Supplementary Information for: **Elimination reintroduction diets and oral food challenge in adults with rheumatoid arthritis: A scoping review**

Julianne McNeill, Caryn Zinn, Gael Mearns, Rebecca Grainger

**Table S1:** Summary of searches undertaken

**Table S2:** Final studies resulting from search; 48 records, representing 20 trials, and 17 case studies

**Table S3:** Characteristics of included studies. Methods and measures for trials.

**Table S4:** Case study characteristics with results of foods reported to affecting individuals with RA

**Table S5:** Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

Table S1. Summary of searches undertaken

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data Source | Date of search | Search terms | Number of results | After deduplication |
| Medline, EBSCO | 14 Aug 2022  end October 2022  16.1 2025 | ( Rheumatoid Arthritis” OR rheumatism ) AND ( "food react\*" OR "food reintroduction" OR "diet challenge\*" OR "individual\* diet" OR "food challenge" OR "food antigen" OR "food antibod\*" OR "food sensitiv\*" OR "food intoleran\*" OR "food allerg\*" OR "food allerg\*" OR "food hypersensitivity" OR "diet\* manipulation" OR “diet\* therapy” ) | 451 (English only) | 1217  (503 duplicates) |
| Cochrane | October 2022  16.1 25 | ( Rheumatoid Arthritis” OR rheumatism ) AND ( "food react\*" OR "food reintroduction" OR "diet challenge\*" OR "individual\* diet" OR "food challenge" OR "food antigen" OR "food antibod\*" OR "food sensitiv\*" OR "food intoleran\*" OR "food allerg\*" OR "food allerg\*" OR "food hypersensitivity" OR "diet\* manipulation" OR “diet\* therapy” ) | 128 (English only) |
| Scopus | October 2022  16.1.2025 | ( TITLE-ABS-KEY ( "Rheumatoid arthritis" OR rheumatism ) AND TITLE-ABS-KEY ( "food react\*" OR "food reintroduction" OR "diet challenge\*" OR "individual\* diet" OR "food challenge" OR "food antigen" OR "food antibod\*" OR "food sensitiv\*" OR "food intoleran\*" OR "food allerg\*" OR "food allerg\*" OR "food hypersensitivity" OR "diet\* manipulation" OR "diet\* therapy" ) ) AND ( EXCLUDE ( SUBJAREA , "PHAR" ) OR EXCLUDE ( SUBJAREA , "COMP" ) OR EXCLUDE ( SUBJAREA , "MATH" ) OR EXCLUDE ( SUBJAREA , "DENT" ) OR EXCLUDE ( SUBJAREA , "PHYS" ) OR EXCLUDE ( SUBJAREA , "VETE" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) ) | 618 |
| CINAHL via EBSCO | October 2022  16.1 2025 | "Rheumatoid arthritis" or rheumatism. ti,ab,kw AND  "food react\*" OR "food reintroduction" OR "diet challenge\*" OR "individual\* diet" OR "food challenge" OR "food antigen" OR "food antibod\*" OR "food sensitiv\*" OR "food intoleran\*" OR "food allerg\*" OR "food allerg\*" OR "food hypersensitivity" OR "diet\* manipulation" OR “diet\* therapy” | 199 |
| Google Scholar | October 2022  16.1 2025 | ("Rheumatoid arthritis" or rheumatism) AND ("diet challenge\*" OR "food challenge" OR "food antigen" OR "food antibody" OR "food sensitivity" OR "food intolerance" OR "food allergy" OR "food hypersensitivity" OR "dietary manipulation" OR "diet therapy") | 324  from title screen – 5200 results first 50 pages |
| OATD | December 2022  16.1 2025 | TI,AB "rheumatoid arthritis" AND diet | 74 | 74 |
| ProQuest | October 2022  16.1 2025 | “Rheumatoid arthritis” AND diet, plus associated keywords included or excluded. | 124 | 123 (1 duplicate) |
| Open-Grey | October 2022  16.1 2025 | “rheumatoid arthritis” AND diet | 0 |  |
|  |  |  | **1843** | **1414** |

Table S2: Final studies resulting from search; 48 records, representing 20 trials, and 17 case studies, in chronological order.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Record number/**  **Type** | **Trial number / country** | **Author**  **Reference** | **Title** | **Publication** | **Year** | **Related paper for diet protocol used** |
| **1**  Conference abstract | Study 1  UK | Hicklin et al. (1980) (1) | The Effect of Diet in Rheumatoid Arthritis  British Society for Allergy and Clinical Immunology. Winter meeting Dec 1979 | Clinical Experimental Allergy, 10, p 463  . | 1980 | Diet protocol McEwen & Morgan (1982)(2) |
|  |  |  |  |  |  |  |
| **2**  Conference abstract | Study 2a  USA | Stroud et al. (1980) (3) | Comprehensive environmental control and its effect on rheumatoid arthritis | Clinical research ARA, Central Region, Volume 28, Issue 4, pp. A791 | 1980 |  |
| **3**  Full paper | Study 2a  USA | Stroud (1983) (4) | The effect of fasting followed by specific food challenge on rheumatoid arthritis | Current Topics in Rheumatology: A collection from Johns Hopkins fellows, past and present. In honour of Lawrene E.Shulman, MD PhD and Mary  Betty Stevens, MD Chapter 18 p145-157 | 1983 | Randolph (1964)(5) Environmental control units’ description |
| **4**  Full paper | Study 2b  USA  (Subgroup of 2a results from one centre) | Marshall et al. (1984) (6) | Food challenge effects on fasted rheumatoid arthritis patients: a multicentre study | Clinical Ecology - Volume 2, Issue 4, pp. 181-190 | Fall 1984 |  |
|  |  |  |  |  |  |  |
| **5**  Full paper | Study 3  Australia | Little et al. (1983) (7) | Platelet serotonin release in rheumatoid arthritis: a study in food-intolerant patients | Lancet (London, England) - Volume 2, Issue 8345, pp. 297-299 | 1983 |  |
| **6**  Full paper | Study 4  Italy | Lunardi et al. (1987)(8) | Arthralgia, arthritis and food intolerance | The Italian journal of medicine, Winter 1987, Volume 3, Issue 3 | 1987 | Diet protocol Pachor et al. (1986)  (9) |
| **7**  Full paper | Study 5  India | Beri et al. (1988) (10) | Effect of dietary restrictions on disease activity in rheumatoid arthritis | Annals of the rheumatic diseases - Volume 47, Issue 1, pp. 69-72 | 1988 |  |
| **8**  Preliminary short report | Study 6  Israel | Ratner et al. (1985)(11) | Does milk intolerance affect seronegative arthritis in lactase-deficient women? | Israel Journal of Medical Sciences - Volume 21, Issue 6, pp. 532-534 | 1985 |  |
| **9**  Full paper | Study 7  Switzerland | Felder et al. (1987)(12) | Food allergy in patients with rheumatoid arthritis | Clinical rheumatology - Volume 6, Issue 2, pp. 181-184 | 1987 |  |
| **10**  Doctoral Thesis for publications 8 & 9 | Study 8,9  Netherlands | Van de Laar (1991)(13) | Rheumatoid arthritis and food, allergy? | Laar, Martinus A. F. J. van de. (1991). Rheumatoid arthritis and food, allergy? / Martinus A.F.J. van de Laar. Amsterdam: Thesis Publishers | 1991 |  |
| **11,**  Full paper | Study 8  Netherlands | Van de Laar & van der Korst (1992) (14) | Food intolerance in rheumatoid arthritis. I. A double blind, controlled trial of the clinical effects of elimination of milk allergens and azo dyes | Annals of the rheumatic diseases - Volume 51, Issue 3, pp. 298-302 | 1992 |  |
| **12**  Full paper | Study 9  Netherlands | Van de Laar et al. (1992)(15) | Food intolerance in rheumatoid arthritis. II. Clinical and histological aspects | Annals of the rheumatic diseases - Volume 51, Issue 3, pp. 303-306 | 1992 |  |
| **13**,  Full paper | Study 10  London England | Carini et al (1984)(16) | Food allergy as a cause of arthralgia |  | 1984 |  |
| **14**,  Full paper | Study 11  Italy | Carini et al. (1987)(17) | Immune complexes in food-induced arthralgia | Annals of allergy Volume 59, Issue 6, pp. 422-428 | 1987 |  |
| **15,**  Full paper | Study 12    UK | Darlington et al. (1986) (18) | Placebo-controlled, blind study of dietary manipulation therapy in rheumatoid arthritis | Lancet (London, England) - Volume 1, Issue 8475, pp. 236-238 | 1986 | Diet protocol in Rayman appendix 4. Rayman & Callaghan (2008)(19) |
| **16**  Conference abstract / short report | Study 13  UK | Darlington & Ramsey (1987) (20) | Dietary manipulation therapy in rheumatoid arthritis | Progress in rheumatology, International Seminar on the Treatment of Rheumatic Diseases; Machtey, Israel -pp. 128-132 | 1987 |  |
| **17,**  Conference abstract | Study 14  UK | Darlington et al. (1989) (21) | A prospective study of clinical and serological responses to single or double-blind food challenges in patients with rheumatoid arthritis subject to dietary manipulation. | Br J Rheumatology - Volume 28, Issue 0, pp. 116 | 1989 |  |
| **Records 18 – 28, Study 15a - 15k, all refer to the same study.** | | 15a, 15e and 15j are the papers referred to in scoping review table |  |  |  |  |
| **18,**  Full paper | Study 15/a  Norway | Kjeldsen-Kragh et al. (1991) (22) | Controlled trial of fasting and one-year vegetarian diet in rheumatoid arthritis | Lancet (London, England) - Volume 338, Issue 8772, pp. 899-902 | 1991 |  |
| 19  Full paper | Study 15/b | Haugen et al. (1993)(23) | The influence of fast and vegetarian diet on parameters of nutritional status in patients with rheumatoid arthritis | Clinical rheumatology - Volume 12, Issue 1, pp. 62-69 | 1993 |  |
| 20  Full paper | Study 15/c | Kjeldsen-Kragh et al. (1995) (24) | Changes in laboratory variables in rheumatoid arthritis patients during a trial of fasting and one-year vegetarian diet | Scandinavian journal of rheumatology - Volume 24, Issue 2, pp. 85-93 | 1995 |  |
| 21  Full paper | Study 15/d | Peltonen et al. (1994) (25) | Changes of faecal flora in rheumatoid arthritis during fasting and one-year vegetarian diet | British journal of rheumatology - Volume 33, Issue 7, pp. 638-643 | 1994 |  |
| 22,  Full paper | Study 15/e | Kjeldsen-Kragh et al. (1995) (26) | Antibodies against dietary antigens in rheumatoid arthritis patients treated with fasting and a one-year vegetarian diet | Clinical and Experimental  Rheumatology  13: 167-172 | 1995 |  |
| 23  Full paper | Study 15/f | Kjeldsen-Kragh et al. (1995) (27) | Decrease in anti-Proteus mirabilis but not anti-Escherichia coli antibody levels in rheumatoid arthritis patients treated with fasting and a one year vegetarian diet | Annals of the rheumatic diseases - Volume 54, Issue 3, pp. 221-224 | 1995 |  |
| 24  Full paper | Study 15/g | Kjeldsen-Kragh et al. (1994) (28) | Vegetarian diet for patients with rheumatoid arthritis: can the clinical effects be explained by the psychological characteristics of the patients? | British journal of rheumatology - Volume 33, Issue 6, pp. 569-575 | 1994 |  |
| 25  Full paper | Study 15/h | Haugen et al. (1994)(29) | Changes in plasma phospholipid fatty acids and their relationship to disease activity in rheumatoid arthritis patients treated with a vegetarian diet | The British journal of nutrition - Volume 72, Issue 4, pp. 555-566 | 1993 |  |
| 26  Full paper | Study 15/i | Kjeldsen-Kragh et al. (1996) (30) | Changes in glycosylation of IgG during fasting in patients with rheumatoid arthritis. | British journal of rheumatology - Volume 35, Issue 2, pp. 117-9 | 1996 |  |
| 27  Full paper | Study 15/j | Kjeldsen-Kragh et al. (1994) (31) | Vegetarian diet for patients with rheumatoid arthritis--status: two years after introduction of the diet | Clinical rheumatology - Volume 13, Issue 3, pp. 475-482 | 1994 |  |
| 28  Full paper, overview of the study plus comments | Study 15/k | Kjeldsen-Kragh (1999) (32) | Rheumatoid arthritis treated with vegetarian diets | The American journal of clinical nutrition - Volume 70, Issue 3, pp. 594S-600S | 1999 |  |
|  |  |  |  |  |  |  |
| 29  Full paper | Study 16  UK | Kavanagh et al. (1995)(33) | The effects of elemental diet and subsequent food reintroduction on rheumatoid arthritis | British journal of rheumatology - Volume 34, Issue 3, pp. 270-273  British Society for Rheumatology | 1995 |  |
|  |  |  |  |  |  |  |
| 30,  Full paper | Study 17/a  Turkey | Karatay et al. (2004)(34) | The effect of individualized diet challenges consisting of allergenic foods on TNF-alpha and IL-1beta levels in patients with rheumatoid arthritis | Rheumatology (Oxford, England) - Volume 43, Issue 11, pp. 1429-1433 | 2004 |  |
| 31,  Full paper | Study 17/b Turkey | 14b Karatay et al. (2006)(35) | General or personal diet: the individualized model for diet challenges in patients with rheumatoid arthritis | Rheumatology international - Volume 26, Issue 6, pp. 556-560 | 2006 |  |
| 32,  Full paper | Study 18  USA | Barnard et al. (2022)(36) | A Randomized, Crossover Trial of a Nutritional Intervention for Rheumatoid Arthritis | American Journal of Lifestyle Medicine. 2022;0(0). doi:10.1177/15598276221081819 | 2022 |  |
| 33,  Thesis | Study 19, 20 | Erik Hulander  (2022)(37) | Nutritional impact on health in patients with Rheumatoid  Arthritis | Department of Internal Medicine and Clinical Nutrition  Institute of Medicine Sahlgrenska Academy, University of Gothenburg | 2022 |  |
| 34,  Full paper | Study 19  Sweden | Lindqvist et al.  (2023)(38) | Exploring the differences in serum metabolite profiles after intake of red meat in women with rheumatoid arthritis and a matched control group | European Journal of Nutrition - Volume 63, pp 221–230 | 2024 |  |
| 35,  Full paper | Study 20  Sweden | Hulander et al.  (2024)(39) | A randomized controlled cross-over trial investigating the acute inflammatory and metabolic response after meals based on red meat, fatty fish, or soy protein: the postprandial inflammation in rheumatoid arthritis (PIRA) trial | European Journal of Nutrition – volume 63, pp 2631–2642 | 2024 |  |
|  |  |  |  |  |  |  |
| Case Studies |  |  |  |  |  |  |
| 36  Full paper | Case studies 1-4 USA | Zeller (1949)(40) | Rheumatoid arthritis; food allergy as a factor | Annals of allergy - Volume 7, Issue 2, pp. 200-205. Read before Southwest Allergy Forum, Oklahoma City, Oklahoma, April 5, 1948. | March -April 1949 |  |
| 37  Letter in journal, case report | Case study 5  UK  Hammersmith Hospital | [Parke & Hughes (1981)](#_ENREF_32) (41) | For debate… Rheumatoid arthritis and food: a case study | British medical journal (Clinical research ed.) - Volume 282, Issue 6281, pp. 2027-2029 | June 20 1981 |  |
| 38  Letter in journal, case report | Case study 6  London UK | Williams (1981)(42) | Rheumatoid arthritis and food: a case study | British medical journal (Clinical research ed.) - Volume 283, Issue 6290, pp. 563 | 22 August 1981 |  |
| 39  Full paper | Case studies 7,8,9  USA | O’Banion (1982)(43) | Dietary control of rheumatoid arthritis pain: Three case studies | Journal of Holistic Medicine - Volume 4, Issue 1, pp. 49-57 | Spring / Summer 1982 |  |
| 40  Case study as part of paper | Case Study 10 USA | Marshall 1984 et al. (1984)(6) | Food challenge effects on fasted rheumatoid arthritis patients: a multicentre study | Clinical Ecology - Volume 2, Issue 4, pp. 181-190 |  |  |
| 41  Full paper | Case study 11  USA | Panush et al. (1986)(44) | Food-induced (allergic) arthritis. Inflammatory arthritis exacerbated by milk | Arthritis and rheumatism - Volume 29, Issue 2, pp. 220-226 | February 1986 |  |
| 42  Conference Abstract for case study 11 | Case study 11  USA | Panush et al. (1985)(45) | Food-induced (allergic) arthritis, I. Rheumatoid arthritis exacerbated by milk | Journal of Allergy and Clinical Immunology - Volume 75, Issue 1, pp. 203, Abstract 394 | 1985 |  |
| 43  Letter to journal | Case study 12  Verona, Italy | Lunardi et al. (1988)(46) | Food allergy and rheumatoid arthritis | Clinical and experimental rheumatology - Volume 6, Issue 4, pp. 423-424 | 1988 |  |
| 44  Full paper | Case study 13.  USA | Lukaczer (2005)(47) | An integrative nutritional approach to the treatment of rheumatoid arthritis | Integrative Medicine: A Clinician's Journal - Volume 4, Issue 2, pp. 16-22 | 2005 |  |
| 45  Short report | Case study 14  USA | Martinez (2008)(48) | Clinical challenge. Coincidence or medical breakthrough? | Clinical Advisor - Volume 11, Issue 2, pp. 114-115  Haymarket Media, Inc. | Feb 9 2008 |  |
| 46  Letter to journal | Case study 15  Turkey | Kutlu et al. (2010)(49) | Meat-induced joint attacks, or meat attacks the joint: rheumatism versus allergy | Nutrition in clinical practice: official publication of the American Society for Parenteral and Enteral Nutrition - Volume 25, Issue 1, pp. 90-91 | 2010 |  |
| 47  Full paper | Case study 16  MN, USA | Denton (2012)(50) | The elimination/challenge diet | Minnesota medicine - Volume 95, Issue 12, pp. 43-44 | 2012 |  |
| 48  Case study as part of full paper | Case study 17  Madrid, Spain | Isasi et al (2016)(51) | Non-celiac gluten sensitivity and rheumatic diseases | Reumatologia Clinica - Volume 12, Issue 1, pp. 4-10, Case #6 | 2015 |  |
|  |  |  |  |  |  |  |

*Table S 3. Characteristics of included studies. Study design, participants, methods, elimination and reintroduction protocols and outcome measures used.*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author, year country** | **Study design**  **Length** | **Setting**  **Compliance** | **Participants:**  **Total, RA diagnosis, Gender, Age, medication. Other inclusion details** | **Per group: number, gender, age** | **Elimination protocol**  **Length** | **Elimination rationale**  **Theoretical basis** | **Food reintroduction or challenge protocol**  **Number of foods tested**  **Time** | **How response measured**  **Protocol for reaction** | **Clinical and Laboratory tests** | **Clinical test times** | **Food identified or not**  **Follow-up protocol** |
| **RCT (n=5)** |  |  |  |  |  |  |  |  |  |  |  |
| **Darlington et al. (1986)**(18)  **UK**  **Protocol details: Rayman & Callaghan (2008)**(19) | RCT, placebo, single blind. Single group crossover, randomised to  2 groups  Few foods omnivore exclusion diet followed by reintroductions vs usual diet with placebo medication then crossover.  Group 1, 8w total: 2w washout,  1w elimination  5w reintroductions  Group 2, 14w total: 2w washout,  6w placebo,  6w crossover to diet | Community  Compliance: NR | 53 (ARA 1958) 43f/ 10m. Age NR  4 early dropouts = 49 in study  Medication NR | Group 1, Diet- elimination, reintroduction:  25, 20f/5m  Group 2, Placebo then diet: 24, 20f/4m | Pre-elimination: 2-wk washout all medications except paracetamol  1-wk omnivore few foods: cod, salmon, trout, pears, carrots, mineral water, salt. (Reference: Rayman)  (19) | Foods unlikely to be intolerant, allow other foods to be removed from body | 1 to 3 foods each day. More reactive foods, corn, wheat, oats, rye, introduced later and 1 every 2 days. Same food family > 4 days apart to avoid cross reactivity.  ~60 foods over 5 weeks. | RA symptoms  If food caused symptoms it was excluded. | **Clinical** RA activity: pain by day, night, (4-point scale) 24hr VAS-P, DMS, GS, PJC, TW20yd,  **Laboratory:** PLT, C3, ESR, EOS, ANA, RF, Hb, CG, FB  **Other:** BW, Response to treatment, 5-point scale “much better” to “much worse” | **All clinical and laboratory:**  Group 1: Baseline, end week 1 (elimination), week 6 (end reintroduction phase)  Group 2: Placebo phase: Baseline, week 6,  Diet phase: end week 1 (elimination), End week 6 (reintroduction) | No food identified  Follow-up referenced in later articles |
| **Kjeldsen-Kragh et al. (1991)** (22)  **USA** | RCT. Single blind, randomised to 2 groups.  Fast; vegetable broth, followed by reintroductions to GF vegan, then reintroductions to lactovegetarian, vs usual diet  13m total  7-10d: Fast  3.5m: reintroductions to GF vegan  9m: reintroductions to lactovegetarian | 4wk health farm or convalescent home  12m community  Dietitian instruction  Week 1-4 daily food diary, then 24DR  9 times in 13 months  Unscheduled phone calls from dietitian | 53 RA functional class II or III, active disease (ARA 1958).  45f/8 m  Corticosteroid dosage ≤7.5 mg/day. Stable SAARDs or cytostatic meds for ≥ 3m.    Stable codliver oil >6wks | G1, Diet: 27, 24f/3m,  med age 50, (30-63)  RA duration med 6yrs (1-32)  G2, No diet change: 27, 21f/5m,  med age 57 (38-78), RA duration 11yrs (1-31) | 7-10 days Fast 800-1260kJ/d: Herbal teas, vegetable broth  3.5m  **Restricted diet** gluten free Vegan; plus no citrus, sugar, preservatives, salt, alcohol, tea, coffee, strong spices, tomato, cucumber. No reactive foods | Fasting reduces subjective and objective indices of disease activity in most with RA | 1 food every 2 days until restricted GF Vegan.  Vegan 3.5 m, then foods added in same way to lacto-vegetarian diet, 9m | Participant recorded all foods that worsened symptoms.  If reaction, retested >1wk later. Excluded from diet if ↑pain, stiffness after 2x tests. | **Clinical**: VAS-P, DMS, RAI, TJC, PJC, SJC, GS, BW.  **Laboratory:** ESR, PLC, WBC, CRP, Alb,  **Other:** Radiographs of wrist, hand, forefoot  Dietary assessment | **Clinical and Laboratory:** Baseline, 1, 4, 7, 10, and 13m  **24hr DR:** 1, 2.5, 4, 5.5, 7, 8.5, 10, 11.5, 13 m  **Radiographs:** baseline, 13m | No food identified  2year follow-up  Kjeldsen-Kragh 1994 |
| **Kjeldsen-Kragh et al. (1994)**(31)  **2 years status**  **USA** | 2 year follow-up, 1 year from end of Kjeldsen Kragh 1991 trial to compare change from baseline to 2 year status of responders, non-responders and control.  Same physician  Single time point, 1 year post study end | Community  Dietitian interview on extent to which diet maintained. | 45 of 53 from Kjeldsen-Kragh 1991  12 Responders, 33 Non-Responders | G1, Intervention diet: 22  19f/3m  Res (n=10) 9f/1m  Age mean 50 (30-63)  Non-Res (n=12)  10f/2m  Age mean 54(37-63)  G2, Control, usual diet: 23, 20f/3m  Res (n=2) 1f/1m. Age 67 (66-67)  Non-Res (n=21) 19f/ 2m, Age 55 (39-78) | No diet requirements for participants after study end. Participants free to change diet. | N/A | N/A | N/A | **Laboratory:** ESR, PLT, WBC, Alb  **Clinical:** VAS-P, DMS, PtGA compared to time of entering study, (5-point: much better to much worse), HAQ, TJC, SJC, RAI, GS,  **Dietary:** Interview with dietitian of dietary history and identification of foods that exacerbated rheumatic symptoms, and were avoided  **Anthropometrics:** BW, upper arm CIR, triceps skin fold  **Other:** Medication changes | **All measures:** Once at 1 year after study end | Food avoided 1 year post study identified |
| **Van de Laar (1991) Van de Laar & van de Korst (1992)** (13,14)  **Netherlands** | RCT Double blind, randomised to 2 groups.  Artificial food with or without 2 allergens, followed by rechallenge with normal diet  12w total  4w: usual diet  4w: elimination diet  4w: rechallenge | Community  Assigned dietitian. Dietitian instructions.  Un scheduled telephone calls from dietitian | 94 RA (≥6 ARA 1958 criteria) Excluding Functional class 4 Steinbrocker All RF+ve.  Stable DMARDs ≥ 3m. Corticosteroid ≤10 mg/day | 2 diet groups: G1: Artificial food, no allergens  45, 30f/15m, mean (SD) Age 58.6yr, Weight 69.9 (10.4)kg  G2: Artificial food plus 2 allergens  49, 36f/13m, Age 57.7yr, Weight 68.2(10.3)kg | 4w, Artificial food, allergen and additive free, (Pepti 2000, Nutricia) with or without milk allergens and azo dyes. Plus 3 apples, tea, allergen free chewing gum, sugar. Isocaloric  . | Food allergy is implicated in RA. Allergen free food replacement, no additives. Or 2 potential allergens added  Additional food allowed considered low-allergenic | **Re-challenge, both groups,** usual diet all foods  No food challenged individually | Overall changes calculated as an average of percentage change in (MS + TJ + SJ+ RI, +TW + ESR + CRP) and (bilat GS + PGA + VAS-F) | **Clinical:**  DMS, VAS-GA, VAS-F, TJC (77), SJC (74), RI (78), GS, TW30ft,  **Laboratory:** ESR, Hb, PLT, WBC, EOS, CRP, IgM RF  **Other:** BW | **All measures:** baseline, 2 weekly, blind observer. | No food identified |
| **Kavanagh et al. (1995)**(33)  **UK** | RCT, Single blind, randomised to 2 groups  Exclusion diet of elemental food plus few foods followed by reintroductions,  vs normal diet with added elemental food  24w total  4w: elimination  4w: reintroductions  16wk: follow-up | Community  Dietician gave extensive instructions. | 47 RA, (ARA 1958). NSAIDs allowed  Excluded if on corticosteroid and/or DMARDs | G1, interventions diet: 24, 18f/6m, age 42.8+10.5  G2, Control: 23, 19f/4m 42.8+13.7yrs | 4w: Elemental E028 diet replacement plus chicken, fish, rice, carrots, runner beans and bananas | Elemental diet considered hypoallergenic, alone it is poorly tolerated, additional foods added found to be safe in Crohn’s disease study | Single foods at interval of 2 days or longer. Food unlikely to cause intolerance introduced earlier, other foods such as grain and dairy later  Food number NR, to normal diet, over 4 weeks | Worsening of joint pain or stiffness  Exclude food from diet | **Clinical:** thermographic joint score, RAI, GS, functional score, DMS,  **Laboratory:** ESR, CRP  **Other:** BW | **All measures:**  Wk 1-8: Weekly  Wks 8-24 monthly | Food identified  Follow-up included in study 16weeks post reintroduction. |
| **Barnard et al. (2022)**(36)  **USA** | RCT, randomised to 2 groups crossover design, single blind, Vegan diet with added exclusions followed by food reintroductions, vs usual diet with placebo supplement.  36 weeks total:  16w intervention:  4w: no animal foods  3w: further eliminations  9w: reintroductions  Or 16w placebo  4w: washout  16w: crossover | Community  Weekly 1hr, education, support group session | 44 RA Physician’s diagnosis. 44f/0m  Mean age (SD) 57 (+ 9)  Medication stable >6w | G1, Diet intervention first: 22  G2, Placebo first.: 22, Usual diet plus placebo supplement (Alpha-linolenic acid 10mcg, Vit E 10mcg cap)  No breakdown by group | **4w, Pre-exclusion diet**: no animal foods  **3w, Exclusion diet:** Vegan, NO gluten, soy,  potatoes, sweet  potatoes, chocolate, citrus,  nuts, peanuts, onions, corn,  tomatoes, apples, bananas, celery,  peppers, coffee, alcohol, sugar. Limited oils. | Removal of inflammatory elements of an omnivorous diet reduces gut permeability. Hypothesis that a plant based with reduced range of food exposure reduces disease activity | **week 8-16:** 1 food every 2 days. Not required to reintroduce foods not eaten prior to study  Food number NR, over 9 weeks | Pain or other symptoms upon  reintroduction  Eliminated for the remainder of the diet phase.  Next food reintroduced when symptoms returned to baseline | **Clinical:** VAS-PtGA, VAS-PGA, PJC, SJC, TJC, MHAQ, DMS, DAS-28 CRP,  **Laboratory:** ESR, CRP, Lipids,  **Other:** 3 day diet diary  Height, BW,  At end of each phase: 5-point Likert ‘much worse’ to ‘much better’ or 2nd phase Patients global impression of change (PGIC) 1-7 ‘no change’ to ‘a great deal better’ | **All measures:**  Beginning, midpoint, and end of 16 week phases. | No food identified  Follow-up NR |
| **Hulander et al. (2024)**(37,39)  **Sweden** | RCT, randomised controlled crossover, assigned to three different isocaloric protein meals.  Aim: examine postprandial inflammatory and metabolic response to isocaloric meals based on differ­ent sources of protein.  Overnight fast, single meal.  1w washout between meal challenges | Sahlgrenska University Hospital  Meals supplied | 25 RA, Females, ≥ 2 years disease duration, (ICD-code M05.9 or M05.8), 20-70y, median age 60 (BMI) 18.5–30.0, mean 24.8 kg/m2.  Most were in remission, mean DAS28 2.5  Not on medication that decreased Il-6 or blood lipids  No allergies or food intolerance | 25 total in 3 groups, of 6, 10, 9, allocated to one of 3 meals, crossover to second then third meal. Each group consumed all 3 meals in different order | **Overnight fast** | Single meals given in fasted state, pre and post prandial measures | Single isocaloric hamburger meals, with similar macronutrient composition, each with 700 kcal, with either soy, salmon or meat (60% beef, 40% pork) | Single meals, IL-6 evaluation of inflammation before and post prandially, between meal comparison | Laboratory: CRP, Hb, HbA1C, ESR  Serum metabolites  Clinical: DAS28  Dietary index (1-12) for diet quality  **Clinical:** IL-6, triglycerides, and VLDL lipid fractions | **Laboratory measures:**  IL-6, triglycerides, and VLDL lipid fractions Before meal, and30 min, 1, 2, 3, and 5 h after. | No food identified  No follow-up |
| **Non RCT, 2 arms** |  |  |  |  |  |  |  |  |  |  |  |
| **Karatay et al (2004, 2006)**(34,35)  **Turkey** | Two RA arms, uncontrolled, blind examiner  Exclusion diet followed by food challenge with all foods defined by positive skin prick tests, vs exclusion diet followed by food challenge with two foods.  36 days total:  12d: exclusion common allergens.  12d: food challenge  12d: re-elimination | Inpatient monitored | 40 RA (ACR 1987) class I-II, none clinically active.  All on DMARDs  No NSAIDs, antihistamines or glucocorticoids <1 month before the skin prick test | 2 groups:  G1, skin prick test +ve (SPTP): 20  16f,2m  Age 46.1 + 8.7  RA duration 54 (24-240)m  G2, skin prick test -ve (SPTN): 20  16f,1m  Age 48.4 + 10.2  RA duration 48 (24-240)m | **12d, Excludes** common allergens: dairy, eggs, meat, fish, sugar, wheat, corn, rice, nuts, citrus, tomato, coffee  **Includes** cooked veg, legumes, fruit compote, rye bread in limited amount. | Restrict most common allergen foods, except rye a daily staple food in Turkey | **Challenge:** Day 13 - 24  G1, SPTP: all individual +ve SPT foods daily in increasing amounts  Food number NR  G2, SPTN: corn and rice daily, in increasing amounts (corn considered allergenic, rice not) | All measures at day 12 (end of elimination phase) compared to day 24 (end of challenge phase) | **Clinical measures:** Stiffness - DMS, VAS-P, TJC, SJC, HAQ, RAI, PGA, PtGA assessment of disease activity (0-5)  **Laboratory:** serum TNF-α, IL-1β, ESR, CRP, SAA | **All measures:** end of elimination (labelled baseline), end of challenge, end of re-elimination. | No food identified  Skin prick positive foods listed, foods not individually challenged. |
| **Little et al. (1983)** (7)  **Australia** | Two arms, RA vs HC, un-blinded.  Food challenges with confirmed reactive foods, platelet serotonin release response in RA compared to response in healthy controls  1 day total: Overnight fast  8.30am: food challenge + 6 hours observation | Hospital clinic  Monitored | 14 total  7 RA, with positive reactions to foods measured by JD, GS, J Pain and stiffness  No medication for 7 days before testing  7 healthy control | RA group: 7 7f, 32-51years  mild to moderate severity, 6 RF +ve, RA duration 1.5 –15 years.  HC group: 7, 4m, 3f 22-25yrs, no Hx of food reactions | Overnight fast.  Assumed avoidance of reactive foods, not clear | N/A | RA group: Challenged one food each person: Egg 200g n=3, wheat 45g n=2, potato 250g n=1, beef 300g n=1, at 8.30 am  HC: Same food challenge | All clinical and laboratory measures over 6 hours compared to pre-challenge baseline | **Laboratory**: Serum Serotonin (5HT) and 5 hydroxyindolaecetic acid (5-HIAA)  **Clinical**: JD, GS, Pain and stiffness in affected joint, peripheral cyanosis | **All measures:** Baseline and every 30 min for 6 hours after food challenge. | One food each person confirmed and identified |
| **Lindqvist et al. (2023)** (38)  **Sweden** | Two arms, RA and HC, un-blinded, parallel single meal  Aim: compare the postprandial  metabolic response to a red meat meal in RA and a matched control group.  1 day total: overnight fast  Food challenge + 5 hours post prandial testing | Sahlgrenska University Hospital  Meals supplied  Monitored | 22 women RA ≥ 2 yrs duration, (ICD-code M05.9 or M05.8), 20-70y, median age 60 (46-71) BMI 18.5–31.0, mean 24.8.  Median DAS28 2.5  No medication that decreased Il-6 or blood lipids  No allergies or food intolerance  28 HC Women, 22 matched for comparison data | RA group: 22 F median age 66 (IQR 59,69)  DAS28 2.54 (IQR 1.94,3.45)  HC group: 22 matched from 28 participants | **Overnight fast** | Single meal given in fasted state, pre and post prandial measures | Hamburger meal: 130g mince (60% beef, 40% pork)  25 g egg,  84 g (2 slices) toasted white  bread, lettuce,  cucumber, tomato slices  20 g dressing | Serum metabolite changes compared before and after a red meat meal, RA and HC compared | Laboratory: CRP, Hb, HbA1C, ESR  Serum metabolites  Clinical: VAS-P, VAS-F, TJ(23), SJ(28), DAS28, VAS-GH,  Dietary index (1-12) for diet quality | **Laboratory measures:** Serum metabolites quantified by Nuclear Magnetic Resonance (NMR) analysis.Before meal, and30 min, 1, 2, 3, and 5 h after. | No food identified  No follow-up |
| **3 arm** |  |  |  |  |  |  |  |  |  |  |  |
| **Darlington et al. (1989)**(21)  **UK**  **Conference abstract** | RA, Randomisation NR, 3 groups Blind observer.  Single- and double-blind, and placebo food challenges with confirmed symptomatic foods.  Pre-study elimination and reintroductions, time NR  3 weeks total study  Week 1-3: 1 food challenged per person each week | Assessed in hospital rheumatology unit  Foods provided | 15 RA patients. Positive for symptomatic foods  Age, gender NR  Medication NR | 3 groups, 5 in each:  G1: Single blind challenge  G2: Double blind challenge  G3: Double blind, placebo challenge  Age: NR  Gender: NR | Pre-study: 1 week elimination diet of fish, pears, carrots, mineral wate. followed by food reintroductions to find foods that provoked symptoms.  Foods provoking symptoms excluded. Other foods eaten freely | NR | 3 symptomatic foods selected for each person. 1 food each week challenged  **G1:** single blind, 1 food given daily, a week each food.  **G2:** double blind: lentil soup laced with symptomatic food part of week, lentil soup only for other part of week  **G3:** double blind: lentil soup nothing added, i.e. placebo | Change in clinical measures | **Serological assessments:** food antibodies and food Ig complexes. Hb  **Clinical**: day, night 24hr pain, painful joints, DMS, WT | NR | Foods not identified  Follow-up 3 monthly with symptomatic food excluded from diet. |
| **Single intervention arm, other participants for blood tests only** |  |  |  |  |  |  |  |  |  |  |  |
| **Kjeldsen-Kragh et al. (1995)**(26)  **USA** | RA arm from Kjeldsen Kragh et al. (1991)(22) vs HC  Serum antibodies measured against dietary antigens, levels in RA compared to HC, and disease activity in RA.  13m total  RA group: diet Kjeldsen-Kragh 1991  HC group: no diet change | Same as Kjeldsen-Kragh 1991 | Total participants: 57  RA arm of Kjeldsen-Kragh 1991  27, (ARA 1958) 24f/3m,  RA duration med 6yrs (1-32)  Healthy control: 30  26f, 4m. Age 47.1 ± 11.9  No Hx of allergy. | G1, RA intervention diet group: 27  24f/3m,  Age 51.4 ± 10.1  G2, HC, no diet change: 30, 26f/4m.. Age 47.1 ± 11.9 | Same as Kjeldsen-Kragh 1991 | Same as Kjeldsen-Kragh 1991 | Same as Kjeldsen-Kragh 1991 | Any reactions to foods recorded in a diary with a description of adverse reaction | **Laboratory:** Serum IgA, IgG, IgM antibody activity against food antigens from dairy, eggs, beef, soy, wheat, oats  Serum IgE RAST to cows milk, α-lactalbumin, β-lactoglobulin, wheat, rye, barley, oats, gluten, soy, crab, shrimp.  **Clinical:** Disease activity graded with modified Stoke disease activity index | **All measures:** Baseline, 1, 4, 7, 10, 13 m | No food identified |
| **Carini et al. (1984)** (16)  **London** | Single arm, arthritis plus allergy, subgroup with RA,  Exclusion diet, omnivore few foods, reintroductions, unblinded and blinded challenges  Comparator groups to compare anti-globulin IgG anti IgE levels, no diet intervention  6w+ total  5d: elimination  Time NR: reintroductions  Follow-up 1-4yrs | Setting NR  Compliance NR | 24 total intervention group. Joint and allergy symptoms.  16f/8m, mean age 46 (19-70)  Joint symptom duration mean 6 (1-20) yrs  4/27 with RA (ARA criteria),  Comparators for blood tests only:  52 RA, no allergy  45 Allergy, no joint  30 healthy  Medication NR | **G1, diet intervention: total 24.**  **Subgroup, RA: 4/24**  2f/2m, ages 47-54 grade 3 severity, 3 RF +ve  **Comparator:** 127, 3 groups - Antiglobulin IgG anti IgE blood test  G2, RA: 52 42f/10m, mean age 45(8-72)  G3, Atopy: 45, 29f.16m, mean age 43 (17-67), skin test +ve to allergens  G3, HC: 30, 20f/10m, mean age 28 | 5d, Elimination diet: Lamb, cauliflower, pears, and spring-water | Ref Brostoff p825, few foods diet | Sequential food reintroduction, > 2 days apart  Blind food challenges in 7, allergen in a capsule or disguised (not known if these included RA)  12 given pre-treatment with 500mg sodium cromoglycate (SCG) or placebo and food challenged, double blind  Food number NR  Time frame NR | Monitored by symptom diary,clinical - ability to take a step, raise arms above head, degree of pain. Graded in terms of disability before and after each diagnostic challenge episode  Time to symptoms appearing recorded | **Laboratory tests:** Antiglobulin IgG anti IgE, Total IgE,  RA latex test.  RAST for food antibodies to egg, milk, rice, chocolate, nuts, cheese, fish, wheat.  **Clinical:** Severity grades 0- 3, Grade 1 mild symptoms not unduly affecting activity, grade 2 able to work and carry out household activity, grade 3 severely disabled and unable to work | **Baseline:** RAST and laboratory tests  **Clinical assessment:** baseline and after diet  **Comparator groups:** Antiglobulin IgG anti IgE blood test | Foods identified  Follow-up 1-4years |
| **Carini et al. (1987)** (17)  **Italy** | Single arm, RA plus allergy. elimination diet, omnivore few foods with single- and double-blind food challenges  Comparator groups to compare anti-globulin IgG anti IgE levels, no diet intervention  Approx. 4 weeks+  6d: elimination  Time NR: reintroductions  Follow up 1-4yrs | Outpatient and outpatient department under medical supervision  “Every effort made to ensure patients complied with study instructions” | 10 RA with Hx food allergy, atopy. 8f/2m. Mean age 46.7 (range 19-70)  RA symptoms 1-20yrs mean 5yrs  Medication NR  Comparator groups for blood tests only:  10 RA no food allergy  10 traumatic arthralgia  10 osteoarthritis  10 healthy | G1, RA: 10, 8f/2m. Mean age 46.7 (range 19-70)  RA symptoms mean 5yrs, (1-20). 4 grade 3,  5 grade 2, one grade 1.  1 RF +ve, 3 weak RF +ve  Comparator groups for blood tests only:  G2, RA no allergy or atopy: 10  G3, traumatic arthralgia: 10  G3, osteoarthritis: 10  G4 healthy: 10  Age, gender NR | **Pre-study Stage 1:** Reactive foods found using an elimination reintroduction diet  Skin prick and intradermal tests  **6d, Stage 2, Elimination diet** 6 days; mineral water, cod, pears. | Fast unacceptable. Standardised hypoallergenic diet. Foods on a statistical basis unlikely to be intolerant | **Food challenge:** one food at a time for 5 days trial.  Normal meal portion Foods: egg, milk, milk products, all grains and cereals, meats, pips, nuts.  **Stage 3: Double blind challenges** of identified foods on at least 3 occasions; lyophilised foods or placebo in opaque capsules, 12 hr observation in clinic, symptom diary 72hrs, 0-3 scale  **Food number challenged: 7 groups, Time NR** | Inpatient 12 hour observation period, symptoms charted. Patient diary next 72 hours  If food provoked symptoms excluded  Antiglobulin IgG anti-IgE serum in 6 food allergic participants previously selected for high values of IgG anti-IgE in sera. 1, 3, 24 hours after food challenge. | **Food sensitivity tests:** IgE RAST and PRIST to food antibodies: egg, rice, chocolate, nuts, cheese, fish, milk, cereals  SPT  **Serum and synovial fluid:** Presence of  Antiglobulin IgG anti-IgE activity.  **Clinical assessment – rheumatological:** joint pain, no of involved joints, swelling of involved joints, symmetry of involved joints, continuous or come and go, pain grade 0=none, 1=low grade, 2= pain, stiffness swelling, 3= disability to work with pain, swelling and stiffness.  **Laboratory:** CBC, differential counts, joint scan, RF latex, ANA, C3, C4, CIC, ESR, EOS, immunoglobulins IgA, IgM, IgG | **Single assay all:**  Antiglobulin IgG anti-IgE activity in serum and synovial fluid.  Serum Antiglobulin IgG anti-IgE activity in 6 patients: 1, 3, 24 post challenge    **Baseline**: All lab tests and allergy tests | Foods identified  Follow-up 12m-4yrs, |
| **Single arm** |  |  |  |  |  |  |  |  |  |  |  |
| **Beri et al (1988)** (10)  **India** | Single arm, unblinded.  Exclusion diet, few foods vegan, followed by single food group reintroductions  Time: approx. 10 weeks+  2w: washout  2w: elimination  2w x 5: reintroductions  Follow-up 10 months | Setting NR  Compliance NR | 27 RA, (definite, ARA 1958)  gender NR, Age NR,  None had Hx of DMARDs use | RA Entered study: 27  Completed diet 1, continued to reintroductions: 14  13 dropped out early during elimination diet | **Pre-study**: 2 week washout of NSAIDs  **2w, Elimination diet** (diet #1): Isocaloric, fruit, vegetables, sugar, refined oil. | Study description: “washout” of most foods | A food group added each 2 weeks.  **Diets #2:** All pulses added to diet 1  **Diet #3a:** wheat plus diet 1.  **Diet #3b:** rice plus diet 1  **Diet #4:** milk products added  **Diet #5:** animal food added (eggs, meat, fish, chicken)  **5 food groups, 2 w each addition** | All laboratory and clinical assessments after 2 weeks consuming new food group.  If reaction return to diet 1  Reactive foods excluded from diet. | **Clinical:** DMS (graded 1=15m,2= 15m-1hr, 3= 1-2.5hr, 4>2.5hr) JPS (joint pain score Deodhar), RAI, PtGA(graded 1, much better to 5 much worse),  **Laboratory:** Hb, ESR, WBC  Other Lab:, Latex fixation titre  **Other:** BW | **Laboratory and clinical:** admission, end of washout. End of elimination, and after 2 weeks of each reintroduction  Baseline: Latex fixation titre | Foods identified  Follow-up 3 monthly |
| **Hicklin et al. (1980)**(1)  **UK**  **Diet protocol assumed to be co-authors: McEwen & Morgan (1982)** (2) | Single arm, unblinded  Allergy exclusion diet followed by  food reintroductions  Time NR | Setting NR  Compliance NR | 22 RA, 15 seropositive  Age NR  Gender NR  Medication NR | RA total: 22 | **Length,** until improvement: Allergy exclusion diet (Sago, lamb, green vegetables, carrots, dairy free margarine, water, and rhubarb) | Allergy exclusion. Eliminate all foods likely to cause allergy  Reference for protocol assumed to be McEwen Morgan | Each food group eaten daily for a week.  (Protocol reference McEwen).  **Food number NR**  **Time NR** | Participant-assessed exacerbation of arthritis symptoms | Specific measures NR | Assessment times NR | Foods identified  Followup NR |
| **Stroud et al. (1980, 1983)** (3,4)  **USA** | Single arm  Unblinded  Environmentally controlled unit.  Water fast followed by single food reintroductions.  Time NR  4-9d: Fast  Time NR: reintroductions | 3 centres  Environmentally controlled units, inpatient.  Food provided | 45 RA (ARA criteria)  2 withdrew at start = 43  All medication discontinued in study except 3/43 on corticosteroids 5-7.5mg | RA Fast only: 43  30f/13m, mean age 46.2yrs  Functional class 1, n=2  Class II, n=29  Class III, n=11  RA Food challenge group: 35/43 | Fast, 4-9 days, mean 6.6 days Spring and distilled water. Water enemas and mineral laxatives. NaCl and KCl if required. Until state of maximum improvement (baseline) | Environment free of chemicals ref: Randolph.  Complete removal of food from bowel by fasting and enemas. | Single sequential food meals, 2-4 meals per day, maximum of 6 consecutive meals  Organic food challenges followed by same foods commercial version with additives (subgroup of 24 – see Marshall 1984)  New foods challenged when person at baseline  Food number ~64 foods  961 food challenges in 35, 27.5 foods tested pp | Physician observed reaction to foods: Graded from 0= no reaction to  4+ = fast onset and more severe reaction.  GS, DPI of all hand & wrist joints, ArC of PIP ½ hour before and after meals  Any non-joint symptoms: skin, headaches, GI etc.  If reaction safe food or fast until baseline. Laxatives if needed | **Clinical:** FAI, DPI all hand and wrist joints, ArC of PIP, TJS, SJS,  **Laboratory:** ESR, 9 had immune complex determinations.  Comparison of measures post reactive food and non-reactive foods by student T-test | **All measures:** Admission, end of fast and discharge  **Before and after food reactions:** GS, DPI, ArC of PIP | Foods identified  Followup NR |
| **Marshall et al. (1984)**(6) **(subgroup 27 participants from Stroud 1983**  **USA** | Single arm  Unblinded  Water fast, followed by organic then commercial food reintroductions, in environmentally controlled unit.  Time NR  7d: Fast  Time NR: reintroductions | Single centre, environmentally controlled unit, inpatient.  Food provided | 27 RA (definite or classical ARA criteria)  Age, gender NR  (Sub-group of Stroud 1983)  No medications except 3/27 on maintenance corticosteroids | RA, fast followed by food reintroductions: 27  Commercial food challenges, non-organic with additives: 24/27 | 7 days, Distilled water Fast | Environment free of chemicals ref: Randolph.  Complete removal of food from bowel by fasting and enemas. | Single sequential meal sized portion of food, 3 meals per day. Max 6 consecutive meals.  Commercial food challenges Same foods containing additives; monosodium glutamate, butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT), pesticide traces  Food number ~64 foods | Subjective symptoms all types, joint and non joint. Severity rated by staff  1: no reaction to 5: severe, rapid onset, lasting 24hrs or more  Staff measured: GS, DPI hand and wrist joints, ArC of PIP, before each meal and after food reactions | **Clinical:** GS, DPI hand and wrist joints, ArC of PIP,  Physician graded indices of joint pain and swelling  **Laboratory:** ESR  Other FAI,  Comparison of mean measures post reactive food and non-reactive foods by student T-test | **All measures:** Before and after fast, at discharge  **Before food and after food reactions:** GS, DPI, ArC of PIP | Foods identified Weighted food reaction index for the group; number of reactions x severity of reaction.  Followup: 1 person as case study. |
| **Lunardi et al (1987)**(8)  **Italy**  **Diet protocol Pachor et al. (1986)**(9) | Single arm, uncontrolled, inflammatory arthritis and food intolerance, subgroup with RA. Trial of elimination diets Subgroup had food challenges.  Blinding NR  Results reported by group  Total time NR  >4weeks.  2-4w each elimination diet:  up to 4 diet variations  Time NR: 41% food challenges | Setting NR  Compliance NR | 31 total, diagnosed with food intolerance (FI) plus articular tumification  17/31 with RA (rheumatological dept referred, diagnosis of RA)  27f/4m, mean age 35.5 (24-45),  RA serum positive: 9  RA serum negative: 8  Medication NR | Arthritis total, same diet intervention: 31  RA subgroup: 17/31  Results by group.  3 groups:  G1, food intolerance and articular tumefaction: 14  G2, RA serum +ve plus FI: 9  G3, RA serum -ve and inflammatory connective tissue disease plus FI: 8  RA groups Gender NR, age NR | 2w **Baseline:** Unrestricted diet,  2-4 weeks, one or more diets:  4 variations (Pachor)  Diet 1: water, tea, sugar, bread, pasta, cornflakes, beef, lamb, vegetables, potatoes, banana, pineapple, salt, maize oil.  Diet 2: lamb, tea, turkey, sugar, water, vegetables, potato and salt  Diet 3: no cereals,  Diet 4: no acetylsalicylic acid | Pachor, diet 2 based on McEwen (exclusion diet for RA)  Hypoallergic diet, exclude foods most frequently responsible for FI and FA | n=13 had food challenges: one food group for first 3 days of week, wait until the next week for next food challenge  Food excluded from diet if symptoms  15 food groups tested  (ref: Pachor) | Food challenge: patient recorded daily symptoms in diary, scale 0-4 for severity of symptoms.  Mean values of daily symptom scores were calculated for each day | **Laboratory:** Immunoglobulin assay, total IgE assay, RAST for foods, SPT Rheumatic tests; Waaler Rose, Rheuma  **Clinical:** participant daily symptom diary, 0-4 score for severity of symptoms, daily mean value calculated  **Other:** BW | **Laboratory:** Baseline and end of study  Student T test for paired data before and after diets.  Symptom diary: during 2 week baseline, and throughout study | One person’s reactive food identified  Long term NR |
| **Darlington & Ramsey (1987, 1993)**  (20,52)  **UK**  **Conf Abstract also in 1993 review.** | Single arm, uncontrolled. Blinding NR Elimination diet and  food reintroductions to identify foods affecting RA symptoms  Total time 6w: Elimination, reintroductions as per 1986 protocol | Setting NR  Compliance NR | 48 RA patients  Gender NR  Age NR  Medication NR | RA  All same intervention: 48 | Elimination diet as per 1986 protocol | NR | Food reintroductions over 6 weeks to identify foods most often intolerant to  **Food number NR** | Producing symptoms (no other details) | NR | NR | Foods identified.  Responder numbers for each food  Followup NR |
| **van de Laar et al. (1992)**(15)  **van de Laar (1991)** (13)  **(paper and thesis)**  **Netherlands** | Single arm, double blind.  Identification of suspect foods followed by allergen free artificial food diet and  double blind,  placebo controlled food challenges. Histological studies of synovial and intestinal tissue biopsies.  Exact time NR: 4 months+  Elimination until remission  ~4m: food challenges | Inpatient/ not clear  All foods administered | 6 RA ( ≥6 ARA criteria 1958) RF +ve, previous symptomatic improvement on hypoallergenic artificial diet  Disease onset >16yrs.  Stable DMARDs ≥ 3m. Corticosteroid ≤10 mg/day | RA, Elimination diet: 6  Clinical remission, continued to food challenges: 4/6  f65, m52, f79, f70 | Until clinical remission: Artificial food (Pepti 2000, Nutricia) plus rice (peeled), 3 apples, lamb, sunflower seed and oil, broccoli, cabbage, gelatin, tea, allergen free chewing gum, beet sugar, lettuce, continued during food challenges. | Allergen free food replacement, elementary, low molecular, no additives. Addition foods allowed considered allergen restricted. | **Challenges:** 3 x per week double blind food challenge with suspect foods or placebo, disguised in allergen free carrier: Pepti 2000, plus caramel\dextrin maltose, beet sugar, rice flour, boiled rice. Each food tested twice  Food tested All participants: Potato, fruits, (apple orange, banana) egg, fish, milk, legumes, wheat, pork, plus specific suspected foods in 2 – sesame oil, coriander, cardamom. | Disease activity scored after each challenge  If disease activity increased, next challenge delayed until it returned to normal | **Prior to study tests to find suspect foods:** total serum IgE and %age of binding for specific food antibodies of IgE, IgG1 and IgG4 classes RAST. SPT for food, contact, and inhalant allergens. Food and symptom diary for 4 weeks.  **Clinical Measures:** DMS, VAS-F, VAS-GA, TJC (77), SJC (74) RAI (78) GS, WT100ft, Thompson joint score  **Laboratory:** ESR, CRP,  **Histological studies :**  Biopsies of synovial membrane large joint and proximal small intestine, mast cell infiltration, In synovium - Plasma cell IgG, IgM, IgE, macroscopy, microscopy. Intestine, lymphocytes, mast cells, villus/crypt ratio | **Clinical and laboratory:** Bi- weekly disease activity parameters same observer  Disease activity scored before and after each challenge assessed by a change of point test  **Histological studies:**  During active disease – start of study, and after 6w during remission if it occurred, in 3/4 | Foods Identified  Follow-up 8 months + |
| **Felder et al. (1987)**(12)  **Switzerland** | Single arm Unblinded  Food challenges with single foods claimed to cause reaction,  followed by clinical and laboratory observations.  5 days total:  Day 1-3: baseline observations, elimination NR  Day 3: single food challenge  36h: observation | Food given in hospital, monitored for 24 hours post challenge  2 inpatient  4 outpatient | 6 RA (ARA criteria) who claimed a specific food affected RA  Age NR  Gender NR  Medication NR | RA intervention: 6 | **Day 1-3 observation hospital or outpatient**  **Elimination:** Not recorded, participants assumed to exclude test foods. | NR | **Challenge:** day 3, 1 food per person that they claimed intolerance to,  2 inpatients: 300g cold pork at breakfast, no more food for 6 hours  Outpatients challenge: 1)honey, 2)grapefruit, 3)orange, 4)bread | **Day 3:** food challenge and Assessments:  **Lab tests:** Before and post food challenge 30', 60', 90', 4h, 6h, 24h. platelets, immune complexes, C3, C4, immunoglobulins,  **Before, and 4,6,24hrs after challenge:** GS, RAI, CircPIP, Body Temperature.  **Before and 2 hrly post challenge during day**: VAS-P  **24hrs after challenge:** Change in blood flow in synovial tissue; technetium- scintigramme, lymphocyte transformation test | **Day 1**  RBC, WBC, PLT, lymphocyte transformation test, immune complexes, granulocyte  phagocytosis  test, immunoglobulins, C3, C4, technetium-scintigramme,  **Day 2:** RAI, SPT with suspect food | Physician observation and testing for 36 hours  **Day 1:** Clinical and Laboratory tests  **Day 2**: RAI, skin test with suspect food  **Day 3**: Pre and post challenge observation and testing | Specific named foods challenged. Not confirmed as being reactive  No follow-up |
| **Ratner et al. (1985)**(11)  **Israel**  **Preliminary or short communication** | Single arm Unblinded, Inflammatory polyarthritis, subgroup with RA  Single food (dairy) elimination, dairy challenge in responders  Individual results.  ≥ 1 year  3-4m: elimination  3m time point: single food group challenge  6m timepoint: single food group challenge | Community  Compliance NR | 23 inflammatory polyarthritis  19/23 RA, 14f/5m,  19 – 63 years  12 RF-ve, 7 RF +ve  4/23 Psoriatic, 1f/3m  35-60yrs  None pain free in previous 3 years.  NSAIDs and intermittent steroids allowed. | Total with inflammatory polyarthritis, intervention: 23  Subgroup with RA:19/23  14f/5m,  19 – 63 years  12 RF-ve, 7 RF +ve | Dairy and beef free diet, 3 months +3-4 weeks | Dairy, plus beef removed to avoid cross reactions between β-lactoglobulin and β-globulin | **Food challenge:** In RA responders to elimination; 6/19, dairy challenge at 3 months for (7/23 of total group)  Repeat challenge at 6 months for 3/6 RA responders | Changes in joint swelling, pain, and anti-inflammatory medication | Medication changes  Pain, swelling.  Reduction in pain and swelling,  > 50% change in medication = favourable response  **Assessments**: Baseline Lactose tolerance tests.  ELISA for milk antibodies (time not specified, possible baseline) | **All measures:** Baseline  Assessment frequency NR | Followed for 1 year |
| **Abbreviations:** 24DR, 24-hour dietary recalls; Alb, Albumin; ACR 1987, American College of Rheumatology diagnostic criteria for RA 1987; ANA, Anti-nuclear Antibody; ARA 1958, American Rheumatism Association diagnostic criteria for RA 1958; ArC of PIP, Arthrocircameter proximal interphalangeal joint circumference; BW, Body weight; C3, complement component 3; C4, complement component 4; CG, cryoglobulins; CIC, Circulating Immune Complexes; CIR, circumference; CircPIP, Circumference of proximal interphalangeal; CRP, C-reactive protein; DAS28, Disease activity score 28; DMARD, Disease modifying anti-rheumatic drug; DMS, Duration of Morning stiffness; DPI, dolorimeter pain index; EOS, eosinophil count; ELISA, enzyme linked immunosorbent assay; ESR, Erythrocyte sedimentation rate; FAI, functional activity index; FB, Fibrinogen; FI, food intolerance; G, Group; GI, gastrointestinal; GS, grip strength; HAQ, Stanford health assessment questionnaire; Ig, Immunoglobulin; IgA, Immunoglobulin A; IgE, Immunoglobulin E; IgG, Immunoglobulin G; IgM, Immunoglobulin M; IL-1β, Interleukin-1β; JD, Joint diameter; JS, Joint swelling; HC, Healthy control; Hx, History; Non-Res, Non responders; NR, No record; NSAID, Nonsteroidal anti-inflammatory drug; MHAQ, Modified Health Assessment Questionnaire; PGA, Physician global assessment; PtGA, patient global assessment; PJC, Painful joint count; PLT, platelet count, thrombocytes; PRIST, paper radioimmunosorbent test; RA, Rheumatoid arthritis; R(A)I, Ritchie (articular) index; RAST, Radioallergosorbent test; RCT, Randomised control trial; Res, Responders; RF, Rheumatoid factor; SAA, serum amyloid A protein; SAARD, slow acting anti rheumatic drugs; SJC, Swollen joint count; SJ, Swollen joints; SJS, Swollen joint score; SPT, Skin prick tests; TNF-α, Tumour Necrosis Factor alpha; TJ, Tender joints; TJC, Tender joint count; TJS, Tenderness joint score; TW, Timed walk test; VAS, visual analogue scale; VAS-F, Visual Analogue Scale-Fatigue; VAS-P, Visual Analogue Scale-Pain.; VAS-GA, Visual Analogue Scale-Global assessment; VAS-GH, VAS-Global Health, VAS-PGA, VAS-Physician global Assessment; VAS-PtGA, VAS-Patient global assessment; WBC, Leukocyte/white blood cell count; WT, Walk time | | | | | | | | | | | |

**Table S4, Case study characteristics with results of foods reported to affecting individuals with RA**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Study**  **Author, year, country** | **Cases study design:**  **Elimination, challenge measures** | **Case study participant** | **Response to elimination** | **Response to food challenge** | **Foods implicated** | **Reported long term outcome of food exclusions** |
| 1**. Zeller (1949)**(40)  USA | Elimination diet basic foods. ‘Ingestion tests’ 1 food at a time, introduced every 2 days. (Rinkel)  Leucocyte count (LC) for 40 minutes. Joint – JS, JP and non-joint symptoms. ESR | 1) Female, 39,  9 years  Hands, wrists, shoulders, knees | Relief of joint symptoms | Onset of fatigue, JP, JS, from 1 hour.  Milk:D,N,H, LC: 7400 →5400 cells.  Choc, banana H  Scratch intradermal -ve | Milk, Beef, banana, fish, nuts | Relief of joint symptoms, remains symptom free. ESR 20 → 8mm/h |
| 2) Male, 67, 25 years  Hands, knees, ankles | Not recorded | LC decreased post milk, wheat, eggs  JS, JP, Ft 4-6hrs, Max intensity 16hrs, lasted several days | wheat, eggs, fish, tomatoes, pork, whiskey, beer | Symptoms decreased 80% in 3 months. 2 years some deformity and ankyloses decreased. ESR 80 → 38mm/hr (May 1946 to March 1948) |
| 3) Female 41,  6 years  Wrists, hands, fingers | Not recorded | Pork borborygmi, nasal congestion 40-60min.  Milk, cough, F, PJ, 45min, D. Subsided 36hrs  Other foods – JP, JS, Ft, Nasal, GI 3hours, for 24-36 hours (repeated challenges same result) | Lettuce, white potatoes, string beans, milk, pork | ESR normal, no change  Other symptoms – remarkable improvement |
| 4) Female, white, 42  20 years  Hands, knees, wrists, shoulders | Reacted compatibly | Milk LC: 5900 → 3900 cells in 40min  Wheat LC: 7200 → 4200 cells.  Beef: JS, JP, Ft, after 4-5 hrs, persisting 36hrs | Beef - joints  Milk, eggs, wheat, allergic symptoms, | Deformity of hands that appeared irreversible has disappeared, and barely noticeable |
| 2  [**Parke & Hughes (1981**](#_ENREF_32)**)** (41)  UK, Hammersmith Hospital | Dairy free diet – eliminated milk, cheese, butter  Dairy food challenge 10 months, in patient  RAI, GS, DMS, ring size, VAS-P, CIC, ESR | Female, 38  11 years history progressive Erosive seronegative RA. | 3 w ↓synovitis, ↓ DMS, ↓ RAI, ↓VAS-P, ↓ ESR  Circulating immune complexes disappeared | 24hours ↑ synovitis, ↑ RAI, ↑DMS, ↑ring size 5mm, ↑WBC, +ve RAST to dairy IgE antibodies during challenge, peaking at 12 days post challenge, heat-damaged red cell clearance rates impaired. ↑CIC Clq | Dairy: Milk, cheese, butter | Prolonged improvement in previously unresponsive RA  Able to discontinue prednisone |
| 3  **Williams (1981)**(42)  London, UK  Letter, case report | Exclusion diet, not specified, elimination of corn and maize starch, including starch filler in medications. Symptoms, ESR, Chest Xray | Female, Active RA for 25yrs, pulmonary involvement | “Dramatic improvement” after 1 week of exclusion diet. | 6 w. Accidental challenge caused RA flare “arthritis flared badly” | Maize / corn starch | 3 monthly checks  ESR fell steadily from 75 to 31. Off all medication. Joints improved. Put on weight. Chest x-rays clear, lung function returned to ‘normal’ Looking and feeling better than for 20 years |
| **4**  **O’Banion**  **(1982)**(43)  North Texas State University USA | Phase 1  Diary 13-35 days; food, drink, symptoms, hourly pulse rate. Hourly pain, plus sleep scale 1-10,  Phase 2 Water plus rotary diet; fresh meats, vegetables and fruit, one food per meal, 3 foods/day, 4 day rotation. Same biological family foods separated by 48hours. If reactive - food eliminated. Retested if uncertain.  Diary: Pulse rate, pain, sleep 1-10 scale  Phase 3, after 3 consecutive pain free days, resume and test normal diet | 1) F21, RA 7 yrs,  Back, shoulders, hands, knees  Hx food and chemical sensitivities. Epilepsy | Pain free 19 days into elimination. Daily pulse rate decreased, sleep improved | 1 meal of pre study diet caused recurrence of pain. Pain lasted 7-10 days, pain free on non-reactive diet again in 11 days.  Specific foods caused pain in a short time, becoming severe. | Peanuts, beef, pork (commercial and organic), oranges, dairy products, poultry, wheat, honey, cane sugar, potatoes, coffee, corn, barley, pecans. | Remained pain-free for 1.5 years on rigid diet. Able to tolerate some previously reactive foods if eaten on rotatory basis. |
| 2) F18, RA 10yrs, Joint pain plus headache, allergies, sinus, swelling, moodiness | First symptom free day, 9 days  No change in pulse rate | Pre study diet challenge, pain increased to baseline in a few days  Specific foods caused brief increase in pain. | Wheat, beef, pork, cane sugar, milk, corn and a few other foods | Sleep and mood improved, sinus and allergic symptoms stopped. Arthritis pain reduced |
| 3) F36  Joint pain plus headaches, bowel disturbance, sinus, sleepiness, overweight | Decreased pain in elimination and testing phase  Average pulse 74.2 → 65.1 | Some foods consistently increased pulse by 10 – 20 beats/min which also concomitant to physical and emotional responses | Wheat, corn, tomatoes, cane sugar, milk products, eggs, apples, beef, lettuce, peanuts, cantaloupe, peas | Returned to normal diet and pain increased day 64- 100. No data after this. |
| **5.**  **Marshall et al. (1984)**(6)  Case study included in group study | Fast, 5 days, withdrawal of medications.  Controlled environment. Organic food challenges, single meals, 3 per day  then challenged with commercial version of same foods, non-reactive in organic form  Commercial food contained additives | M61, 5months. Severe seropositive RA, hands, hips, shoulders. | Fast: ↑ GS, ↓dolorimeter pain index, ↑ FAI, 54.2 → 84.2%  ↓ESR 20 →5mm  ↓Joint tenderness index 14 → 2 | Food challenges, post-prandial GS, dolorimeter pain, changes significant to some foods(p<0.01). consecutive meals of beef > response than single.  Commercial food counterparts, -ve in organic form: ↓ GS, ↑dolorimeter pain index | Wheat, beef, potato, lamb.  Commercial foods containing additives | Discharged medication free. Maintained complete arthritic remission 4 years.  Dietary indiscretions cause temporary increase in arthritic activity. |
| **6.**  **Panush et al (1985, 1986)**(44,45)  USA | Fast 3d, followed by 33 day Vivonex  After 2 days, double blind food challenges.  Lyophilized foods in capsules (325-860mg/cap, 8-20 caps) or placebo. 52 challenges total over 31d  DMS, SJC, TJC, GS, 50ftTW, JCirc.  SPT, IgG, IgE, IgG4, VAS-GA, C3, C4, CIC | F, 52 11 yrs  Class I, Stage I active RA | Fast or Vivonex:  30→ 0minDMS,  9→3 TJI,  3→0 SJI  Subjective VAS-GA 87% → 100% | 4 milk challenges, Milk ≥8oz,  Symptoms 6-12 hours  produced 0 →26mMS, 3→14 TJI, 0→4 SJI, subjective VAS-GA 100 →85%, peaking 24-48hours, resolved next 24-48hours  No IgE, marked ↑ IgG4 anti-milk only  Milk predictable, reproducible.  Greater mononuclear cellular reactivity to milk than normal subjects  No reactions to placebo capsules | Dairy: milk  Beef, chicken, challenges, uncertain, minor reactions | Careful attention to food intake was associated with satisfactory control of her RA |
| **7**  **Lunardi et al. (1988)**(46)  Verona, Italy  Letter to editor | Elimination diet 3 weeks / food challenge (Pachor 1986)  SPT +ve for cereals  Symptoms, ESR post challenge | Gender, age NR. Active serum +ve RA, worsening despite treatment  Pleuritis and vasculitis, cutaneous ulcers. ESR 120mm/h  High IgE | “Dramatic improvement” in 3 weeks | Arthralgia, articular tumefaction, MS, vasculitis triggered in response to cereals | Cereals | Remission when cereals avoided, maintained at 1 year follow-up.  Rheuma and Waaler Rose became  -ve, total IgE value normal  ESR 120 →20 |
| **8.**  **Lukaczer (2005)**(47) | Elimination diet, modified vegan, avoiding common allergens; gluten, dairy, beef, pork, eggs. Food reintroductions  Supplements added Questionnaires QOL, AIMS2 | F 25, white, 2 years. Fits criteria for RA diagnosis, plus constipation | Strict elimination for 2 weeks, reported substantial improvement in joint pain | Gradual re-introductions over 16 weeks without reactions, to beef, dairy, eggs mentioned. Reacted to apples and corn | Apples and corn | Successful reintroduction of most foods by 20 weeks  Pain 7.5/10 → 0/10 at 20 weeks  QOL scores reflected improvement |
| **9**  **Martinez (2008)**(48)  **USA** | ImmunoCAP test for allergies. Trial of diet free of positive test foods, also no dairy and meat | F 39, RA since age 20  Plus chronic watery nasal secretion | RA completely resolved as a result of removing foods for other allergies  Nasal secretion alleviated. | Can trigger attacks of RA in hands by eating suspect foods, (not detailed) | ImmunoCAP: Corn, garlic, orange, peanuts, potato, rice, soy, tomato wheat.  Dairy & meat RA reactive foods NR | 3 years later – continues diet, F&V, cereals, a little meat.  No RA symptoms Clinical remission, no joint deformity or extra-articular symptoms. X-ray clear. No medication required.  Remains allergy free |
| **10**  **Kutlu et al (2010)**(49)  Turkey | Pt history –observed RA symptoms following animal foods, none when avoiding.  Oral diet challenge with meat, clinician observed response | F 32, RA, 8 yrs  Prednisone, Mx, NSAIDs | No arthritis symptoms on plant protein only diet | Swelling, erythema, tenderness in L knee day after meat challenge observed by clinician.  Pt reported episodes start 6-10 hrs post, last for 2-3 days | Animal protein: eggs, milk, meat. Meat strongest reaction. | Not recorded |
| **11**  **Denton (2012)**(50)  MN, USA | Elimination diet (common triggers of inflammation): wheat, corn, cow’s milk dairy products, nightshade vegetables, 10-14 days  Food challenges, one at a time. Journal of reactions, energy, mood, sleep | F, 65, RA and gastritis 15yrs, uncontrolled pain escalating doses of meds  Plus eczema, rhinitis, dry eyes, anxiety, poor sleep | Pt reported improvement after only a few days of exclusion. ↑energy, dramatically ↓ pain Bowels normalised. | Nightshades; strongest reaction, burning pain in back, arm, hands, achy body, GI symptoms  Corn; eye, hands, colitis symptoms  Cow’s milk, wheat; no reaction | Corn, nightshade vegetables (white potatoes, tomatoes, eggplant, peppers) | Avoided foods for 5 months, completely off methotrexate, trazadone and tramadol. Able to do treadmill training, hiking. |
| **12**  **Isasi e**t al. (**2015)**(51)  Madrid, Spain | Case study in paper on non-celiac gluten sensitivity  GFD trialled. | F 51 AntiCCP+ve erosive RA, multiple medications, poor control.  General pain, severe asthenia, diarrhoea, bloating, oral aphthae. Dependent. | GFD: Clear improvement in all clinical symptoms in 6 months. | Gluten ingestion; recurrence of diarrhoea,  asthenia, arthritis | Gluten | Remained on GFD for 4 years, maintained excellent clinical condition. Medications reduced Independent, able to dance and hike. |
| Abbreviations: ↑Increase; ↓ Decrease; ↔No change; ACR, American College of Rheumatology; AntiCCP, Anti–cyclic citrullinated peptide antibody; ARA, American Rheumatism Association;C3, complement component 3; C4, complement component 4; CIC, Circulating Immune Complexes; CIR, circumference; D, diarrhea; DMS, Duration Morning stiffness; ESR, Erythrocyte sedimentation rate; FAI, functional activity index; Ft, Fatigue; GFD, Gluten free diet; GI, gastrointestinal; GS, grip strength; H, Headache; Hx, History; ; Ig, Immunoglobulin; IgA, Immunoglobulin A; IgE, Immunoglobulin E; IgG, Immunoglobulin G; IgM, Immunoglobulin M; JCirc, Joint circumference; JP, Joint pain; JS, Joint swelling; Mx, Methotrexate; N, Nausea; NCGS, Non-celiac gluten sensitivity; NR, No record; NS, Non-significant; NSAID, Nonsteroidal anti-inflammatory drug; QOL, Quality of Life; RA, rheumatoid arthritis; RAI, Ritchie articular index; RAST, Radioallergosorbent test; RF, Rheumatoid factor;; SJC, Swollen joint count; SPT, Skin prick tests; TJC, Tender joint count;; TW, Timed walk test; VAS, visual analogue scale; VAS-F, Visual Analogue Scale-Fatigue; VAS-P, Visual Analogue Scale-Pain.; VAS-GA, Visual Analogue Scale-Global assessment; WBC, Leukocyte/white blood cell count | | | | | | |

**Supplementary table 5:** Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist (53)

| **SECTION** | **ITEM** | **PRISMA-ScR CHECKLIST ITEM** | **REPORTED ON PAGE #** |
| --- | --- | --- | --- |
| **TITLE** | | | |
| Title | 1 | Identify the report as a scoping review. | 1 |
| **ABSTRACT** | | | |
| Structured summary | 2 | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives. | 2 |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach. | 2-4 |
| Objectives | 4 | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives. | 4-5 |
| **METHODS** | | | |
| Protocol and registration | 5 | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number. | 5 |
| Eligibility criteria | 6 | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale. | 6-7 |
| Information sources\* | 7 | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed. | 6-7, Supplementary table S1 |
| Search | 8 | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated. | 6, Supplementary table S1 |
| Selection of sources of evidence† | 9 | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review. | 6 |
| Data charting process‡ | 10 | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | 7 |
| Data items | 11 | List and define all variables for which data were sought and any assumptions and simplifications made. | 7 |
| Critical appraisal of individual sources of evidence§ | 12 | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate). | 7-8 |
| Synthesis of results | 13 | Describe the methods of handling and summarizing the data that were charted. | 8 |
| **RESULTS** | | | |
| Selection of sources of evidence | 14 | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram. | 9 |
| Characteristics of sources of evidence | 15 | For each source of evidence, present characteristics for which data were charted and provide the citations. | 9-10, Supplementary table S2 |
| Critical appraisal within sources of evidence | 16 | If done, present data on critical appraisal of included sources of evidence (see item 12). | 10-12 |
| Results of individual sources of evidence | 17 | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives. | 10 on, Supplementary tables 3 &4 |
| Synthesis of results | 18 | Summarize and/or present the charting results as they relate to the review questions and objectives. | 11-21 |
| **DISCUSSION** | | | |
| Summary of evidence | 19 | Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | 21-37 |
| Limitations | 20 | Discuss the limitations of the scoping review process. | 27 |
| Conclusions | 21 | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps. | 27-28 |
| **FUNDING** | | | |
| Funding | 22 | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review. | 29 |

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

\* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O’Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting*.*

§The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

**References**

1. Hicklin J, McEwen L, Morgan J. The Effect of Diet in Rheumatoid Arthritis. Clinical Experimental Allergy. 1980;10(December 1979):463–7.

2. McEwen LM, Morgan JE. Allergy Exclusion Diets. Hinckley, Leicester: National Society for Research into Allergy, Leicester, UK; 1982.

3. Stroud RM, Kroker G, Rea WJ, et al. Comprehensive environmental control and its effect on rheumatoid arthritis. Clin Res. 1980;28(4):A791–A791.

4. Stroud RM. The effect of fasting followed by specific food challenge on rheumatoid arthritis. Current Topics in Rheumatology: a collection from John Hopkins fellows, past and present. Upjohn; 1983;145–57.

5. Randolph T. The Ecologic Unit. 1. Hosp Manage [Internet]. United States: Clissold Publishing Co; 1964 Mar;97:45–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/14130572

6. Marshall R, Stroud RM, Kroker G, et al. Food challenge effects on fasted rheumatoid arthritis patients: a multicentre study. Clinical Ecology. Chicago: Clinical Ecology; 1984;2(4):181–90.

7. Little CH, Stewart AG, Fennessy MR. Platelet serotonin release in rheumatoid arthritis: a study in food-intolerant patients. Lancet [Internet]. 1983 Aug 6 [cited 2024 Nov 25];2(8345):297–9. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0140673683902866

8. Lunardi C, Pachor ML, Nicolis F, et al. Arthralgia, arthritis and food intolerance. Italian Journal of Medicine. 1987;3(3):88–91.

9. Pachor ML, Andri L, Nicolis F, et al. Elimination diet and challenge test in diagnosis of food intolerance. Italian Journal of Medicine. 1986;2(1):1–6.

10. Beri D, Malaviya AN, Shandilya R, et al. Effect of dietary restrictions on disease activity in rheumatoid arthritis. Ann Rheum Dis [Internet]. Department of Medicine, All India Institute of Medical Sciences, New Delhi.: BMJ; 1988 Jan 1;47(1):69–72. Available from: https://ard.bmj.com/lookup/doi/10.1136/ard.47.1.69

11. Ratner D, Schneeyour A, Eshel E, et al. Does milk intolerance affect seronegative arthritis in lactase-deficient women? Isr J Med Sci [Internet]. 1985 Jun [cited 2024 Feb 20];21(6):532–4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/3874853

12. Felder M, De Blecourt ACE, Wüthrich B. Food allergy in patients with rheumatoid arthritis. Clin Rheumatol [Internet]. 1987 Jun;6(2):181–4. Available from: http://link.springer.com/10.1007/BF02201021

13. van de Laar MAFJ. Rheumatoid arthritis and food, allergy? [Internet]. Thesis Publishers Amsterdam; 1991. Available from: https://catalogue.nla.gov.au/catalog/2690263

14. van de Laar MA, van der Korst JK. Food intolerance in rheumatoid arthritis. I. A double blind, controlled trial of the clinical effects of elimination of milk allergens and azo dyes. Ann Rheum Dis [Internet]. 1992 Mar 1;51(3):298–302. Available from: https://ard.bmj.com/lookup/doi/10.1136/ard.51.3.298

15. van de Laar MA, Aalbers M, Bruins FG, et al. Food intolerance in rheumatoid arthritis. II. Clinical and histological aspects. Ann Rheum Dis [Internet]. Department of Rheumatology, Jan van Breemen Instituut and Academisch Medisch Centrum, University of Amsterdam, The Netherlands.: BMJ Publishing Group Ltd; 1992 Mar 1;51(3):303–6. Available from: https://ard.bmj.com/lookup/doi/10.1136/ard.51.3.303

16. Carini C, Brostoff J, Wraith DG. Food allergy as a cause of arthralgia. Immunologia Clinica e Sperimentale. 1984;3(1):31–40.

17. Carini C, Fratazzi C, Aiuti F. Immune complexes in food-induced arthralgia. Ann Allergy [Internet]. Department of Allergology and Clinical Immunology, University of Rome La Sapienza, Italy.: American College of Allergy and Immunology; 1987 Dec [cited 2024 Feb 20];59(6):422–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/3425981

18. Darlington LG, Ramsey NW, Mansfield JR. Placebo-controlled, blind study of dietary manipulation therapy in rheumatoid arthritis. Lancet [Internet]. 1986 Feb 1 [cited 2023 Jun 28];1(8475):236–8. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0140673686907749

19. Rayman M, Callaghan A. Appendix 4: Elimination Diet for Rheumatoid Arthritis. Nutrition and Arthritis [Internet]. Wiley; 2006 [cited 2024 Jun 6]. p. 237–44. Available from: https://onlinelibrary.wiley.com/doi/10.1002/9780470775011.app4

20. Darlington LG, Ramsey N. Dietary manipulation therapy in rheumatoid arthritis. Progress in rheumatology, International Seminar on the Treatment of Rheumatic Diseases; Machtey, Israel. 1987;0(0):128–32.

21. Darlington LG, Jump A, Ramsey NW, et al. A prospective study of clinical and serological responses to single or double blind food challenges in patients with rheumatoid arthritis subject to dietary manipulation. Rheumatology [Internet]. 1989 Nov 14;XXVIII(suppl 2):116–21. Available from: https://academic.oup.com/rheumatology/article-lookup/doi/10.1093/rheumatology/XXVIII.suppl\_2.116

22. Kjeldsen-Kragh J, Borchgrevink CF, Laerum E, et al. Controlled trial of fasting and one-year vegetarian diet in rheumatoid arthritis. The Lancet [Internet]. 1991 Oct;338(8772):899–902. Available from: https://linkinghub.elsevier.com/retrieve/pii/014067369191770U

23. Haugen MA, Kjeldsen-Kragh J, Skakkebæk N, et al. The influence of fast and vegetarian diet on parameters of nutritional status in patients with rheumatoid arthritis. Clin Rheumatol [Internet]. 1993 Mar;12(1):62–9. Available from: http://link.springer.com/10.1007/BF02231561

24. Kjeldsen-Kragh J, Mellbye OJ, Haugen M, et al. Changes in Laboratory Variables in Rheumatoid Arthritis Patients During a Trial of Fasting and One-year Vegetarian Diet. Scand J Rheumatol [Internet]. Institute of Immunology and Rheumatology, National Hospital, Oslo, Norway.: Informa Healthcare; 1995 Jan 12;24(2):85–93. Available from: https://www.tandfonline.com/doi/full/10.3109/03009749509099290

25. Peltonen R, Kjeldsen-Kragh J, Haugen M, et al. Changes of faecal flora in rheumatoid arthritis during fasting and one-year vegetarian diet. Br J Rheumatol [Internet]. Department of Medical Microbiology, University of Turku, Finland.: Oxford University Press; 1994 Jul [cited 2024 Nov 25];33(7):638–43. Available from: https://academic.oup.com/rheumatology/article-lookup/doi/10.1093/rheumatology/33.7.638

26. Kjeldsen-Kragh J, Hvatum M, Haugen M, et al. Antibodies against dietary antigens in rheumatoid arthritis patients treated with fasting and a one-year vegetarian diet. Clin Exp Rheumatol [Internet]. 1995;13(2):167–72. Available from: http://www.ncbi.nlm.nih.gov/pubmed/7656463

27. Kjeldsen-Kragh J, Rashid T, Dybwad A, et al. Decrease in anti-Proteus mirabilis but not anti-Escherichia coli antibody levels in rheumatoid arthritis patients treated with fasting and a one year vegetarian diet. Ann Rheum Dis [Internet]. Institute of Immunology and Rheumatology, National Hospital, Oslo, Norway.: BMJ; 1995 Mar;54(3):221–4. Available from: http://pubmedcentralcanada.ca/pmcc/articles/PMC1005560/pdf/annrheumd00503-0065.pdf

28. Kjeldsen-Kragh J, Haugen M, Førre O, et al. Vegetarian diet for patients with rheumatoid arthritis: can the clinical effects be explained by the psychological characteristics of the patients? Br J Rheumatol [Internet]. Department of General Practice, University of Oslo, Norway.: Oxford University Press; 1994 Jun [cited 2024 Nov 25];33(6):569–75. Available from: https://academic.oup.com/rheumatology/article-lookup/doi/10.1093/rheumatology/33.6.569

29. Haugen MA, Kjeldsen-Kragh J, Bjervea KS, et al. Changes in plasma phospholipid fatty acids and their relationship to disease activity in rheumatoid arthritis patients treated with a vegetarian diet. British Journal of Nutrition [Internet]. Oslo Sanitetsforening Rheumatism Hospital, Norway.: Published on behalf of the Nutrition Society by CABI Publishing; 1994 Oct 9;72(4):555–66. Available from: https://www.cambridge.org/core/product/identifier/S0007114594001601/type/journal\_article

30. Kjeldsen-Kragh J, Sumar N, Bodman-Smith K, et al. Changes in glycosylation of IgG during fasting in patients with rheumatoid arthritis. Br J Rheumatol [Internet]. 1996 Feb [cited 2024 Nov 24];35(2):117–9. Available from: https://academic.oup.com/rheumatology/article-lookup/doi/10.1093/rheumatology/35.2.117

31. Kjeldsen-Kragh J, Haugen M, Borchgrevink CF, et al. Vegetarian diet for patients with rheumatoid arthritis — Status: Two years after introduction of the diet. Clin Rheumatol [Internet]. 1994 Sep;13(3):475–82. Available from: http://link.springer.com/10.1007/BF02242946

32. Kjeldsen-Kragh J. Rheumatoid arthritis treated with vegetarian diets. Am J Clin Nutr [Internet]. J. Kjeldsen-Kragh, Dept. of Immunology/Transfusion Med., Ullevaal University Hospital, N-0407 Oslo, Norway. E-mail: jens.kjeldsen-kragh@ioks.uio.no: American Society for Nutrition; 1999 Sep;70(3):594S-600S. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0002916522041120

33. Kavanaghi R, Workman E, Nash P, et al. The effects of elemental diet and subsequent food reintroduction on rheumatoid arthritis. Br J Rheumatol [Internet]. Department of Rheumatology, Addenbrooke’s Hospital, Cambridge.: Oxford University Press; 1995 Mar [cited 2024 Nov 24];34(3):270–3. Available from: https://academic.oup.com/rheumatology/article-lookup/doi/10.1093/rheumatology/34.3.270

34. Karatay S. The effect of individualized diet challenges consisting of allergenic foods on TNF-  and IL-1  levels in patients with rheumatoid arthritis. Rheumatology [Internet]. Department of Physical Medicine and Rehabilitation, Atatürk University, Erzurum, Turkey. skaratay73@hotmail.com: Oxford University Press; 2004 Nov 1;43(11):1429–33. Available from: https://academic.oup.com/rheumatology/article-lookup/doi/10.1093/rheumatology/keh366

35. Karatay S, Erdem T, Kiziltunc A, et al. General or personal diet: the individualized model for diet challenges in patients with rheumatoid arthritis. Rheumatol Int [Internet]. Springer; 2006 Apr 16;26(6):556–60. Available from: http://link.springer.com/10.1007/s00296-005-0018-y

36. Barnard ND, Levin S, Crosby L, et al. A Randomized, Crossover Trial of a Nutritional Intervention for Rheumatoid Arthritis. Am J Lifestyle Med [Internet]. Washington, DC, United States: SAGE Publications Inc.; 2022 Apr 3;0(0):155982762210818. Available from: http://journals.sagepub.com/doi/10.1177/15598276221081819

37. Hulander E. Nutritional impact on health in patients with Rheumatoid Arthritis [Internet] [Doctoral]. [Gothenburg]: Sahlgrenska Acadamy; 2022 [cited 2025 Feb 11]. Available from: https://gupea.ub.gu.se/handle/2077/70930

38. Lindqvist HM, Gjertsson I, Hulander E, et al. Exploring the differences in serum metabolite profiles after intake of red meat in women with rheumatoid arthritis and a matched control group. Eur J Nutr [Internet]. Springer Science and Business Media Deutschland GmbH; 2024 Feb 9;63(1):221–30. Available from: https://link.springer.com/10.1007/s00394-023-03257-y

39. Hulander E, Bärebring L, Winkvist A, et al. A randomized controlled cross-over trial investigating the acute inflammatory and metabolic response after meals based on red meat, fatty fish, or soy protein: the postprandial inflammation in rheumatoid arthritis (PIRA) trial. Eur J Nutr [Internet]. Springer Science and Business Media Deutschland GmbH; 2024 Oct 27;63(7):2631–42. Available from: https://link.springer.com/10.1007/s00394-024-03451-6

40. Zeller M. Rheumatoid arthritis; food allergy as a factor. Ann Allergy [Internet]. United States, United States: American College of Allergy and Immunology; 1949 Mar;7(2):200–5. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18114844

41. Parke AL, Hughes GR. Rheumatoid arthritis and food: a case study. BMJ [Internet]. England: British Medical Association; 1981 Jun 20;282(6281):2027–9. Available from: https://www.bmj.com/lookup/doi/10.1136/bmj.282.6281.2027

42. Williams R. Rheumatoid arthritis and food: a case study. BMJ [Internet]. England: British Medical Association; 1981 Aug 22;283(6290):563–563. Available from: https://www.bmj.com/lookup/doi/10.1136/bmj.283.6290.563

43. O’Banion DR. Dietary control of rheumatoid arthritis pain: Three case studies. Journal of Holistic Medicine. 1982;4(1):49–57.

44. Panush RS, Stroud RM, Webster EM. Food‐induced (allergic) arthritis. Inflammatory arthritis exacerbated by milk. Arthritis Rheum [Internet]. 1986 Feb 29;29(2):220–6. Available from: https://onlinelibrary.wiley.com/doi/10.1002/art.1780290210

45. Panush R, Stroud R, Webster E, et al. 394 Food-induced (allergic) arthritis, I. Rheumatoid arthritis exacerbated by milk. Journal of Allergy and Clinical Immunology [Internet]. 1985 Jan;75(1):203. Available from: https://linkinghub.elsevier.com/retrieve/pii/0091674985905305

46. Lunardi C, Bambara LM, Biasi D, et al. Food allergy and rheumatoid arthritis. Clin Exp Rheumatol [Internet]. Italy: Clinical And Experimental Rheumatology S.A.S; 1988 Oct [cited 2024 Feb 20];6(4):423–4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/3229033

47. Lukaczer D. An integrative nutritional approach to the treatment of rheumatoid arthritis. Integrative medicine [Internet]. 2005 Oct;4(2):16–22. Available from: https://www.researchgate.net/publication/288712428\_An\_integrative\_nutritional\_approach\_to\_the\_treatment\_of\_rheumatoid\_arthritis

48. Martinez RM. Clinical challenge. Coincidence or medical breakthrough? Clinical Advisor [Internet]. New York, New York: Haymarket Media, Inc.; 2008 Feb [cited 2024 Feb 20];11(2):114–5. Available from: https://www.clinicaladvisor.com/home/features/coincidence-or-a-medical-breakthrough/

49. Kutlu A, Öztürk S, Taşkapan O, et al. Meat‐Induced Joint Attacks, or Meat Attacks the Joint. Nutrition in Clinical Practice [Internet]. United States: Wiley; 2010 Feb 3;25(1):90–1. Available from: https://aspenjournals.onlinelibrary.wiley.com/doi/10.1177/0884533609357564

50. Denton C. The elimination/challenge diet. Minn Med [Internet]. 2012 Dec;95(12):43–4. Available from: http://www.ncbi.nlm.nih.gov/pubmed/23346726

51. Isasi C, Tejerina E, Morán LM. Non-celiac Gluten Sensitivity and Rheumatic Diseases. Reumatología Clínica (English Edition) [Internet]. Servicio de Reumatología, Hospital Puerta de Hierro Majadahonda, Majadahonda, Madrid, España. Electronic address: cisasi.hpth@salud.madrid.org. FAU - Tejerina, Eva Servicio de Anatomía Patológica, Hospital Puerta de Hierro Majadahonda, Majadahonda, Madrid: lsevier España, S.L.U. y Sociedad Española de Reumatología y Colegio Mexicano de Reumatología; 2016 Jan;12(1):4–10. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2173574315001112

52. Darlington LG, Ramsey NW. Review of dietary therapy for rheumatoid arthritis. Compr Ther [Internet]. Rheumatology Unit, Epsom General Hospital, United Kingdom.: Clinical And Experimental Rheumatology S.A.S; 1994 May [cited 2024 Nov 24];20(9):490–4. Available from: https://academic.oup.com/rheumatology/article-lookup/doi/10.1093/rheumatology/32.6.507

53. Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Ann Intern Med [Internet]. United States; 2018 Oct 2;169(7):467–73. Available from: https://www.acpjournals.org/doi/10.7326/M18-0850