogaster* | Fruit fly | Normal diet (15% glucose) and CR diet (5% glucose) | short | neutral | 91 | days | n | NA | 0.0% | >0.05 | experiment | 2007 | 117a |
| 125 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 4 | days | n | NA | 40.0% | <0.05 | experiment | 2007 | 118 |
| 126 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 15 | days | n | 80.0% | 90.0% | NA | experiment | 2007 | 119 |
| 127 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet, 90% CR diet and absence of food diet; absence of food initiated at various ages | short | positive | 50 | days | y | 20.0% | 50.0% | NA | experiment | 2006 | 120a |
| 128 | *Saccharomyces cerevisiae* | Yeast | Diets varying in glucose concentration (0.005%, 0.05%, 0.5% and 2%) | short | positive | 70 | generations | n | 10.0% | 19.5% | 0.0001 | experiment | 2006 | 121 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 129 | *Romalea microptera* | Lubber grasshopper | Normal/ad libitum diet, 40% CR diet and 30% CR diet; additional time diet (late onset CR diet), ad lib food for first 49 days then 40% CR until death | short | positive | 150 | days | y | 60.0% | 98.0% | 0.0001 | experiment | 2006 | 122a |
| 130 | *Mus musculus* | Mouse | Normal/ad libitum diet and 30% CR diet; gradual 30% CR by receiving 90% of add lib diet in initial week, 80% in second week and 70% throughout the rest of the study. | short | positive | 1382 | days | n | 19.0% | 25.0% | <0.05 | experiment | 2006 | 123a |
| 131 | *Drosophila melanogaster* | Fruit fly | Multiple diets varying in yeast concentration (1%, 2%, 4%, 8 and 16%) | short | positive | 68 | days | n | 50.0% | 67.0% | 0.0001 | experiment | 2006 | 124 |
| 132 | *Drosophila melanogaster* | Fruit fly | Several diets increasing in concentration; brewer's yeast, sucrose, agar and tegosept, 0.5X, 1X, 1.5X and 3X concentrations | short | positive | 100 | days | n | 42.0% | 121.0% | 0.0001 | experiment | 2005 | 125a |
| 133 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet; individual caged singly or multiply (4 individuals) | short | positive | 1460 | days | y | 17.0% | 22.0% | 0.001 | experiment | 2005 | 126a |
| 134 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.05% glucose) | short | positive | 60 | generations | n | 16.0% | 21.0% | NA | experiment | 2005 | 127 |
| 135 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet; for CR diet the first 3 days was 2% glucose medium followed by starvation | short | positive | 40 | generations | n | NA | 170.0% | NA | experiment | 2005 | 128 |
| 136 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.05% glucose) | short | positive | 60 | generations | n | 29.0% | 52.0% | NA | experiment | 2005 | 129 |
| 137 | *Ceratitis capitata* | Mediterranean fruit fly | Multiple diets varying in yeast concentration (0%, 1%, 1.96%, 4.76%, 5%, 7.7% and 25%). Diets given to virgin and mated males and females | short | opposing | 60 | days | y | 0.0% | 33.0% | 0.0001 | experiment | 2005 | 130 |
| 138 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 60 | generations | n | 16.0% | 48.0% | NA | experiment | 2005 | 131 |
| 139 | *Drosophila melanogaster* | Fruit fly | Diets of yeast:sugar medium; diets varied in yeast and sugar concentration (low and high) | short | opposing | 65 | days | y | 8.7% | 82.6% | 0.0001 | experiment | 2005 | 132a |
| 140 | *Rattus norvegicus* | Rat | Ad lib diet and varying calorie diets (high and low) with two feeding regimes; constant regime was either high and low calorie diets, switched regimes were moving from ad lib to high and low diets | short | positive | 138 | weeks | y | 6.67% | 9.96% | 0.001 | experiment | 2005 | 133a |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 141 | *Ceratitis capitata* | Mediterranean fruit fly | High quality and low quality diets with animals switching between diets with various probabilities and spending time on each diet for various lengths of time during lifetime | short | opposing | 80 | days | y | 41.0% | 57.0% | 0.0001 | experiment | 2005 | 134 |
| 142 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.1% glucose); at a certain density, for both diets, transferred to water | short | negative | 11 | days | y | NA | 60.0% | NA | experiment | 2005 | 135 |
| 143 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 4 | days | n | NA | NA | NA | experiment | 2004 | 136 |
| 144 | *Podospora anserina* | Filamentous fungus | Normal/ad libitum diet and CR diet (100-fold reduction in glucose); fungus with plasmid strain and fungus without plasmid strain given diets | short | opposing | 1500 | hours | y | 2.0% | 400.0% | 0.0001 | experiment | 2004 | 137a |
| 145 | *Saccharomyces cerevisiae* | Yeast | Diets varying in glucose concentration (0.05%, 0.1%, 0.5% and 2%) | short | positive | 60 | generations | n | 15.0% | 25.0% | <0.05 | experiment | 2004 | 138a |
| 146 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 60 | days | n | NA | 85.0% | NA | experiment | 2004 | 139 |
| 147 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and 50% CR diet. Constant diet regime given to fully mated and once-mated females; switched diet regime (starting on one then switching to another for both diets) given to once-mated females | short | positive | 80 | days | y | 36.0% | 63.0% | 0.0001 | experiment | 2004 | 140a |
| 148 | *Mus musculus* | Mouse | Normal/ad libitum diet and CR diet; gradual CR by receiving 20% CR for first month then 41% CR thereafter, CR initiated at 14 months. | short | positive | 50 | months | n | NA | 13.0% | 0.0001 | experiment | 2004 | 141a |
| 149 | *Mus musculus* | Mouse | Normal/ad libitum diet and CR diet; gradual CR by receiving 17% CR for first month then 44% CR thereafter, CR initiated at 19 months. | short | positive | 46 | months | n | NA | 15.0% | 0.0001 | experiment | 2004 | 142 |
| 150 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 50 | generations | n | NA | 30.0% | NA | experiment | 2004 | 143a |
| 151 | *Drosophila melanogaster* | Fruit fly | Diets of yeast:sugar medium; diets varied in yeast and sugar concentration (low and high) | short | opposing | 50 | days | y | 19.0% | 67.0% | 0.0001 | experiment | 2003 | 144 |
| 152 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 55 | generations | n | NA | 51.0% | NA | experiment | 2003 | 145 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 153 | *Rattus norvegicus* | Rat | Normal/ad libitum diet and 40% CR diet; CR initiated at 6 weeks old. | short | positive | 1200 | days | n | NA | 25.0% | NA | experiment | 2003 | 146 |
| 154 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 55 | generations | n | NA | 26.0% | NA | experiment | 2002 | 147 |
| 155 | *Mus musculus* | Mouse | Normal/ad lib diet, 40% CR diet and CR fasting diet; on CR fasting diet individuals were on ad lib diet and fasted one day a week; CR initiated at 10 months old. | short | positive | 96 | weeks | n | 14.0% | 24.0% | 0.001 | experiment | 2002 | 148a |
| 156 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and 66% CR diet | short | positive | 78 | days | n | NA | 82.0% | NA | experiment | 2002 | 149 |
| 157 | *Mus musculus* | Mouse | Normal/ad libitum diet and CR diet; CR initiated through gradual food reduction to achieve body weight of 60-70% of ad lib cohort; CR initiated at 12 weeks of age | short | positive | 78 | weeks | n | 15.7% | 63.5% | 0.02 | experiment | 2002 | 150a |
| 158 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 50 | generations | n | NA | 24.0% | NA | experiment | 2000 | 151 |
| 159 | *Mus musculus* | Mouse | Normal/ad lib diet and 40% CR diet; CR initiated at 4 months old. | short | positive | 45 | months | n | NA | 43.0% | NA | experiment | 1994 | 152a |
| 160 | *Mus musculus* | Mouse | Normal/ad lib diet and CR diet; CR initiated gradually, first two months 20% CR after which 40% CR; CR initiated at 14 months old. | short | positive | 32 | months | n | NA | 9.0% | NA | experiment | 1993 | 153 |
| 161 | *Mus musculus* | Mouse | Normal/ad lib diet and CR diet; CR diet had 50% lipids and 35% carbohydrates replaced by fibre, estimated CR of 12-22% | short | positive | 32 | months | n | NA | 55.5% | NA | experiment | 1991 | 154 |
| 162 | *Caenorhabditis elegans* | Nematode | Normal diet (2.5x10^8 diluted bacterial concentration) and CR diet (2.5x10^7 diluted bacterial concentration) | short | positive | 50 | days | n | NA | 24% | NA | experiment | 2007 | 155 |
| 163 | *Drosophila melanogaster* | Fruit fly | Several diet dilutions of 1.5, 1 and 0.25 times | short | positive | 80 | days | n | NA | 25% | 0.0001 | experiment | 2007 | 156 |
| 164 | *Drosophila melanogaster* | Fruit fly | Individuals fed a CR food dilution of 0, 0.2, 0.4, 0.6, 1.0, and 1.4x amounts or yeast concentrations of 10, 50, 100, 150, or 200 g/L | short | positive | 80 | days | n | 5.20% | 71% | 0.0001 | experiment | 2008 | 157 |
| 165 | *Canis lupus familiaris* | Domestic dog | Normal/ad libitum diet and 25% CR diet | long | positive | 15 | years | n | NA | 8.30% | NA | experiment | 2007 | 158a |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 166 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet. Feeding was every other day for CR diet | short | neutral | 160 | weeks | n | NA | 0% | NA | experiment | 2008 | 159a |
| 167 | *Gasterosteus aculeatus* | Stickleback fish | Normal diet (10% body weight), CR diet (2% body weight), or intermittent diet (feeding alternate days 15% body weight with same total food amount as normal diet) | short | variable | 850 | days | n | NA | NA | NA | experiment | 2008 | 160a |
| 168 | *Mus musculus* | Mouse | Four cohorts of mice - two wild type (WT) with ad libitum (AL) and CR diet; two dwarf mice (DW) with AL and CR diet. WT: AL and 40% CR; DW: AL and initial 20% CR for one month followed by 40% CR | short | positive | 50 | months | n | NA | 12% | 0.002 | experiment | 2008 | 161 |
| 169 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% dextrose) and CR diet (0.5% dextrose) | short | positive | 41 | generations | n | NA | 44% | 0.0001 | experiment | 2008 | 162a |
| 170 | *Drosophila melanogaster* | Fruit fly | Several diet dilutions of 0.1, 0.5, 1, 1.5 and 2 times | short | positive | 90 | days | n | NA | 12.90% | 0.001 | experiment | 2009 | 163a |
| 171 | *Drosophila melanogaster* | Fruit fly | Several diet dilutions of 0.1, 0.5, 1, 1.5 and 3 times | short | positive | 90 | days | n | NA | 11.80% | 0.001 | experiment | 2009 | 163a |
| 172 | *Drosophila melanogaster* | Fruit fly | Several diet dilutions of 0.1, 0.5, 1, 1.5 and 4 times | short | positive | 90 | days | n | NA | 28.10% | 0.001 | experiment | 2009 | 163a |
| 173 | *Nothobranchius furzeri* | Turquoise killifish | Normal/ad libitum diet and 40% CR diet | short | positive | 30 | weeks | n | NA | 13% | 0.005 | experiment | 2009 | 164a |
| 174 | *Drosophila melanogaster* | Fruit fly | Several diets of different yeast at multiple concentrations: standard yeast at 10% and 20%, brewer’s yeast at 2% and 8%, yeast extract at 0.25% and 4% | short | positive | 50 | days | n | NA | 12.50% | 0.0001 | experiment | 2009 | 165 |
| 175 | *Carausius morosus* | Common stick insect | Normal/ad libitum diet and 60% CR diet | short | positive | 330 | days | n | NA | 38% | NA | experiment | 2009 | 166a |
| 176 | *Drosophila melanogaster* | Fruit fly | Normal diet (15% sugar/yeast) diet and CR diet (5% sugar/yeast) | short | positive | 100 | days | n | NA | 36% | NA | experiment | 2009 | 167a |
| 177 | *Drosophila melanogaster* | Fruit fly | Normal diet of standard medium with yeast and standard medium diet without yeast | short | variable | 100 | days | n | 11.60% | 20% | 0.0001 | experiment | 2009 | 168 |
| 178 | *Anastrepha ludens* | Mexfly | Several diets of varying sugar:yeast (SY) ratios and CR levels: SY - 100%, 96%, 90%, 75%; CR - 25%, 50%, 75%, 90% and 100% (water only) | short | positive | 55 | days | n | 12.10% | 18.30% | NA | experiment | 2009 | 169 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 179 | *Caenorhabditis elegans* | Nematode | Diets varied in concentrations of bacteria in standard food medium. Concentrations of bacteria within diets were 10^8, 10^9, and 10^10 cells/ml | short | positive | 40 | days | n | NA | 65% | NA | experiment | 2009 | 170a |
| 180 | *Caenorhabditis elegans* | Nematode | Several diets of varying concentrations of bacteria: 1x10^10, 5x10^9, 1x10^9, 5x10^8 and 1x10^8 | short | positive | 40 | days | n | NA | 24% | NA | experiment | 2010 | 171a |
| 181 | *Daphnia magna* | Water flea | Several diets of varying concentrations: 0.05, 0.15, 0.5, 1.5, and 4.5 mg C1^-1. | short | positive | 120 | days | n | 67% | 75% | 0.0001 | experiment | 2010 | 172 |
| 182 | *Drosophila melanogaster* | Fruit fly | Several diets of varying concentrations of yeast: 1%, 2%, 5%, 12% | short | positive | 100 | days | n | NA | 20.20% | 0.0001 | experiment | 2010 | 173a |
| 183 | *Caenorhabditis elegans* | Nematode | Several diets of varying dilutions: 1x10^7 to 1x10^12 | short | positive | 50 | days | n | NA | 50% | NA | experiment | 2010 | 174 |
| 184 | *Drosophila melanogaster* | Fruit fly | Several diet dilutions of 0.1, 0.5, 1, 1.5 and 2 times | short | positive | 80 | days | n | 12.50% | 29.50% | NA | experiment | 2010 | 175a |
| 185 | *Mus musculus* | Mouse | Normal/ad libitum diet, 14% CR and 29% CR diet | short | positive | 60 | days | n | NA | 57% | NA | experiment | 2010 | 176 |
| 186 | *Mus musculus* | Mouse | Normal/ad libitum diet and 60% CR diet | short | neutral | 1000 | days | n | NA | 0% | 0.05 | experiment | 2010 | 177 |
| 187 | *Caenorhabditis elegans* | Nematode | Several diets of varying bacteria concentration: 5x10^10 to 5x10^6 | short | positive | 30 | days | n | NA | 12.50% | 0.001 | experiment | 2010 | 178a |
| 188 | *Daphnia pulex* | Water flea | Several diets of varying concentration: 2.6x^4 to 2.9x10^5 | short | variable | 23 | days | n | NA | 80% | NA | experiment | 2011 | 179 |
| 189 | *Daphnia pulicaria* | Water flea | Several diets of varying concentration: 2.6x^4 to 2.9x10^5 | short | variable | 45 | days | n | NA | 14% | NA | experiment | 2011 | 179 |
| 190 | *Acheta domesticus* | Cricket | Several diet dilutions of 0%, 25%, 40%, 50% and 75%. All dilutions tested at 42% CR (12h food access every 24h) and 37% CR (12h food access every 36h) | short | variable | 160 | days | n | NA | 24% | 0.0001 | experiment | 2011 | 180a |
| 191 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and CR diet by intermittent fasting (alternating 2 days with food and 2 days without) | short | positive | 50 | days | n | NA | 77% | 0.05 | experiment | 2013 | 181a |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 192 | *Brachionus manjavacas* | Rotifer | Normal/ad libitum diet (AL) and CR diet. CR diet achieved in two ways: 1) varying algae dilutions - 75%, 50%, 25%, 10%, and 0% of AL diet; 2) intermittent fasting on alternate days at 100% and 0% of AL | short | positive | 30 | days | n | NA | 50% | 0.05 | experiment | 2013 | 182a |
| 193 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose), CR 0.5% glucose diet and CR 0.05% glucose diet | short | variable | 20 | days | n | NA | 67% | 0.05 | experiment | 2013 | 183 |
| 194 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet. Individuals were 9-10 weeks old at start of the experiment | short | positive | 32 | days | n | NA | 37.50% | 0.05 | experiment | 2013 | 184 |
| 195 | *Caenorhabditis elegans* | Nematode | Several diets of varying bacteria concentration: 10^9, 10^8, or 10^7. All concentrations tested on individuals fed either alive bacteria or UV-killed bacteria | short | variable | 80 | days | n | NA | 101.60% | 0.0001 | experiment | 2013 | 185a |
| 196 | *Bactrocera dorsalis* | Fruit fly | CR tested in to ways: 1) several diets of varying yeast concentrations - 0%, 1.96%, 4.76%, and 25%; 2) intermittent fasting with 0% concentration given weekly, 25% concentrations given weekly and 25% concentration given at 6 day intervals | short | positive | 100 | days | n | 20.60% | 45% | 0.001 | experiment | 2013 | 186 |
| 197 | *Drosophila melanogaster* | Fruit fly | Fed at varying concentrations of sucrose (1%, 5% and 20%) and yeast extracts (0.25%, 1%, 4% and 5%) for carbohydrate:protein ratios of 10:1 to 20:1 | short | positive | 80 | days | n | NA | 55% | 0.002 | experiment | 2013 | 187 |
| 198 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet. Individuals were 12 weeks old at start of the experiment | short | positive | 100 | weeks | n | NA | 11.50% | 0.0001 | experiment | 2013 | 188 |
| 199 | *Brachionus plicatilis* | Rotifer | Normal/ad libitum diet (AL) and CR diet. CR diet achieved in two ways: 1) varying algae dilutions - 75%, 50%, 25% and 10% of AL diet; 2) intermittent fasting on alternate days at 100% and 0% of AL | short | variable | 25 | days | n | 0% | 12.30% | NA | experiment | 2014 | 189 |
| 200 | *Brachionus manjavacas* | Rotifer | Normal/ad libitum diet and CR diet. CR diet achieved in two ways: 1) 90% CR diet; 2) intermittent fasting on alternate days | short | positive | 20 | days | n | 26% | 88% | 0.05 | experiment | 2014 | 190 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 201 | *Mus musculus* | Mouse | Mice fed 25 diets varying in protein:carbohydrate ratio and fat content. CR achieved by high protein diets or dietary dilution | short | neutral | 175 | weeks | y | NA | 0% | NA | experiment | 2014 | 191a |
| 202 | *Carausius morosus* | Common stick insect | Normal/ad libitum diet and 40% CR diet | short | neutral | 400 | days | n | NA | 33% | 0.948 | experiment | 2014 | 192 |
| 203 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 18 | days | n | NA | 60% | NA | experiment | 2015 | 193 |
| 204 | *Larinioides sclopetarius* | Bridge spider | Fed low (CR), moderate or high diet in juveniles and adults | short | positive | 445 | days | n | NA | NA | 0.0001 | experiment | 2015 | 194 |
| 205 | *Caenorhabditis elegans* | Nematode | Fed normal diet or restricted diet by peptone withdrawal that stops bacterial growth | short | positive | 30 | days | n | NA | 16.40% | 0.005 | experiment | 2015 | 195 |
| 206 | *Mus musculus* | Mouse | Normal/ad libitum diet, 30% CR and 40% CR diet | short | positive | 1500 | days | n | NA | 25% | NA | experiment | 2016 | 196a |
| 207 | *Plodia interpunctella* | Indian meal moth | Normal/ad libitum diet, 30% CR, 50% CR and 70% CR diet | short | negative | 12 | days | n | NA | NA | 0.0001 | experiment | 2016 | 197 |
| 208 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet (AL) and CR diet through intermittent fasting: 2 days fasting followed by 2 days on AL diet | short | positive | 50 | days | n | NA | 33% | 0.001 | experiment | 2017 | 198 |
| 209 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose), 0.5% glucose and 0.05% glucose CR diets | short | positive | 40 | days | n | NA | 50% | 0.001 | experiment | 2017 | 199a |
| 210 | *Mus musculus* | Mouse | Normal diet and CR diet. CR diet achieved through intermittent fasting on alternate days (7.5% CR) | short | positive | 1200 | days | n | NA | 12.60% | NA | experiment | 2017 | 200a |
| 211 | *Caenorhabditis elegans* | Nematode | Normal/ad libitum diet and various treatments: CR with 5x10^10, 5x10^9, and 5x10^8 bacteria/ml; intermittent fasting; fasting. Diet treatments were done separately in hermaphrodites and males | short | positive | 50 | days | y | 59% | 75% | 0.056 | experiment | 2017 | 201 |
| 212 | *Saccharomyces cerevisiae* | Yeast | Normal diet (2% glucose) and CR diet (0.5% glucose) | short | positive | 45 | days | n | NA | 88% | NA | experiment | 2018 | 202 |
| **Study** | **Scientific name** | **Common name** | **Treatment** | **Life history speed** | **CR response** | **Study length** | **Study length units** | **Interaction** | **Effect size (min)** | **Effect size (max)** | **p - value** | **Manuscript type** | **Date** | **Ref.** |
| 213 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum (AL) diet and several intermittent fasting treatments at 2, 3, 4, and 5 days. Individuals were exposed to either a regime of continues intermittent fasting for all fasting treatments or switching to AL diet after 30 days of fasting treatments | short | variable | 100 | days | n | NA | 12.70% | NA | experiment | 2018 | 203 |
| 214 | *Drosophila melanogaster* | Fruit fly | Normal/ad libitum diet and 90% CR diet | short | variable | 35 | days | y | NA | NA | 0.05 | experiment | 2020 | 204 |
| 215 | *Drosophila melanogaster* | Fruit fly | Normal diet (8% yeast) and CR diet (2% yeast) | short | positive | 60 | days | n | NA | 33.30% | 0.001 | experiment | 2020 | 205 |
| 216 | *Caenorhabditis remanei* | Nematode | Ad libitum diet and diet of temporary fasting in females | short | positive | 28 | days | n | NA | 29.90% | 0.13 | experiment | 2020 | 206a |
| 217 | *Drosophila melanogaster* | Fruit fly | Normal diet (5% yeast) and CR diet (0.5% yeast) | short | variable | 90 | days | n | NA | NA | NA | experiment | 2020 | 207 |
| 218 | *Drosophila melanogaster* | Fruit fly | Normal diet (5% yeast) and CR diet (0.25% yeast) | short | positive | 100 | days | n | NA | 50% | 0.0001 | experiment | 2020 | 208a |
| 219 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet | short | positive | 1200 | days | n | NA | 15% | 0.001 | experiment | 1999 | 209a |
| 220 | *Mus musculus* | Mouse | Normal/ad libitum diet and 40% CR diet | short | positive | 54 | months | n | 30% | 40% | NA | experiment | 1995 | 210 |
| 221 | *Rattus norvegicus* | Rat | Normal/ad libitum diet, 31% CR and 40% CR diet | short | positive | 114 | weeks | n | NA | 44% | NA | experiment | 2002 | 211 |
| 222 | *Aedes aegypti* | Mosquito | Several diet regimes of low and high food during early and late life development - LL (low early, low late), LH (low early, high late), HH, HL | short | positive | 60 | days | n | NA | 200% | NA | experiment | 2016 | 212 |

**eTable 2. Summary of generation time for species identified within the literature search.**

Species generation time values from existing literature. Values from existing literature were standardised to days. Common names for species are also provided. Ref. = reference, NA = no information.

|  |  |  |  |
| --- | --- | --- | --- |
| **Scientific name** | **Common name** | **Generation time (days)** | **Ref.** |
| *Drosophila melanogaster* | Fruit fly | 10 | 213 |
| *Caenorhabditis elegans* | Nematode | 3 | 214 |
| *Mus musculus* | Mouse | 70 | 215 |
| *Plecoglossus altivelis* | Ayu | 28 | 216 |
| *Musca domestica* | House fly | 20 | 217 |
| *Rattus norvegicus* | Rat | 90 | 218 |
| *Ceratitis capitata* | Mediterranean fruit fly | 30 | 219 |
| *Saccharomyces cerevisiae* | Yeast | 0.063 | 220 |
| *Schizosaccharomyces pombe* | Fission yeast | 0.42 | 220 |
| *Neoseiulus cucumeris* | Cucumeris mite | 12 | 221 |
| *Danio rerio* | Zebrafish | 91 | 222 |
| *Tetranychus urticae* | Spider mite | 15 | 221 |
| *Microcebus murinus* | Grey mouse lemur | 631 | 223 |
| *Bombyx mori* | Silkworm | 28 | 224 |
| *Romalea microptera* | Lubber grasshopper | 38 | 225 |
| *Macaca mulatta* | Rhesus monkey | 913 | 226 |
| *Bactrocera tryoni* | Queensland fruit fly | 10 | 227 |
| *Asobara tabida* | Parasitoid wasp | 28 | 228 |
| *Trichopria drosophilae* | Parasitoid wasp | 28 | 228 |
| *Brachionus plicatilis* | Rotifer | 1.5 | 229 |
| *Podospora anserina* | Filamentous fungus | 7 | 230 |
| *Latrodectus hasselti* | Australian redback spider | 120 | 231 |
| *Anastrepha ludens* | Tephritid fruit fly | 19 | 232 |
| *Kluyveromyces lactis* | Yeast | 0.075 | 233 |
| *Elosa worallii* | Rotifer | 1.5 | 229 |
| *Cephalodella acidophila* | Rotifer | 1.5 | 229 |
| *Canis lupus familiaris* | Domestic dog | 245 | 234 |
| *Gasterosteus aculeatus* | Stickleback fish | 200 | 235 |
| *Nothobranchius furzeri* | Turquoise killifish | 17 | 236 |
| *Carausius morosus* | Common stick insect | 35 | 237 |
| *Daphnia magna* | Water flea | 19 | 238 |
| *Daphnia pulex* | Water flea | 17 | 239 |
| *Daphnia pulicaria* | Water flea | 35 | 240 |
| *Acheta domesticus* | Cricket | 42 | 241 |
| *Brachionus manjavacas* | Rotifer | 1.5 | 229 |
| *Bactrocera dorsalis* | Fruit fly | 10 | 242 |
| *Larinioides sclopetarius* | Gray cross spider | NA | NA |
| *Plodia interpunctella* | Indian meal moth | 13 | 243 |
| *Caenorhabditis remanei* | Nematode | 1.25 | 244 |
| *Aedes aegypti* | Mosquito | 8 | 245 |
|  |  |  |  |

**References**

1. Jones KE, Bielby J, Cardillo M, et al. PanTHERIA: a species-level database of life history, ecology, and geography of extant and recently extinct mammals. *Ecology*. 2009;90(9):2648-2648. doi:10.1890/08-1494.1

2. R Core Team. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing; 2020. http://www.R-project.org

3. Vigne P, Frelin C. Diet dependent longevity and hypoxic tolerance of adult Drosophila melanogaster. *Mech Ageing Dev*. 2007;128(5):401-406. doi:10.1016/j.mad.2007.05.008

4. Kabil H, Partridge L, Harshman LG. Superoxide dismutase activities in long-lived Drosophila melanogaster females: chico1 genotypes and dietary dilution. *Biogerontology*. 2007;8(2):201-208. doi:10.1007/s10522-006-9065-3

5. Lenaerts I, Van Eygen S, Van Fleteren J. Adult-Limited Dietary Restriction Slows Gompertzian Aging in Caenorhabditis elegans. *Ann N Y Acad Sci*. 2007;1100(1):442-448. doi:10.1196/annals.1395.049

6. Denny CA, Kasperzyk JL, Gorham KN, Bronson RT, Seyfried TN. Influence of caloric restriction on motor behavior, longevity, and brain lipid composition in Sandhoff disease mice. *J Neurosci Res*. 2006;83(6):1028-1038. doi:10.1002/jnr.20798

7. Yoshida K, Hirabayashi Y, Watanabe F, Sado T, Inoue T. Caloric restriction prevents radiation-induced myeloid leukemia in C3H/HeMs mice and inversely increases incidence of tumor-free death: implications in changes in number of hemopoietic progenitor cells. *Exp Hematol*. 2006;34(3):274-283. doi:10.1016/j.exphem.2005.11.016

8. Harper JM, Leathers CW, Austad SN. Does caloric restriction extend life in wild mice? *Aging Cell*. 2006;5(6):441-449. doi:10.1111/j.1474-9726.2006.00236.x

9. Nagasaka R, Okamoto N, Ushio H. Effects of caloric restriction on post-spawning death of ayu. *Exp Gerontol*. 2005;40(7):556-561. doi:10.1016/j.exger.2005.05.003

10. Cooper TM, Mockett RJ, Sohal BH, Sohal RS, Orr WC. Effect of caloric restriction on life span of the housefly, *Musca* domestica. *FASEB J*. 2004;18(13):1591-1593. doi:10.1096/fj.03-1464fje

11. Houthoofd K, Braeckman B, Vreese A, et al. Caloric restriction, INS/IGF-1 signalling and longevity in the nematode Caenorhabditis elegans. *Belg J Zool*. 2004;134(2):79-84.

12. Shimokawa I, Higami Y, Tsuchiya T, et al. Lifespan extension by reduction of the growth hormone-insulin-like growth factor-1 axis: relation to caloric restriction. *FASEB J Off Publ Fed Am Soc Exp Biol*. 2003;17:1108-1109. doi:10.1096/fj.02-0819fje

13. Carey JR, Liedo P, Harshman L, et al. Life history response of Mediterranean fruit flies to dietary restriction: Dietary restriction of Mediterranean fruit flies, J. R. Carey *et al.* *Aging Cell*. 2002;1(2):140-148. doi:10.1046/j.1474-9728.2002.00019.x

14. Rogina B, Helfand SL, Frankel S. Longevity Regulation by *Drosophila* Rpd3 Deacetylase and Caloric Restriction. *Science*. 2002;298(5599):1745-1745. doi:10.1126/science.1078986

15. Turturro A, Duffy P, Hass B, Kodell R, Hart R. Survival Characteristics and Age-Adjusted Disease Incidences in C57BL/6 Mice Fed a Commonly Used Cereal-Based Diet Modulated by Dietary Restriction. *J Gerontol A Biol Sci Med Sci*. 2002;57(11):B379-B389. doi:10.1093/gerona/57.11.B379

16. Jiang JC, Wawryn J, Shantha Kumara HMC, Jazwinski SM. Distinct roles of processes modulated by histone deacetylases Rpd3p, Hda1p, and Sir2p in life extension by caloric restriction in yeast. *Exp Gerontol*. 2002;37(8-9):1023-1030. doi:10.1016/S0531-5565(02)00064-5

17. Bartke A, Wright JC, Mattison JA, Ingram DK, Miller RA, Roth GS. Extending the lifespan of long-lived mice. *Nature*. 2001;414(6862):412-412. doi:10.1038/35106646

18. Sell DR, Kleinman NR, Monnier VM. Longitudinal determination of skin collagen glycation and glycoxidation rates predicts early death in C57BL/6NNIA mice. *FASEB J*. 2000;14(1):145-156. doi:10.1096/fasebj.14.1.145

19. Pugh T, Oberley T, Weindruch R. Dietary intervention at middle age: caloric restriction but not dehydroepiandrosterone sulfate increases lifespan and lifetime cancer incidence in mice. *Cancer Res*. 1999;59(7):1642-1648.

20. Christian MS, Hoberman AM, Johnson MD, Brown WR, Bucci TJ. Effect of Dietary Optimization on Growth, Survival, Tumor Incidences and Clinical Pathology Parameters in CD Sprague-Dawley and Fischer-344 Rats: A 104-Week Study. *Drug Chem Toxicol*. 1998;21(1):97-117. doi:10.3109/01480549809017854

21. Laroque P, Keenan KP, Soper KA, et al. Effect of early body weight and moderate dietary restriction on the survival of the sprague-dawley rat. *Exp Toxicol Pathol*. 1997;49(6):459-465. doi:10.1016/S0940-2993(97)80135-2

22. Holloszy JO. Mortality rate and longevity of food-restricted exercising male rats: a reevaluation. *J Appl Physiol*. 1997;82(2):399-403. doi:10.1152/jappl.1997.82.2.399

23. Weindruch R, Walford RL, Fligiel S, Guthrie D. The Retardation of Aging in Mice by Dietary Restriction: Longevity, Cancer, Immunity and Lifetime Energy Intake. *J Nutr*. 1986;116(4):641-654. doi:10.1093/jn/116.4.641

24. Blackwell BN, Bucci TJ, Hart RW, Turturro A. Longevity, Body Weight, and Neoplasia in Ad Libitum-Fed and Diet-Restricted C57BL6 Mice Fed NIH-31 Open Formula Diet. *Toxicol Pathol*. 1995;23(5):570-582. doi:10.1177/019262339502300503

25. Thurman JD, Bucci TJ, Hart RW, Turturro A. Survival, Body Weight, and Spontaneous Neoplasms in *Ad* Libitum- Fed and Food-Restricted Fischer-344 Rats. *Toxicol Pathol*. 1994;22(1):1-9. doi:10.1177/019262339402200101

26. Yu BP, Masoro EJ, McMahan CA. Nutritional Influences on Aging of Fischer 344 Rats: I. Physical, Metabolic, and Longevity Characteristics1. *J Gerontol*. 1985;40(6):657-670. doi:10.1093/geronj/40.6.657

27. Masoro EJ, McCarter RJM, Katz MS, McMahan CA. Dietary Restriction Alters Characteristics of Glucose Fuel Use. *J Gerontol*. 1992;47(6):B202-B208. doi:10.1093/geronj/47.6.B202

28. Turturro A, Hart R. Dietary alteration in the rates of cancer and aging. *Exp Gerontol*. 1992;27(5-6):583-592. doi:10.1016/0531-5565(92)90013-P

29. Koizumi A, Tsukada M, Wada Y, Masuda H, Weindruch R. Mitotic Activity in Mice is Suppressed by Energy Restriction-Induced Torpor. *J Nutr*. 1992;122(7):1446-1453. doi:10.1093/jn/122.7.1446

30. Turturro A, Hart RW. Longevity-Assurance Mechanisms and Caloric Restriction. *Ann N Y Acad Sci*. 1991;621(1 Physiological):363-372. doi:10.1111/j.1749-6632.1991.tb16992.x

31. Ball ZB, Barnes RH, Visscher MB. THE EFFECTS OF DIETARY CALORIC RESTRICTION ON MATURITY AND SENESCENCE, WITH PARTICULAR REFERENCE TO FERTILITY AND LONGEVITY. *Am J Physiol-Leg Content*. 1947;150(3):511-519. doi:10.1152/ajplegacy.1947.150.3.511

32. Fukuda APM, Camandona V de L, Francisco KJM, Rios-Anjos RM, Lucio do Lago C, Ferreira-Junior JR. Simulated microgravity accelerates aging in Saccharomyces cerevisiae. *Life Sci Space Res*. 2021;28:32-40. doi:10.1016/j.lssr.2020.12.003

33. Barré BP, Hallin J, Yue JX, et al. Intragenic repeat expansion in the cell wall protein gene *HPF1* controls yeast chronological aging. *Genome Res*. 2020;30(5):697-710. doi:10.1101/gr.253351.119

34. Sun Y, Yu R, Guo HB, Qin H, Dang W. A quantitative yeast aging proteomics analysis reveals novel aging regulators. *GeroScience*. 2021;43(5):2573-2593. doi:10.1007/s11357-021-00412-3

35. Ming Hui L, Qing-Hai F, Zhi-Qiang Z. Caloric restriction extends lifespan of mothers at the expense of offspring survival in a predatory mite (Neoseiulus cucumeris). *Syst Appl Acarol*. 2020;25(11):1948-1962. doi:https://doi.org/10.11158/saa.25.11.2

36. Gao Y, Zhu C, Li K, et al. Comparative proteomics analysis of dietary restriction in Drosophila. Min KJ, ed. *PLOS ONE*. 2020;15(10):e0240596. doi:10.1371/journal.pone.0240596

37. Moger-Reischer RZ, Snider EV, McKenzie KL, Lennon JT. Low costs of adaptation to dietary restriction. *Biol Lett*. 2020;16(3):20200008. doi:10.1098/rsbl.2020.0008

38. Zhou G, Huang C, Xing L, Li L, Jiang Y, Wei Y. Methionine increases yolk production to offset the negative effect of caloric restriction on reproduction without affecting longevity in C. elegans. *Aging*. 2020;12(3):2680-2697. doi:10.18632/aging.102770

39. Ahmed MA, O’Callaghan C, Chang ED, Jiang H, Vassilopoulos A. Context-Dependent Roles for SIRT2 and SIRT3 in Tumor Development Upon Calorie Restriction or High Fat Diet. *Front Oncol*. 2020;9:1462. doi:10.3389/fonc.2019.01462

40. Ma S, Sun S, Geng L, et al. Caloric Restriction Reprograms the Single-Cell Transcriptional Landscape of Rattus Norvegicus Aging. *Cell*. 2020;180:1-18. doi:10.1016/j.cell.2020.02.008

41. Li C, Barton C, Henke K, et al. celsr1a is essential for tissue homeostasis and onset of aging phenotypes in the zebrafish. Rawls JF, Stainier DY, Parichy DM, eds. *eLife*. 2020;9:e50523. doi:10.7554/eLife.50523

42. Kwong MMY, Lee JW, Samian MR, Watanabe N, Osada H, Ong EBB. Comparison of microplate- and bottle-based methods to age yeast for chronological life span assays. *J Microbiol Methods*. 2019;167:105743. doi:10.1016/j.mimet.2019.105743

43. Yu D, Tomasiewicz JL, Yang SE, et al. Calorie-Restriction-Induced Insulin Sensitivity Is Mediated by Adipose mTORC2 and Not Required for Lifespan Extension. *Cell Rep*. 2019;29(1):236-248.e3. doi:10.1016/j.celrep.2019.08.084

44. Hahm JH, Jeong C, Nam HG. Diet restriction-induced healthy aging is mediated through the immune signaling component ZIP-2 in Caenorhabditis elegans. *Aging Cell*. 2019;18(5):e12982. doi:10.1111/acel.12982

45. Maslanka R, Zadrag-Tecza R. Less is more or more is less: Implications of glucose metabolism in the regulation of the reproductive potential and total lifespan of the Saccharomyces cerevisiae yeast. *J Cell Physiol*. 2019;234(10):17622-17638. doi:10.1002/jcp.28386

46. Li GY, Zhang ZQ. The sex- and duration-dependent effects of intermittent fasting on lifespan and reproduction of spider mite Tetranychus urticae. *Front Zool*. 2019;16(1):10. doi:10.1186/s12983-019-0310-4

47. Mitchell SJ, Bernier M, Mattison JA, et al. Daily Fasting Improves Health and Survival in Male Mice Independent of Diet Composition and Calories. *Cell Metab*. 2019;29(1):221-228.e3. doi:10.1016/j.cmet.2018.08.011

48. Smith Jr. DL, Yang Y, Nagy TR, et al. Weight Cycling Increases Longevity Compared with Sustained Obesity in Mice. *Obesity*. 2018;26(11):1733-1739. doi:10.1002/oby.22290

49. Pifferi F, Terrien J, Marchal J, et al. Caloric restriction increases lifespan but affects brain integrity in grey mouse lemur primates. *Commun Biol*. 2018;1(1):1-8. doi:10.1038/s42003-018-0024-8

50. Liang Y, Liu C, Lu M, et al. Calorie restriction is the most reasonable anti-ageing intervention: a meta-analysis of survival curves. *Sci Rep*. 2018;8(1):5779. doi:10.1038/s41598-018-24146-z

51. Fisher ML, Fowler FE, Denning SS, Watson DW. Survival of the House Fly (Diptera: Muscidae) on Truvia and Other Sweeteners. *J Med Entomol*. 2017;54(4):999-1005. doi:10.1093/jme/tjw241

52. Pan Y, Lü P, Wang Q, et al. Comparative transcriptomic analysis of Bombyx mori fat body tissue following dietary restriction. *Arch Insect Biochem Physiol*. 2017;95(1):e21388. doi:10.1002/arch.21388

53. Seo AY, Lau PW, Feliciano D, et al. AMPK and vacuole-associated Atg14p orchestrate μ-lipophagy for energy production and long-term survival under glucose starvation. Deretic V, ed. *eLife*. 2017;6:e21690. doi:10.7554/eLife.21690

54. Kazi RS, Banarjee RM, Deshmukh AB, Patil GV, Jagadeeshaprasad MG, Kulkarni MJ. Glycation inhibitors extend yeast chronological lifespan by reducing advanced glycation end products and by back regulation of proteins involved in mitochondrial respiration. *J Proteomics*. 2017;156:104-112. doi:10.1016/j.jprot.2017.01.015

55. Richardson A, Austad SN, Ikeno Y, Unnikrishnan A, McCarter RJ. Significant life extension by ten percent dietary restriction. *Ann N Y Acad Sci*. 2016;1363(1):11-17. doi:10.1111/nyas.12982

56. Chadwick SR, Pananos AD, Di Gregorio SE, et al. A Toolbox for Rapid Quantitative Assessment of Chronological Lifespan and Survival in Saccharomyces cerevisiae. *Traffic*. 2016;17(6):689-703. doi:10.1111/tra.12391

57. Patel SA, Chaudhari A, Gupta R, Velingkaar N, Kondratov RV. Circadian clocks govern calorie restriction—mediated life span extension through BMAL1- and IGF-1-dependent mechanisms. *FASEB J*. 2016;30(4):1634-1642. doi:10.1096/fj.15-282475

58. Cai Y, Wei YH. Stress resistance and lifespan are increased in C. elegans but decreased in S. cerevisiae by mafr-1/maf1 deletion. *Oncotarget*. 2016;7(10):10812-10826. doi:10.18632/oncotarget.7769

59. Hou L, Wang D, Chen D, et al. A Systems Approach to Reverse Engineer Lifespan Extension by Dietary Restriction. *Cell Metab*. 2016;23(3):529-540. doi:10.1016/j.cmet.2016.02.002

60. Jensen K, McClure C, Priest NK, Hunt J. Sex-specific effects of protein and carbohydrate intake on reproduction but not lifespan in Drosophila melanogaster. *Aging Cell*. 2015;14(4):605-615. doi:10.1111/acel.12333

61. Jo MC, Liu W, Gu L, Dang W, Qin L. High-throughput analysis of yeast replicative aging using a microfluidic system. *Proc Natl Acad Sci U S A*. 2015;112(30):9364-9369.

62. Rona G, Herdeiro R, Mathias CJ, Torres FA, Pereira MD, Eleutherio E. CTT1 overexpression increases life span of calorie-restricted Saccharomyces cerevisiae deficient in Sod1. *Biogerontology*. 2015;16(3):343-351. doi:10.1007/s10522-015-9550-7

63. Mei SC, Brenner C. Calorie Restriction-Mediated Replicative Lifespan Extension in Yeast Is Non-Cell Autonomous. *PLOS Biol*. 2015;13(1):e1002048. doi:10.1371/journal.pbio.1002048

64. Maoz N, Gabay O, Waldman Ben-Asher H, Cohen HY. The Yeast Forkhead HCM1 Controls Life Span Independent of Calorie Restriction. *J Gerontol Ser A*. 2015;70(4):444-453. doi:10.1093/gerona/glu059

65. Ramsey JJ, Tran D, Giorgio M, et al. The Influence of Shc Proteins on Life Span in Mice. *J Gerontol Ser A*. 2014;69(10):1177-1185. doi:10.1093/gerona/glt198

66. Huberts DHEW, González J, Lee SS, et al. Calorie restriction does not elicit a robust extension of replicative lifespan in *Saccharomyces* cerevisiae. *Proc Natl Acad Sci U S A*. 2014;111(32):11727-11731. doi:10.1073/pnas.1410024111

67. Lee SH, An HS, Jung YW, et al. Korean mistletoe (Viscum album coloratum) extract extends the lifespan of nematodes and fruit flies. *Biogerontology*. 2014;15(2):153-164. doi:10.1007/s10522-013-9487-7

68. Chiba T, Tamashiro Y, Park D, et al. A key role for neuropeptide Y in lifespan extension and cancer suppression via dietary restriction. *Sci Rep*. 2015;4(1):4517. doi:10.1038/srep04517

69. Aris JP, Alvers AL, Ferraiuolo RA, et al. Autophagy and leucine promote chronological longevity and respiration proficiency during calorie restriction in yeast. *Exp Gerontol*. 2013;48(10):1107-1119. doi:10.1016/j.exger.2013.01.006

70. Hatle JD, Kellenberger JW, Viray E, Smith AM, Hahn DA. Life-extending ovariectomy in grasshoppers increases somatic storage, but dietary restriction with an equivalent feeding rate does not. *Exp Gerontol*. 2013;48(9):966-972. doi:10.1016/j.exger.2013.06.006

71. Tahara EB, Cunha FM, Basso TO, Della Bianca BE, Gombert AK, Kowaltowski AJ. Calorie Restriction Hysteretically Primes Aging Saccharomyces cerevisiae toward More Effective Oxidative Metabolism. *PLOS ONE*. 2013;8(2):e56388. doi:10.1371/journal.pone.0056388

72. Vera E, Bernardes de Jesus B, Foronda M, Flores JM, Blasco MA. Telomerase Reverse Transcriptase Synergizes with Calorie Restriction to Increase Health Span and Extend Mouse Longevity. *PLOS ONE*. 2013;8(1):e53760. doi:10.1371/journal.pone.0053760

73. Mattison JA, Roth GS, Beasley TM, et al. Impact of caloric restriction on health and survival in rhesus monkeys from the NIA study. *Nature*. 2012;489(7415):318-321. doi:10.1038/nature11432

74. Fanson BG, Taylor PW. Protein:carbohydrate ratios explain life span patterns found in Queensland fruit fly on diets varying in yeast:sugar ratios. *AGE*. 2012;34(6):1361-1368. doi:10.1007/s11357-011-9308-3

75. Sun X, Komatsu T, Lim J, et al. Nutrient-dependent requirement for SOD1 in lifespan extension by protein restriction in Drosophila melanogaster. *Aging Cell*. 2012;11(5):783-793. doi:10.1111/j.1474-9726.2012.00842.x

76. Herbert AP, Riesen M, Bloxam L, et al. NMR Structure of Hsp12, a Protein Induced by and Required for Dietary Restriction-Induced Lifespan Extension in Yeast. *PLOS ONE*. 2012;7(7):e41975. doi:10.1371/journal.pone.0041975

77. Ellers J, Ruhe B, Visser B. Discriminating between energetic content and dietary composition as an explanation for dietary restriction effects. *J Insect Physiol*. 2011;57(12):1670-1676. doi:10.1016/j.jinsphys.2011.08.020

78. Dick KB, Ross CR, Yampolsky LY. Genetic variation of dietary restriction and the effects of nutrient-free water and amino acid supplements on lifespan and fecundity of Drosophila. *Genet Res*. 2011;93(4):265-273. doi:10.1017/S001667231100019X

79. Sharma PK, Agrawal V, Roy N. Mitochondria-mediated hormetic response in life span extension of calorie-restricted Saccharomyces cerevisiae. *AGE*. 2011;33(2):143-154. doi:10.1007/s11357-010-9169-1

80. Kaneko G, Yoshinaga T, Yanagawa Y, Ozaki Y, Tsukamoto K, Watabe S. Calorie restriction-induced maternal longevity is transmitted to their daughters in a rotifer. *Funct Ecol*. 2011;25(1):209-216.

81. van Diepeningen AD, Slakhorst SM, Koopmanschap AB, Ikink GJ, Debets AJM, Hoekstra RF. Calorie restriction in the filamentous fungus Podospora anserina. *Exp Gerontol*. 2010;45(7):516-524. doi:10.1016/j.exger.2010.01.002

82. Wang J, Jiang JC, Jazwinski SM. Gene regulatory changes in yeast during life extension by nutrient limitation. *Exp Gerontol*. 2010;45(7):621-631. doi:10.1016/j.exger.2010.02.008

83. Sanz A, Soikkeli M, Portero-Otin M, et al. Expression of the yeast NADH dehydrogenase Ndi1 in Drosophila confers increased lifespan independently of dietary restriction. *Proc Natl Acad Sci U S A*. 2010;107(20):9105-9110.

84. Smith DL Jr, Elam CF Jr, Mattison JA, et al. Metformin Supplementation and Life Span in Fischer-344 Rats. *J Gerontol Ser A*. 2010;65A(5):468-474. doi:10.1093/gerona/glq033

85. Zuin A, Carmona M, Morales-Ivorra I, et al. Lifespan extension by calorie restriction relies on the Sty1 MAP kinase stress pathway. *EMBO J*. 2010;29(5):981-991. doi:10.1038/emboj.2009.407

86. Colman RJ, Anderson RM, Johnson SC, et al. Caloric Restriction Delays Disease Onset and Mortality in Rhesus Monkeys. *Science*. 2009;325(5937):201. doi:10.1126/science.1173635

87. Kasumovic MM, Brooks RC, Andrade MCB. Body condition but not dietary restriction prolongs lifespan in a semelparous capital breeder. *Biol Lett*. 2009;5(5):636-638. doi:10.1098/rsbl.2009.0335

88. Sun L, Sadighi Akha AA, Miller RA, Harper JM. Life-Span Extension in Mice by Preweaning Food Restriction and by Methionine Restriction in Middle Age. *J Gerontol Ser A*. 2009;64A(7):711-722. doi:10.1093/gerona/glp051

89. Fanson BG, Weldon CW, Pérez-Staples D, Simpson SJ, Taylor PW. Nutrients, not caloric restriction, extend lifespan in Queensland fruit flies (Bactrocera tryoni). *Aging Cell*. 2009;8(5):514-523. doi:10.1111/j.1474-9726.2009.00497.x

90. Goldberg AA, Bourque SD, Kyryakov P, et al. Effect of calorie restriction on the metabolic history of chronologically aging yeast. *Exp Gerontol*. 2009;44(9):555-571. doi:10.1016/j.exger.2009.06.001

91. Zhou J, Zhong Q, Li G, Greenberg ML. Loss of Cardiolipin Leads to Longevity Defects That Are Alleviated by Alterations in Stress Response Signaling. *J Biol Chem*. 2009;284(27):18106-18114. doi:10.1074/jbc.M109.003236

92. Zou S, Carey JR, Liedo P, et al. The prolongevity effect of resveratrol depends on dietary composition and calorie intake in a tephritid fruit fly. *Exp Gerontol*. 2009;44(6):472-476. doi:10.1016/j.exger.2009.02.011

93. Masternak MM, Panici JA, Bonkowski MS, Hughes LF, Bartke A. Insulin Sensitivity as a Key Mediator of Growth Hormone Actions on Longevity. *J Gerontol Ser A*. 2009;64A(5):516-521. doi:10.1093/gerona/glp024

94. Burtner CR, Murakami CJ, Kennedy BK, Kaeberlein M. A molecular mechanism of chronological aging in yeast. *Cell Cycle*. 2009;8(8):1256-1270. doi:10.4161/cc.8.8.8287

95. Greer EL, Brunet A. Different dietary restriction regimens extend lifespan by both independent and overlapping genetic pathways in C. elegans. *Aging Cell*. 2009;8(2):113-127. doi:10.1111/j.1474-9726.2009.00459.x

96. Bonkowski MS, Dominici FP, Arum O, et al. Disruption of Growth Hormone Receptor Prevents Calorie Restriction from Improving Insulin Action and Longevity. *PLOS ONE*. 2009;4(2):e4567. doi:10.1371/journal.pone.0004567

97. Mair W, Panowski SH, Shaw RJ, Dillin A. Optimizing Dietary Restriction for Genetic Epistasis Analysis and Gene Discovery in C. elegans. *PLOS ONE*. 2009;4(2):e4535. doi:10.1371/journal.pone.0004535

98. McDonald RB, Walker KM, Warman DB, et al. Characterization of survival and phenotype throughout the life span in UCP2/UCP3 genetically altered mice. *Exp Gerontol*. 2008;43(12):1061-1068. doi:10.1016/j.exger.2008.09.011

99. Mannarino SC, Amorim MA, Pereira MD, et al. Glutathione is necessary to ensure benefits of calorie restriction during ageing in Saccharomyces cerevisiae. *Mech Ageing Dev*. 2008;129(12):700-705. doi:10.1016/j.mad.2008.09.001

100. Carey JR, Harshman LG, Liedo P, Müller HG, Wang JL, Zhang Z. Longevity-fertility trade-offs in the tephritid fruit fly, Anastrepha ludens, across dietary-restriction gradients. *Aging Cell*. 2008;7(4):470-477. doi:10.1111/j.1474-9726.2008.00389.x

101. Skorupa DA, Dervisefendic A, Zwiener J, Pletcher SD. Dietary composition specifies consumption, obesity, and lifespan in Drosophila melanogaster. *Aging Cell*. 2008;7(4):478-490. doi:10.1111/j.1474-9726.2008.00400.x

102. Cai W, He JC, Zhu L, et al. Oral Glycotoxins Determine the Effects of Calorie Restriction on Oxidant Stress, Age-Related Diseases, and Lifespan. *Am J Pathol*. 2008;173(2):327-336. doi:10.2353/ajpath.2008.080152

103. Oliveira GA, Tahara EB, Gombert AK, Barros MH, Kowaltowski AJ. Increased aerobic metabolism is essential for the beneficial effects of caloric restriction on yeast life span. *J Bioenerg Biomembr*. 2008;40(4):381-388. doi:10.1007/s10863-008-9159-5

104. Ohtsuka H, Mita S, Ogawa Y, Azuma K, Ito H, Aiba H. A novel gene, ecl1+, extends the chronological lifespan in fission yeast. *FEMS Yeast Res*. 2008;8(4):520-530. doi:10.1111/j.1567-1364.2008.00379.x

105. Smith ED, Kaeberlein TL, Lydum BT, et al. Age- and calorie-independent life span extension from dietary restriction by bacterial deprivation in Caenorhabditis elegans. *BMC Dev Biol*. 2008;8(1):49. doi:10.1186/1471-213X-8-49

106. Sutphin GL, Kaeberlein M. Dietary restriction by bacterial deprivation increases life span in wild-derived nematodes. *Exp Gerontol*. 2008;43(3):130-135. doi:10.1016/j.exger.2007.10.019

107. Murakami CJ, Burtner CR, Kennedy BK, Kaeberlein M. A Method for High-Throughput Quantitative Analysis of Yeast Chronological Life Span. *J Gerontol Ser A*. 2008;63(2):113-121. doi:10.1093/gerona/63.2.113

108. Zha Y, Taguchi T, Nazneen A, Shimokawa I, Higami Y, Razzaque MS. Genetic Suppression of GH-IGF-1 Activity, Combined with Lifelong Caloric Restriction, Prevents Age-Related Renal Damage and Prolongs the Life Span in Rats. *Am J Nephrol*. 2008;28(5):755-764. doi:10.1159/000128607

109. Smith J Daniel L, McClure JM, Matecic M, Smith JS. Calorie restriction extends the chronological lifespan of Saccharomyces cerevisiae independently of the Sirtuins. *Aging Cell*. 2007;6(5):649-662. doi:10.1111/j.1474-9726.2007.00326.x

110. Schulz TJ, Zarse K, Voigt A, Urban N, Birringer M, Ristow M. Glucose Restriction Extends Caenorhabditis elegans Life Span by Inducing Mitochondrial Respiration and Increasing Oxidative Stress. *Cell Metab*. 2007;6(4):280-293. doi:10.1016/j.cmet.2007.08.011

111. McCarter R, Mejia W, Ikeno Y, et al. Plasma Glucose and the Action of Calorie Restriction on Aging. *J Gerontol Ser A*. 2007;62(10):1059-1070. doi:10.1093/gerona/62.10.1059

112. Bass TM, Grandison RC, Wong R, Martinez P, Partridge L, Piper MDW. Optimization of Dietary Restriction Protocols in Drosophila. *J Gerontol Ser A*. 2007;62(10):1071-1081. doi:10.1093/gerona/62.10.1071

113. Medvedik O, Lamming DW, Kim KD, Sinclair DA. MSN2 and MSN4 Link Calorie Restriction and TOR to Sirtuin-Mediated Lifespan Extension in Saccharomyces cerevisiae. *PLOS Biol*. 2007;5(10):e261. doi:10.1371/journal.pbio.0050261

114. Weithoff G. Dietary Restriction in Two Rotifer Species: The Effect of the Length of Food Deprivation on Life Span and Reproduction. *Oecologia*. 2007;153(2):303-308.

115. Maas MF, Hoekstra RF, Debets AJ. A mitochondrial mutator plasmid that causes senescence under dietary restricted conditions. *BMC Genet*. 2007;8(1):9. doi:10.1186/1471-2156-8-9

116. Easlon E, Tsang F, Dilova I, et al. The Dihydrolipoamide Acetyltransferase Is a Novel Metabolic Longevity Factor and Is Required for Calorie Restriction-mediated Life Span Extension. *J Biol Chem*. 2007;282(9):6161-6171. doi:10.1074/jbc.M607661200

117. Troen AM, French EE, Roberts JF, et al. Lifespan modification by glucose and methionine in Drosophila melanogaster fed a chemically defined diet. *AGE*. 2007;29(1):29-39. doi:10.1007/s11357-006-9018-4

118. Tahara EB, Barros MH, Oliveira GA, Netto LES, Kowaltowski AJ. Dihydrolipoyl dehydrogenase as a source of reactive oxygen species inhibited by caloric restriction and involved in Saccharomyces cerevisiae aging. *FASEB J*. 2007;21(1):274-283. doi:10.1096/fj.06-6686com

119. Weinberger M, Feng L, Paul A, et al. DNA Replication Stress Is a Determinant of Chronological Lifespan in Budding Yeast. *PLOS ONE*. 2007;2(8):e748. doi:10.1371/journal.pone.0000748

120. Kaeberlein TL, Smith ED, Tsuchiya M, et al. Lifespan extension in Caenorhabditis elegans by complete removal of food. *Aging Cell*. 2006;5(6):487-494. doi:10.1111/j.1474-9726.2006.00238.x

121. Tsuchiya M, Dang N, Kerr EO, et al. Sirtuin-independent effects of nicotinamide on lifespan extension from calorie restriction in yeast. *Aging Cell*. 2006;5(6):505-514. doi:10.1111/j.1474-9726.2006.00240.x

122. Hatle JD, Wells SM, Fuller LE, et al. Calorie restriction and late-onset calorie restriction extend lifespan but do not alter protein storage in female grasshoppers. *Mech Ageing Dev*. 2006;127(12):883-891. doi:10.1016/j.mad.2006.09.003

123. Bonkowski MS, Rocha JS, Masternak MM, Al Regaiey KA, Bartke A. Targeted Disruption of Growth Hormone Receptor Interferes with the Beneficial Actions of Calorie Restriction. *Proc Natl Acad Sci U S A*. 2006;103(20):7901-7905.

124. Min KJ, Tatar M. Drosophila diet restriction in practice: Do flies consume fewer nutrients? *Mech Ageing Dev*. 2006;127(1):93-96. doi:10.1016/j.mad.2005.09.004

125. Bross TG, Rogina B, Helfand SL. Behavioral, physical, and demographic changes in Drosophila populations through dietary restriction. *Aging Cell*. 2005;4(6):309-317. doi:10.1111/j.1474-9726.2005.00181.x

126. Ikeno Y, Hubbard GB, Lee S, et al. Housing Density Does Not Influence the Longevity Effect of Calorie Restriction. *J Gerontol Ser A*. 2005;60(12):1510-1517. doi:10.1093/gerona/60.12.1510

127. Kaeberlein M, Powers RW, Steffen KK, et al. Regulation of Yeast Replicative Life Span by TOR and Sch9 in Response to Nutrients. *Science*. 2005;310(5751):1193. doi:10.1126/science.1115535

128. Fabrizio P, Gattazzo C, Battistella L, et al. Sir2 Blocks Extreme Life-Span Extension. *Cell*. 2005;123(4):655-667. doi:10.1016/j.cell.2005.08.042

129. Kaeberlein M, Hu D, Kerr EO, et al. Increased Life Span due to Calorie Restriction in Respiratory-Deficient Yeast. *PLOS Genet*. 2005;1(5):e69. doi:10.1371/journal.pgen.0010069

130. Davies S, Kattel R, Bhatia B, Petherwick A, Chapman T. The effect of diet, sex and mating status on longevity in Mediterranean fruit flies (Ceratitis capitata), Diptera: Tephritidae. *Exp Gerontol*. 2005;40(10):784-792. doi:10.1016/j.exger.2005.07.009

131. Lamming DW, Latorre-Esteves M, Medvedik O, et al. HST2 Mediates SIR2-Independent Life-Span Extension by Calorie Restriction. *Science*. 2005;309(5742):1861-1864.

132. Mair W, Piper MDW, Partridge L. Calories Do Not Explain Extension of Life Span by Dietary Restriction in Drosophila. *PLOS Biol*. 2005;3(7):e223. doi:10.1371/journal.pbio.0030223

133. Vasselli JR, Weindruch R, Heymsfield SB, et al. Intentional Weight Loss Reduces Mortality Rate in a Rodent Model of Dietary Obesity. *Obes Res*. 2005;13(4):693-702. doi:10.1038/oby.2005.78

134. Carey JR, Liedo P, Müller HG, Wang JL, Zhang Y, Harshman L. Stochastic dietary restriction using a Markov-chain feeding protocol elicits complex, life history response in medflies. *Aging Cell*. 2005;4(1):31-39. doi:10.1111/j.1474-9728.2004.00140.x

135. Osorio H, Silles E, Maia R, et al. Influence of chronological aging on the survival and nucleotide content of cells grown in different conditions: occurrence of a high concentration of UDP–acetylglucosamine in stationary cells grown in 2% glucose. *FEMS Yeast Res*. 2005;5(4-5):387-398. doi:10.1016/j.femsyr.2004.10.001

136. Barros MH, Bandy B, Tahara EB, Kowaltowski AJ. Higher Respiratory Activity Decreases Mitochondrial Reactive Oxygen Release and Increases Life Span in Saccharomyces cerevisiae. *J Biol Chem*. 2004;279(48):49883-49888. doi:10.1074/jbc.M408918200

137. Maas MFPM, Boer HJ de, Debets AJM, Hoekstra RF. The mitochondrial plasmid pAL2-1 reduces calorie restriction mediated life span extension in the filamentous fungus Podospora anserina. *Fungal Genet Biol*. 2004;41(9):865-871. doi:10.1016/j.fgb.2004.04.007

138. Kaeberlein M, Kirkland KT, Fields S, Kennedy BK. Sir2-Independent Life Span Extension by Calorie Restriction in Yeast. *PLOS Biol*. 2004;2(9):e296. doi:10.1371/journal.pbio.0020296

139. Reverter-Branchat G, Cabiscol E, Tamarit J, Ros J. Oxidative Damage to Specific Proteins in Replicative and Chronological-aged Saccharomyces cerevisiae: COMMON TARGETS AND PREVENTION BY CALORIE RESTRICTION. *J Biol Chem*. 2004;279(30):31983-31989. doi:10.1074/jbc.M404849200

140. Mair W, Sgrò CM, Johnson AP, Chapman T, Partridge L. Lifespan extension by dietary restriction in female Drosophila melanogaster is not caused by a reduction in vitellogenesis or ovarian activity. *Exp Gerontol*. 2004;39(7):1011-1019. doi:10.1016/j.exger.2004.03.018

141. Lee CK, Pugh TD, Klopp RG, et al. The impact of α-lipoic acid, coenzyme Q10 and caloric restriction on life span and gene expression patterns in mice. *Free Radic Biol Med*. 2004;36(8):1043-1057. doi:10.1016/j.freeradbiomed.2004.01.015

142. Dhahbi JM, Kim HJ, Mote PL, Beaver RJ, Spindler SR. Temporal linkage between the phenotypic and genomic responses to caloric restriction. *Proc Natl Acad Sci U S A*. 2004;101(15):5524-5529. doi:10.1073/pnas.0305300101

143. Lin SJ, Ford E, Haigis M, Liszt G, Guarente L. Calorie restriction extends yeast life span by lowering the level of NADH. *Genes Dev*. 2004;18(1):12-16. doi:10.1101/gad.1164804

144. Mair W, Goymer P, Pletcher SD, Partridge L. Demography of Dietary Restriction and Death in Drosophila. *Science*. 2003;301(5640):1731-1733. doi:10.1126/science.1086016

145. Anderson RM, Bitterman KJ, Wood JG, Medvedik O, Sinclair DA. Nicotinamide and PNC1 govern lifespan extension by calorie restriction in Saccharomyces cerevisiae. *Nature*. 2003;423(6936):181-185. doi:10.1038/nature01578

146. Black BJ, McMahan CA, Masoro EJ, Ikeno Y, Katz MS. Senescent terminal weight loss in the male F344 rat. *Am J Physiol-Regul Integr Comp Physiol*. 2003;284(2):R336-R342. doi:10.1152/ajpregu.00640.2001

147. Lin SJ, Kaeberlein M, Andalis AA, et al. Calorie restriction extends Saccharomyces cerevisiae lifespan by increasing respiration. *Nature*. 2002;418(6895):344-348. doi:10.1038/nature00829

148. Berrigan D, Perkins SN, Haines DC, Hursting SD. Adult-onset calorie restriction and fasting delay spontaneous tumorigenesis in p53-deficient mice. *Carcinogenesis*. 2002;23(5):817-822. doi:10.1093/carcin/23.5.817

149. Pletcher SD, Macdonald SJ, Marguerie R, et al. Genome-Wide Transcript Profiles in Aging and Calorically Restricted Drosophila melanogaster. *Curr Biol*. 2002;12(9):712-723. doi:10.1016/S0960-9822(02)00808-4

150. Lipman RD. Effect of Calorie Restriction on Mortality Kinetics in Inbred Strains of Mice Following 7,12-dimethylbenz[a]anthracene Treatment. *J Gerontol Ser A*. 2002;57(4):B153-B157. doi:10.1093/gerona/57.4.B153

151. Lin SJ, Defossez PA, Guarente L. Requirement of NAD and SIR2 for Life-Span Extension by Calorie Restriction in Saccharomyces cerevisiae. *Science*. 2000;289(5487):2126. doi:10.1126/science.289.5487.2126

152. Sohal RS, Ku HH, Agarwal S, Forster MJ, Lal H. Oxidative damage, mitochondrial oxidant generation and antioxidant defenses during aging and in response to food restriction in the mouse. *Mech Ageing Dev*. 1994;74(1):121-133. doi:10.1016/0047-6374(94)90104-X

153. Means LW, Higgins JL, Fernandez TJ. Mid-life onset of dietary restriction extends life and prolongs cognitive functioning. *Physiol Behav*. 1993;54(3):503-508. doi:10.1016/0031-9384(93)90243-9

154. Tacconi MT, Lligoña L, Salmona M, Pitsikas N, Algeri S. Aging and food restriction: Effect on lipids of cerebral cortex. *Neurobiol Aging*. 1991;12(1):55-59. doi:10.1016/0197-4580(91)90039-M

155. Bishop NA, Guarente L. Two neurons mediate diet-restriction-induced longevity in C. elegans. *Nature*. 2007;447(7144):545-549. doi:10.1038/nature05904

156. Soh JW, Hotic S, Arking R. Dietary restriction in Drosophila is dependent on mitochondrial efficiency and constrained by pre-existing extended longevity. *Mech Ageing Dev*. 2007;128(11-12):581-593. doi:10.1016/j.mad.2007.08.004

157. Giannakou ME, Goss M, Partridge L. Role of dFOXO in lifespan extension by dietary restriction in Drosophila melanogaster: not required, but its activity modulates the response. *Aging Cell*. 2008;7(2):187-198. doi:10.1111/j.1474-9726.2007.00362.x

158. Lawler DF, Larson BT, Ballam JM, et al. Diet restriction and ageing in the dog: major observations over two decades. *Br J Nutr*. 2008;99(4):793-805. doi:10.1017/S0007114507871686

159. Pearson KJ, Baur JA, Lewis KN, et al. Resveratrol Delays Age-Related Deterioration and Mimics Transcriptional Aspects of Dietary Restriction without Extending Life Span. *Cell Metab*. 2008;8(2):157-168. doi:10.1016/j.cmet.2008.06.011

160. Inness CLW, Metcalfe NB. The impact of dietary restriction, intermittent feeding and compensatory growth on reproductive investment and lifespan in a short-lived fish. *Proc R Soc B Biol Sci*. 2008;275(1644):1703-1708. doi:10.1098/rspb.2008.0357

161. Garcia AM, Busuttil RA, Calder RB, et al. Effect of Ames dwarfism and caloric restriction on spontaneous DNA mutation frequency in different mouse tissues. *Mech Ageing Dev*. 2008;129(9):528-533. doi:10.1016/j.mad.2008.04.013

162. Tang F, Watkins JW, Bermudez M, et al. A lifespan-extending form of autophagy employs the vacuole-vacuole fusion machinery. *Autophagy*. 2008;4(7):874-886. doi:10.4161/auto.6556

163. Grandison RC, Wong R, Bass TM, Partridge L, Piper MDW. Effect of a Standardised Dietary Restriction Protocol on Multiple Laboratory Strains of Drosophila melanogaster. Tanimoto H, ed. *PLoS ONE*. 2009;4(1):e4067. doi:10.1371/journal.pone.0004067

164. Terzibasi E, Lefrançois C, Domenici P, Hartmann N, Graf M, Cellerino A. Effects of dietary restriction on mortality and age-related phenotypes in the short-lived fish *Nothobranchius* furzeri. *Aging Cell*. 2009;8(2):88-99. doi:10.1111/j.1474-9726.2009.00455.x

165. Edman U, Garcia AM, Busuttil RA, et al. Lifespan extension by dietary restriction is not linked to protection against somatic DNA damage in Drosophila melanogaster: Lifespan extension in Drosophila melanogaster. *Aging Cell*. 2009;8(3):331-338. doi:10.1111/j.1474-9726.2009.00480.x

166. Roark AM, Bjorndal KA. Metabolic rate depression is induced by caloric restriction and correlates with rate of development and lifespan in a parthenogenetic insect. *Exp Gerontol*. 2009;44(6-7):413-419. doi:10.1016/j.exger.2009.03.004

167. Liu YL, Lu WC, Brummel TJ, et al. Reduced expression of *alpha-1,2-mannosidase I* extends lifespan in *Drosophila* melanogaster and *Caenorhabditis* elegans. *Aging Cell*. 2009;8(4):370-379. doi:10.1111/j.1474-9726.2009.00471.x

168. Le Rohellec M, Le Bourg É. Contrasted effects of suppressing live yeast from food on longevity, aging and resistance to several stresses in Drosophila melanogaster. *Exp Gerontol*. 2009;44(11):695-707. doi:10.1016/j.exger.2009.08.001

169. Kulminski AM, Molleman F, Culminskaya IV, et al. Date of eclosion modulates longevity: Insights across dietary-restriction gradients and female reproduction in the mexfly Anastrepha ludens. *Exp Gerontol*. 2009;44(11):718-726. doi:10.1016/j.exger.2009.08.007

170. Zhang M, Poplawski M, Yen K, et al. Role of CBP and SATB-1 in Aging, Dietary Restriction, and Insulin-Like Signaling. *PLOS Biol*. 2009;7(11):e1000245. doi:10.1371/journal.pbio.1000245

171. Park S, Link CD, Johnson TE. Life‐span extension by dietary restriction is mediated by NLP‐7 signaling and coelomocyte endocytosis in *C*. elegans. *FASEB J*. 2010;24(2):383-392. doi:10.1096/fj.09-142984

172. Pietrzak B, Grzesiuk M, Bednarska A. Food quantity shapes life history and survival strategies in Daphnia magna (Cladocera). *Hydrobiologia*. 2010;643:51-54. doi:10.1007/s10750-010-0135-9

173. Burger JMS, Buechel SD, Kawecki TJ. Dietary restriction affects lifespan but not cognitive aging in Drosophila melanogaster: Dietary restriction and memory. *Aging Cell*. 2010;9(3):327-335. doi:10.1111/j.1474-9726.2010.00560.x

174. Ching TT, Paal AB, Mehta A, Zhong L, Hsu AL. drr-2 encodes an eIF4H that acts downstream of TOR in diet-restriction-induced longevity of C. elegans: eIF4H/DRR-2 mediates DR longevity response. *Aging Cell*. 2010;9(4):545-557. doi:10.1111/j.1474-9726.2010.00580.x

175. Broughton SJ, Slack C, Alic N, et al. DILP-producing median neurosecretory cells in the Drosophila brain mediate the response of lifespan to nutrition: Drosophila DILP-producing mNSCs and DR longevity. *Aging Cell*. 2010;9(3):336-346. doi:10.1111/j.1474-9726.2010.00558.x

176. Buschemeyer WC, Klink JC, Mavropoulos JC, et al. Effect of intermittent fasting with or without caloric restriction on prostate cancer growth and survival in SCID mice: Intermittent Fasting and Prostate Cancer. *The Prostate*. 2010;70(10):1037-1043. doi:10.1002/pros.21136

177. Rikke BA, Liao CY, McQueen MB, Nelson JF, Johnson TE. Genetic dissection of dietary restriction in mice supports the metabolic efficiency model of life extension. *Exp Gerontol*. 2010;45(9):691-701. doi:10.1016/j.exger.2010.04.008

178. Mouchiroud L, Molin L, Kasturi P, et al. Pyruvate imbalance mediates metabolic reprogramming and mimics lifespan extension by dietary restriction in Caenorhabditis elegans: Pyruvate imbalance controls lifespan. *Aging Cell*. 2011;10(1):39-54. doi:10.1111/j.1474-9726.2010.00640.x

179. Latta LC, Frederick S, Pfrender ME. Diet restriction and life history trade-offs in short- and long-lived species of Daphnia. *J Exp Zool Part Ecol Genet Physiol*. 2011;315A(10):610-617. doi:10.1002/jez.710

180. Lyn JC, Naikkhwah W, Aksenov V, Rollo CD. Influence of two methods of dietary restriction on life history features and aging of the cricket Acheta domesticus. *AGE*. 2011;33(4):509-522. doi:10.1007/s11357-010-9195-z

181. Uno M, Honjoh S, Matsuda M, et al. A Fasting-Responsive Signaling Pathway that Extends Life Span in C. elegans. *Cell Rep*. 2013;3(1):79-91. doi:10.1016/j.celrep.2012.12.018

182. Gribble KE, Mark Welch DB. Life-Span Extension by Caloric Restriction Is Determined by Type and Level of Food Reduction and by Reproductive Mode in Brachionus manjavacas (Rotifera). *J Gerontol A Biol Sci Med Sci*. 2013;68(4):349-358. doi:10.1093/gerona/gls170

183. Wu Z, Liu SQ, Huang D. Dietary Restriction Depends on Nutrient Composition to Extend Chronological Lifespan in Budding Yeast Saccharomyces cerevisiae. Broughton S, ed. *PLoS ONE*. 2013;8(5):e64448. doi:10.1371/journal.pone.0064448

184. Jiang YS, Wang FR. Caloric restriction reduces edema and prolongs survival in a mouse glioma model. *J Neurooncol*. 2013;114(1):25-32. doi:10.1007/s11060-013-1154-y

185. Thu M, Win M, Yamamoto Y, et al. Validated Liquid Culture Monitoring System for Lifespan Extension of Caenorhabditis elegans through Genetic and Dietary Manipulations. *Aging Dis J*. 2013;4:178-185.

186. Chen EH, Wei D, Wei DD, Yuan GR, Wang JJ. The effect of dietary restriction on longevity, fecundity, and antioxidant responses in the oriental fruit fly, Bactrocera dorsalis (Hendel) (Diptera: Tephritidae). *J Insect Physiol*. 2013;59(10):1008-1016. doi:10.1016/j.jinsphys.2013.07.006

187. Bruce KD, Hoxha S, Carvalho GB, et al. High carbohydrate–low protein consumption maximizes Drosophila lifespan. *Calor Restrict Fasting Chall Future Dir Res*. 2013;48(10):1129-1135. doi:10.1016/j.exger.2013.02.003

188. Sun LY, Spong A, Swindell WR, et al. Growth hormone-releasing hormone disruption extends lifespan and regulates response to caloric restriction in mice. *eLife*. 2013;2:e01098. doi:10.7554/eLife.01098

189. Gribble KE, Kaido O, Jarvis G, Mark Welch DB. Patterns of intraspecific variability in the response to caloric restriction. *Exp Gerontol*. 2014;51:28-37. doi:10.1016/j.exger.2013.12.005

190. Gribble KE, Jarvis G, Bock M, Mark Welch DB. Maternal caloric restriction partially rescues the deleterious effects of advanced maternal age on offspring. *Aging Cell*. 2014;13(4):623-630. doi:10.1111/acel.12217

191. Solon-Biet SM, McMahon AC, Ballard JWO, et al. The Ratio of Macronutrients, Not Caloric Intake, Dictates Cardiometabolic Health, Aging, and Longevity in Ad Libitum-Fed Mice. *Cell Metab*. 2014;19(3):418-430. doi:10.1016/j.cmet.2014.02.009

192. Roark AM, Bjorndal KA. Bridging Developmental Boundaries: Lifelong Dietary Patterns Modulate Life Histories in a Parthenogenetic Insect. Benoit JB, ed. *PLoS ONE*. 2014;9(11):e111654. doi:10.1371/journal.pone.0111654

193. Hine C, Harputlugil E, Zhang Y, et al. Endogenous Hydrogen Sulfide Production Is Essential for Dietary Restriction Benefits. *Cell*. 2015;160(1-2):132-144. doi:10.1016/j.cell.2014.11.048

194. Kleinteich A, Wilder SM, Schneider JM. Contributions of juvenile and adult diet to the lifetime reproductive success and lifespan of a spider. *Oikos*. 2015;124(2):130-138. doi:10.1111/oik.01421

195. Stastna JJ, Snoek LB, Kammenga JE, Harvey SC. Genotype-dependent lifespan effects in peptone deprived Caenorhabditis elegans. *Sci Rep*. 2015;5(1):16259. doi:10.1038/srep16259

196. Koopman JJE, van Heemst D, van Bodegom D, Bonkowski MS, Sun LY, Bartke A. Measuring aging rates of mice subjected to caloric restriction and genetic disruption of growth hormone signaling. *Aging*. 2016;8(3):539-546. doi:10.18632/aging.100919

197. Littlefair JE, Nunn KA, Knell RJ. The development of a synthetic diet for investigating the effects of macronutrients on the development of *Plodia* interpunctella. *Entomol Exp Appl*. 2016;159(3):305-310. doi:10.1111/eea.12441

198. Ihara A, Uno M, Miyatake K, Honjoh S, Nishida E. Cholesterol regulates DAF-16 nuclear localization and fasting-induced longevity in C. elegans. *Exp Gerontol*. 2017;87:40-47. doi:10.1016/j.exger.2016.10.011

199. Guedes A, Ludovico P, Sampaio-Marques B. Caloric restriction alleviates alpha-synuclein toxicity in aged yeast cells by controlling the opposite roles of Tor1 and Sir2 on autophagy. *Mech Ageing Dev*. 2017;161:270-276. doi:10.1016/j.mad.2016.04.006

200. Xie K, Neff F, Markert A, et al. Every-other-day feeding extends lifespan but fails to delay many symptoms of aging in mice. *Nat Commun*. 2017;8(1):155. doi:10.1038/s41467-017-00178-3

201. Honjoh S, Ihara A, Kajiwara Y, Yamamoto T, Nishida E. The Sexual Dimorphism of Dietary Restriction Responsiveness in Caenorhabditis elegans. *Cell Rep*. 2017;21(13):3646-3652. doi:10.1016/j.celrep.2017.11.108

202. Choi KM, Hong SJ, van Deursen JM, Kim S, Kim KH, Lee CK. Caloric Restriction and Rapamycin Differentially Alter Energy Metabolism in Yeast. *J Gerontol Ser A*. 2018;73(1):29-38. doi:10.1093/gerona/glx024

203. Catterson JH, Khericha M, Dyson MC, et al. Short-Term, Intermittent Fasting Induces Long-Lasting Gut Health and TOR-Independent Lifespan Extension. *Curr Biol*. 2018;28(11):1714-1724.e4. doi:10.1016/j.cub.2018.04.015

204. Gomez FH, Stazione L, Sambucetti P, Norry FM. Negative genetic correlation between longevity and its hormetic extension by dietary restriction in Drosophila melanogaster. *Biogerontology*. 2020;21(2):191-201. doi:10.1007/s10522-019-09852-z

205. McCracken AW, Adams G, Hartshorne L, Tatar M, Simons MJP. The hidden costs of dietary restriction: Implications for its evolutionary and mechanistic origins. *Sci Adv*. 2020;6(8):eaay3047. doi:10.1126/sciadv.aay3047

206. Mautz BS, Lind MI, Maklakov AA. Dietary Restriction Improves Fitness of Aging Parents But Reduces Fitness of Their Offspring in Nematodes. *J Gerontol Ser A*. 2020;75(5):843-848. doi:10.1093/gerona/glz276

207. Jin K, Wilson KA, Beck JN, et al. Genetic and metabolomic architecture of variation in diet restriction-mediated lifespan extension in Drosophila. Murphy CT, ed. *PLOS Genet*. 2020;16(7):e1008835. doi:10.1371/journal.pgen.1008835

208. Pandey M, Bansal S, Bar S, et al. miR-125-chinmo pathway regulates dietary restriction-dependent enhancement of lifespan in Drosophila. *eLife*. 2021;10:e62621. doi:10.7554/eLife.62621

209. Pendergrass WR, Li Y, Jiang D, Fei RG, Wolf NS. Caloric Restriction: Conservation of Cellular Replicative Capacity in Vitro Accompanies Life-Span Extension in Mice. *Exp Cell Res*. 1995;217(2):309-316. doi:10.1006/excr.1995.1091

210. Turturro A, Witt WW, Lewis S, Hass BS, Lipman RD, Hart RW. Growth Curves and Survival Characteristics of the Animals Used in the Biomarkers of Aging Program. *J Gerontol Ser A*. 1999;54(11):B492-B501. doi:10.1093/gerona/54.11.B492

211. Duffy PH, Lewis SM, Mayhugh MA, et al. Effect of the AIN-93M Purified Diet and Dietary Restriction on Survival in Sprague-Dawley Rats: Implications for Chronic Studies. *J Nutr*. 2002;132(1):101-107. doi:10.1093/jn/132.1.101

212. Zeller M, Koella JC. Effects of food variability on growth and reproduction of  *\textless*span style="font-variant:small-caps;"\textgreaterA\textless/span\textgreater edes aegypti. *Ecol Evol*. 2016;6(2):552-559. doi:10.1002/ece3.1888

213. Fernández-Moreno MA, Farr CL, Kaguni LS, Garesse R. Drosophila melanogaster as a Model System to Study Mitochondrial Biology. In: Walker JM, Leister D, Herrmann JM, eds. *Mitochondria*. Vol 372. Humana Press; 2007:33-49. doi:10.1007/978-1-59745-365-3\_3

214. Aoki I, Nakano S, Mori I. Molecular Mechanisms of Learning in Caenorhabditis elegans. In: *Learning and Memory: A Comprehensive Reference*. Elsevier; 2017:415-434. doi:10.1016/B978-0-12-809324-5.21096-1

215. Phifer-Rixey M, Nachman MW. Insights into mammalian biology from the wild house mouse Mus musculus. *eLife*. 2015;4:e05959. doi:10.7554/eLife.05959

216. Yagishita N, Kume G. Genetic characteristics of the amphidromous fish Ayu Plecoglossus altivelis altivelis (Osmeriformes: Plecoglossidae) on Yaku-shima Island in Japan, the southernmost population of the subspecies. *Genetica*. 2021;149(2):117-128. doi:10.1007/s10709-021-00117-7

217. Abu Tahir N, Hassan A, Jasmi A. *Life Tables and Development of Musca Domestica (Diptera: Muscidae) on Three Different Diets*.; 2012.

218. Agoston DV. How to Translate Time? The Temporal Aspect of Human and Rodent Biology. *Front Neurol*. 2017;8. doi:10.3389/fneur.2017.00092

219. Krainacker DA, Carey JR, Vargas RI. Effect of larval host on life history traits of the mediterranean fruit fly, Ceratitis capitata. *Oecologia*. 1987;73(4):583-590. doi:10.1007/BF00379420

220. Forsburg S. The yeasts Saccharomyces cerevisiae and Schizosaccharomyces pombe: models for cell biology research. *Gravitational Space Biol Bull Publ Am Soc Gravitational Space Biol*. 2005;18:3-9.

221. Al-Azzazy MM, Al-Rehiayani SM, Abdel-Baky NF. Life tables of the predatory mite *Neoseiulus* cucumeris (Acari: Phytoseiidae) on two pest mites as prey, *Aculops* lycopersici and *Tetranychus* urticae. *Arch Phytopathol Plant Prot*. 2018;51(11-12):637-648. doi:10.1080/03235408.2018.1507013

222. Lawrence C, Adatto I, Best J, James A, Maloney K. Generation time of zebrafish (Danio rerio) and medakas (Oryzias latipes) housed in the same aquaculture facility. *Lab Anim*. 2012;41(6):158-165. doi:10.1038/laban0612-158

223. Teixeira H, van Elst T, Ramsay MS, et al. RADseq Data Suggest Occasional Hybridization between Microcebus murinus and M. ravelobensis in Northwestern Madagascar. *Genes*. 2022;13(5):913. doi:10.3390/genes13050913

224. Meng X, Zhu F, Chen K. Silkworm: A Promising Model Organism in Life Science. *J Insect Sci*. 2017;17(5):97. doi:10.1093/jisesa/iex064

225. Gunawardene EU, Stephenson RE, Hatle JD, Juliano SA. ARE REPRODUCTIVE TACTICS DETERMINED BY LOCAL ECOLOGY IN ROMALEA MICROPTERA (ORTHOPTERA: ACRIDIDAE)? *Fla Entomol*. 2004;87(2):119-123. doi:10.1653/0015-4040(2004)087[0119:ARTDBL]2.0.CO;2

226. Zhang X, Zhang Q, Su B. Emergence and evolution of inter-specific segregating retrocopies in cynomolgus monkey (Macaca fascicularis) and rhesus macaque (Macaca mulatta). *Sci Rep*. 2016;6(1):32598. doi:10.1038/srep32598

227. Zamek AL, Spinner JE, Micallef JL, Gurr GM, Reynolds OL. Parasitoids of Queensland Fruit Fly Bactrocera tryoni in Australia and Prospects for Improved Biological Control. *Insects*. 2012;3(4):1056-1083. doi:10.3390/insects3041056

228. Dedeine F, Vavre F, Shoemaker DD, Boulétreau M. INTRA-INDIVIDUAL COEXISTENCE OF A WOLBACHIA STRAIN REQUIRED FOR HOST OOGENESIS WITH TWO STRAINS INDUCING CYTOPLASMIC INCOMPATIBILITY IN THE WASP ASOBARA TABIDA. *Evolution*. 2004;58(10):2167-2174. doi:10.1111/j.0014-3820.2004.tb01595.x

229. Yin XW, Zhao W. Studies on life history characteristics of Brachionus plicatilis O. F. Müller (Rotifera) in relation to temperature, salinity and food algae. *Aquat Ecol*. 2008;42(1):165-176. doi:10.1007/s10452-007-9092-4

230. Horwitz BA, Mukherjee PK, Mukherjee M, Kubicek CP. *Genomics of Soil- and Plant-Associated Fungi*. 1st ed. Springer Berlin; 2013.

231. Bindman A. ADW: Latrodectus hasselti: INFORMATION. *Lact Hasselti*. Published online 2013. Accessed June 28, 2022. https://animaldiversity.org/accounts/Latrodectus\_hasselti/

232. Celedonio-Hurtado H, Liedo P, Aluja M, Guillen J, Berrigan D, Carey J. Demography of Anastrepha ludens, A. obliqua and A. serpentina (Diptera: Tephritidae) in Mexico. *Fla Entomol*. 1988;71(2):111. doi:10.2307/3495357

233. Riley MI, Hopper JE, Johnston SA, Dickson RC. GAL4 of Saccharomyces cerevisiae activates the lactose-galactose regulon of Kluyveromyces lactis and creates a new phenotype: glucose repression of the regulon. *Mol Cell Biol*. 1987;7(2):780-786. doi:10.1128/mcb.7.2.780-786.1987

234. Lewis TW, Blott SC, Woolliams JA. Genetic Evaluation of Hip Score in UK Labrador Retrievers. Toland AE, ed. *PLoS ONE*. 2010;5(10):e12797. doi:10.1371/journal.pone.0012797

235. Terekhanova NV, Logacheva MD, Penin AA, et al. Fast Evolution from Precast Bricks: Genomics of Young Freshwater Populations of Threespine Stickleback Gasterosteus aculeatus. Peichel CL, ed. *PLoS Genet*. 2014;10(10):e1004696. doi:10.1371/journal.pgen.1004696

236. Blažek R, Polačik M, Reichard M. Rapid growth, early maturation and short generation time in African annual fishes. *EvoDevo*. 2013;4(1):24. doi:10.1186/2041-9139-4-24

237. Reitz G, Bücker H, Facius R, et al. Influence of cosmic radiation and/or microgravity on development of carausius morosus. *Adv Space Res*. 1989;9(10):161-173. doi:10.1016/0273-1177(89)90435-3

238. Korpelainen H. The effects of temperature and photoperiod on life history parameters of Daphnia magna (Crustacea: Cladocera). *Freshw Biol*. 1986;16(5):615-620. doi:10.1111/j.1365-2427.1986.tb01004.x

239. Chen X, Stillman JH. Multigenerational analysis of temperature and salinity variability affects on metabolic rate, generation time, and acute thermal and salinity tolerance in Daphnia pulex. *J Therm Biol*. 2012;37(3):185-194. doi:10.1016/j.jtherbio.2011.12.010

240. Ziarek JJ, Nihongi A, Nagai T, Uttieri M, Strickler JR. Seasonal adaptations of Daphnia pulicaria swimming behaviour: the effect of water temperature. *Hydrobiologia*. 2011;661(1):317-327. doi:10.1007/s10750-010-0540-0

241. Patton RL. Growth and Development Parameters for Acheta domesticus1,2. *Ann Entomol Soc Am*. 1978;71(1):40-42. doi:10.1093/aesa/71.1.40

242. Mohamed S, Roseli M, Sajili MH, Adam NA. Life Table and Demographic Parameters of Bactrocera dorsalis Reared on Mango (Mangifera indica L.). *Biosci Res*. 2019;16:311-318.

243. Eliopoulos PA, Stathas GJ. Life Tables of Habrobracon hebetor (Hymenoptera: Braconidae) Parasitizing Anagasta kuehniella and Plodia interpunctella (Lepidoptera: Pyralidae): Effect of Host Density. *J Econ Entomol*. 2008;101(3):982-988. doi:10.1093/jee/101.3.982

244. Diaz SA, Lindström J, Haydon DT. Basic Demography of Caenorhabditis remanei Cultured under Standard Laboratory Conditions. *J Nematol*. 2008;40(3):167-178.

245. Maimusa HA, Ahmad AH, Kassim NFA, Rahim J. Age-Stage, Two-Sex Life Table Characteristics of *Aedes* albopictus and *Aedes* Aegypti in Penang Island, Malaysia. *J Am Mosq Control Assoc*. 2016;32(1):1-11. doi:10.2987/moco-32-01-1-11.1