Supplementary information

Preclinical models of maternal asthma and progeny outcomes: a scoping review

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List of supplementary information

Table S1 – Databases and search strategies

MEDLINE (PubMed) – last searched 10th January 2023	(Asthma [mh] OR Asthma [tiab] OR "Respiratory hypersensitivity" [tiab] OR Wheez* [tiab]) AND (Pregnancy [mh] OR Maternal [tiab] OR Gestat* [tiab] OR Pregnan* [tiab]) AND (("animal experimentation"[MeSH Terms] OR "models, animal"[MeSH Terms] OR "Animals"[Mesh:noexp] OR "animal population groups"[MeSH Terms] OR "chordata"[MeSH Terms:noexp] OR "vertebrates"[MeSH Terms:noexp] OR "mammals"[MeSH Terms:noexp] OR "primates"[MeSH Terms:noexp] OR "artiodactyla"[MeSH Terms] OR "carnivora"[MeSH Terms] OR "cetacea"[MeSH Terms] OR "chiroptera"[MeSH Terms] OR "elephants"[MeSH Terms] OR "hyraxes"[MeSH Terms] OR "lagomorpha"[MeSH Terms] OR "marsupialia"[MeSH Terms] OR "monotremata"[MeSH Terms] OR "perissodactyla"[MeSH Terms] OR "rodentia"[MeSH Terms] OR "scandentia"[MeSH Terms] OR "sirenia"[MeSH Terms] OR "xenarthra"[MeSH Terms] OR "haplorhini"[MeSH Terms:noexp] OR "strepsirhini"[MeSH Terms] OR "platyrrhini"[MeSH Terms] OR "tarsii"[MeSH Terms] OR "catarrhini"[MeSH Terms:noexp] OR "cercopithecidae"[MeSH Terms] OR "hylobatidae"[MeSH Terms] OR "hominidae"[MeSH Terms:noexp] OR "gorilla gorilla"[MeSH Terms] OR "pan paniscus"[MeSH Terms] OR "pan troglodytes"[MeSH Terms] OR "pongo pygmaeus"[MeSH Terms]) OR ((animals[tiab] OR animal[tiab] OR mice[Tiab] OR mus[Tiab] OR mouse[Tiab] OR murine[Tiab] OR woodmouse[tiab] OR rats[Tiab] OR rat[Tiab] OR murinae[Tiab] OR muridae[Tiab] OR cottonrat[tiab] OR cottonrats[tiab] OR hamster[tiab] OR hamsters[tiab] OR cricetinae[tiab] OR rodentia[Tiab] OR rodent[Tiab] OR rodents[Tiab] OR pigs[Tiab] OR pig[Tiab] OR swine[tiab] OR swines[tiab] OR piglets[tiab] OR piglet[tiab] OR boar[tiab] OR boars[tiab] OR "sus scrofa"[tiab] OR ferrets[tiab] OR ferret[tiab] OR polecat[tiab] OR polecats[tiab] OR "mustela putorius"[tiab] OR "guinea pigs"[Tiab] OR "guinea pig"[Tiab] OR cavia[Tiab] OR callithrix[Tiab] OR marmoset[Tiab] OR marmosets[Tiab] OR cebuella[Tiab] OR hapale[Tiab] OR octodon[Tiab] OR chinchilla[Tiab] OR chinchillas[Tiab] OR gerbillinae[Tiab] OR gerbil[Tiab] OR gerbils[Tiab] OR jird[Tiab] OR jirds[Tiab] OR merione[Tiab] OR meriones[Tiab] OR rabbits[Tiab] OR rabbit[Tiab] OR hares[Tiab] OR hare[Tiab] OR cats[Tiab] OR cat[Tiab] OR carus[Tiab] OR felis[Tiab] OR dogs[Tiab] OR dog[Tiab] OR canine[Tiab] OR canines[Tiab] OR canis[Tiab] OR sheep[Tiab] OR sheeps[Tiab] OR mouflon[Tiab] OR mouflons[Tiab] OR ovis[Tiab] OR goats[Tiab] OR goat[Tiab] OR capra[Tiab] OR capras[Tiab] OR rupicapra[Tiab] OR rupicapras[Tiab] OR chamois[Tiab] OR haplorhini[Tiab] OR monkey[Tiab] OR monkeys[Tiab] OR anthropoidea[Tiab] OR anthropoids[Tiab] OR saguinus[Tiab] OR tamarin[Tiab] OR tamarins[Tiab] OR leontopithecus[Tiab] OR hominidae[Tiab] OR ape[Tiab] OR apes[Tiab] OR "pan paniscus"[Tiab] OR bonobo[Tiab] OR bonobos[Tiab] OR

	"pan troglodytes"[Tiab] OR gibbon[Tiab] OR gibbons[Tiab] OR siamang[Tiab] OR siamangs[Tiab] OR nomascus[Tiab] OR symphalangus[Tiab] OR chimpanzee[Tiab] OR chimpanzees[Tiab] OR prosimian[Tiab] OR prosimians[Tiab] OR "bush baby"[Tiab] OR bush babies[Tiab] OR galagos[Tiab] OR galago[Tiab] OR pongidae[Tiab] OR gorilla[Tiab] OR gorillas[Tiab] OR "pongo pygmaeus"[Tiab] OR orangutan[Tiab] OR orangutans[Tiab] OR lemur[Tiab] OR lemurs[Tiab] OR lemuridae[Tiab] OR horse[Tiab] OR horses[Tiab] OR equus[Tiab] OR cow[Tiab] OR calf[Tiab] OR bull[Tiab] OR sciuridae[Tiab] OR squirrel[Tiab] OR squirrels[Tiab] OR chipmunk[Tiab] OR chipmunks[Tiab] OR suslik[Tiab] OR susliks[Tiab] OR vole[Tiab] OR voles[Tiab] OR lemming[Tiab] OR lemmings[Tiab] OR muskrat[Tiab] OR muskrats[Tiab] OR lemmus[Tiab] OR otter[Tiab] OR otters[Tiab] OR marten[Tiab] OR martens[Tiab] OR martes[Tiab] OR weasel[Tiab] OR badger[Tiab] OR badgers[Tiab] OR ermine[Tiab] OR mink[Tiab] OR minks[Tiab] OR sable[Tiab] OR sables[Tiab] OR gulo[Tiab] OR gulos[Tiab] OR wolverine[Tiab] OR wolverines[Tiab] OR mustela[Tiab] OR llama[Tiab] OR llamas[Tiab] OR alpaca[Tiab] OR alpacas[Tiab] OR camelid[Tiab] OR camelids[Tiab] OR guanaco[Tiab] OR guanacos[Tiab] OR chiroptera[Tiab] OR chiropteras[Tiab] OR bat[Tiab] OR bats[Tiab] OR fox[Tiab] OR foxes[Tiab] OR donkey[Tiab] OR donkeys[Tiab] OR mule[Tiab] OR mules[Tiab] OR zebra[Tiab] OR zebras[Tiab] OR shrew[Tiab] OR shrews[Tiab] OR bison[Tiab] OR bisons[Tiab] OR buffalo[Tiab] OR buffaloes[Tiab] OR deer[Tiab] OR deers[Tiab] OR bear[Tiab] OR bears[Tiab] OR panda[Tiab] OR pandas[Tiab] OR "wild hog"[Tiab] OR "wild boar"[Tiab] OR fitchew[Tiab] OR fitch[Tiab] OR beaver[Tiab] OR beavers[Tiab] OR jerboa[Tiab] OR jerboas[Tiab] OR capybara[Tiab] OR capybaras[Tiab] OR canine [tiab] OR bovine [tiab] OR porcine [tiab] OR hog [tiab] OR hogs [tiab]) NOT medline[sb]))
Elsevier (Embase) - last searched 10th January 2023	(exp Asthma OR Asthma:ti,ab OR Respiratory hypersensitivity:ti,ab OR Wheeze*:ti,ab) AND (exp Pregnancy OR Maternal:ti,ab OR Gestat*:ti,ab OR Pregnan*:ti,ab) AND (exp animal experiment/ OR exp animal model/ OR exp experimental animal/ OR exp transgenic animal/ OR exp male animal/ OR exp female animal/ OR exp juvenile animal/ OR animal/ OR chordata/ OR vertebrate/ OR tetrapod/ OR amniote/ OR mammal/ OR therian/OR exp monotremate/ OR placental mammals/ OR exp marsupial/ OR Euarchontoglires/ OR exp Afrotheria/ OR exp Boreoeutheria/ OR exp Laurasiatheria/ OR exp Xenarthra/ OR primate/ OR exp Dermoptera/ OR exp Glires/ OR exp Scandentia/ OR Haplorhini/ OR exp prosimian/ OR simian/ OR exp tarsiiform/ OR Catarrhini/ OR exp Platyrrhini/ OR ape/ OR exp Cercopithecidae/ OR hominid/ OR exp hylobatidae/ OR exp chimpanzee/ OR exp gorilla/ OR exp orang utan/ OR (animal OR animals OR shrew OR shrews OR sorex OR araneus OR crocidura OR russula OR european mole OR talpa OR chiroptera OR bat OR bats OR eptesicus OR serotinus OR myotis OR dasycneme OR daubentonii OR

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Web of Science - last searched 10th January 2023	(Asthma OR Asthma OR “Respiratory hypersensitivity” OR Wheez*) AND (Pregnancy OR Maternal OR Gestat* OR Pregnan*) AND ((“animal experimentation” OR “models, animal” OR “Animals” OR “animal population groups” OR “chordata” OR “vertebrates” OR “mammals” OR “primates” OR “artiodactyla” OR “carnivora” OR “cetacea” OR “chiroptera”

	OR “elephants” OR “hyraxes” OR “lagomorpha” OR “marsupialia” OR “monotremata” OR “perissodactyla” OR “rodentia” OR “scandentia” OR “sirenia” OR “xenarthra” OR “haplorhini” OR “strepsirhini” OR “platyrrhini” OR “tarsii” OR “catarrhini” OR “cercopithecidae” OR “hylobatidae” OR “hominidae” OR “gorilla gorilla” OR “pan paniscus” OR “pan troglodytes” OR “pongo pygmaeus”) OR (animals OR animal OR mice OR mus OR mouse OR murine OR woodmouse OR rats OR rat OR murinae OR muridae OR cottonrat OR cottonrats OR hamster OR hamsters OR cricetinae OR rodentia OR rodent OR rodents OR pigs OR pig OR swine OR swines OR piglets OR piglet OR boar OR boars OR “sus scrofa” OR ferrets OR ferret OR polecat OR polecats OR “mustela putorius” OR “guinea pigs” OR “guinea pig” OR cavia OR callithrix OR marmoset OR marmosets OR cebuella OR hapale OR octodon OR chinchilla OR chinchillas OR gerbillinae OR gerbil OR gerbils OR jird OR jirds OR merione OR meriones OR rabbits OR rabbit OR hares OR hare OR cats OR cat OR carus OR felis OR dogs OR dog OR canine OR canines OR canis OR sheep OR sheeps OR mouflon OR mouflons OR ovis OR goats OR goat OR capra OR capras OR rupicapra OR rupicapras OR chamois OR haplorhini OR monkey OR monkeys OR anthropoidea OR anthropoids OR saguinus OR tamarin OR tamarins OR leontopithecus OR hominidae OR ape OR apes OR “pan paniscus” OR bonobo OR bonobos OR “pan troglodytes” OR gibbon OR gibbons OR siamang OR siamangs OR nomascus OR symphalangus OR chimpanzee OR chimpanzees OR prosimian OR prosimians OR “bush baby” OR bush babies OR galagos OR galago OR pongidae OR gorilla OR gorillas OR “pongo pygmaeus” OR orangutan OR orangutans OR lemur OR lemurs OR lemuridae OR horse OR horses OR equus OR cow OR calf OR bull OR sciuridae OR squirrel OR squirrels OR chipmunk OR chipmunks OR suslik OR susliks OR vole OR voles OR lemming OR lemmings OR muskrat OR muskrats OR lemmus OR otter OR otters OR marten OR martens OR martes OR weasel OR badger OR badgers OR ermine OR mink OR minks OR sable OR sables OR gulo OR gulos OR wolverine OR wolverines OR mustela OR llama OR llamas OR alpaca OR alpacas OR camelid OR camelids OR guanaco OR guanacos OR chiroptera OR chiropteras OR bat OR bats OR fox OR foxes OR donkey OR donkeys OR mule OR mules OR zebra OR zebras OR shrew OR shrews OR bison OR bisons OR buffalo OR buffaloes OR deer OR deers OR bear OR bears OR panda OR pandas OR “wild hog” OR “wild boar” OR fitchew OR fitch OR beaver OR beavers OR jerboa OR jerboas OR capybara OR capybaras OR canine OR bovine OR porcine OR hog OR hogs))

Table S2 – ARRIVE 2.0 Guidelines

Taken verbatim from the published checklist.[1]

1. Study design For each experiment, provide brief details of study design including: a. The groups being compared, including control groups. If no control group has been used, the rationale should be stated. b. The experimental unit (e.g., a single animal, litter, or cage of animals).
2. Sample size a. Specify the exact number of experimental units allocated to each group, and the total number in each experiment. Also indicate the total number of animals used. b. Explain how the sample size was decided. Provide details of any a priori sample size calculation, if done.
3. Inclusion and exclusion criteria a. Describe any criteria used for including and excluding animals (or experimental units) during the experiment, and data points during the analysis. Specify if these criteria were established a priori. If no criteria were set, state this explicitly. b. For each experimental group, report any animals, experimental units, or data points not included in the analysis and explain why. If there were no exclusions, state so. c. For each analysis, report the exact value of n in each experimental group.
4. Randomization a. State whether randomisation was used to allocate experimental units to control and treatment groups. If done, provide the method used to generate the randomization sequence. b. Describe the strategy used to minimize potential confounders such as the order of treatments and measurements, or animal/cage location. If confounders were not controlled, state this explicitly.
5. Blinding Describe who was aware of the group allocation at the different stages of the experiment (during the allocation, the conduct of the experiment, the outcome assessment, and the data analysis).
6. Outcome measures a. Clearly define all outcome measures assessed (e.g., cell death, molecular markers, or behavioural changes). b. For hypothesis-testing studies, specify the primary outcome measure, i.e., the outcome measure that was used to determine the sample size.
7. Statistical methods a. Provide details of the statistical methods used for each analysis, including software used. b. Describe any methods used to assess whether the data met the assumptions of the statistical approach, and what was done if the assumptions were not met.

8. Experimental animals
    a. Provide species-appropriate details of the animals used, including species, strain and substrain, sex, age or developmental stage, and, if relevant, weight.
    b. Provide further relevant information on the provenance of animals, health/immune status, genetic modification status, genotype, and any previous procedures.

9. Experimental procedures

    For each experimental group, including controls, describe the procedures in enough detail to allow others to replicate them, including:

    a. What was done, how it was done, and what was used.
    b. When and how often.
    c. Where (including detail of any acclimatization periods).
    d. Why (provide rationale for procedures).

10. Results

    For each experiment conducted, including independent replications, report:

    a. Summary/descriptive statistics for each experimental group, with a measure of variability where applicable (e.g., mean and SD, or median and range).
    b. If applicable, the effect size with a confidence interval.

11. Abstract

    Provide an accurate summary of the research objectives, animal species, strain and sex, key methods, principal findings, and study conclusions.

12. Background
    a. Include sufficient scientific background to understand the rationale and context for the study, and explain the experimental approach.
    b. Explain how the animal species and model used address the scientific objectives and, where appropriate, the relevance to human biology.

13. Objectives

    Clearly describe the research question, research objectives and, where appropriate, specific hypotheses being tested.

14. Ethical statement
    a. Provide the name of the ethical review committee or equivalent that has approved the use of animals in this study, and any relevant license or protocol numbers (if applicable). If ethical approval was not sought or granted, provide a justification.

15. Housing and husbandry

    Provide details of housing and husbandry conditions, including any environmental enrichment.

16. Animal care and monitoring
    a. Describe any interventions or steps taken in the experimental protocols to reduce pain, suffering, and distress.
    b. Report any expected or unexpected adverse events.
    c. Describe the humane endpoints established for the study, the signs that were monitored, and the frequency of monitoring. If the study did not have humane endpoints, state this.

17. Interpretation/scientific implications
    a. Interpret the results, taking into account the study objectives and hypotheses, current theory, and other relevant studies in the literature.
    b. Comment on the study limitations, including potential sources of bias, limitations of the animal model, and imprecision associated with the results.

18. Generalizability/translation
    Comment on whether, and how, the findings of this study are likely to generalize to other species or experimental conditions, including any relevance to human biology (where appropriate).

19. Protocol registration
    Provide a statement indicating whether a protocol (including the research question, key design features, and analysis plan) was prepared before the study, and if and where this protocol was registered.

20. Data access
    Provide a statement describing if and where study data are available.

21. Declaration of interests
    a. Declare any potential conflicts of interest, including financial and nonfinancial. If none exist, this should be stated.
    b. List all funding sources (including grant identifier) and the role of the funder(s) in the design, analysis, and reporting of the study.

Table S3 - Description of included studies and maternal asthma induction

						Outcomes reported			
Study ID; design	**Animal (species/strain)**	**Aim/hypothesis**	**Induction protocol start relative to pregnancy**	**Allergen used for sensitisation, adjuvant and timing**	**Airway challenge frequency and timing**	**Maternal**	**Placental**	**Pregnancy/ Fetal**	**Postnatal progeny**
Abdala-Valencia 2014; Non-Randomised experimental study[2]	Mouse (C57BL/6)	Therefore, we determined whether α-T blocked development of allergic responses in offspring of allergic female mice.	before	OVA (200 µl) + potassium aluminium sulphate (1 mg) i.p. injection on day 0 and 7 of study	15 min 3% OVA in saline on three consecutive days at 8, 12, and 16 weeks of age; once at week 18			✓	✓
Abdala-Valencia 2016; Non-Randomised experimental study[3]	Mouse (C57BL/6)	We determined whether γ-T augments development of allergic responses in offspring of allergic female mice.	before	OVA (200 µl) + potassium aluminium sulphate (1 mg) i.p. injection on day 0 and 7 of study	20 min, 3% OVA in saline, three times a week at 4, 8, 12, and 16 weeks of age	✓		✓	✓
Akkoc 2008; Non-Randomised experimental study [4]	Mouse (BALB/c)	We aimed to determine the effect of single Mycobacterium vaccae immunisation to OVA-sensitized pregnant mice on IL-5 and IFN-γ secretion from placental lymphocytes and splenocytes of offspring.	before	OVA (10 µl) i.p. injection 28, 14, and 7 days before mating	20 min challenges, 1% OVA in saline, every second day during gestation	✓	✓		✓
Allina 2011; Pilot study experimental study [5]	Mouse (Outbred CD-1 male and female mice)	This pilot study examined the long-term effect of maternal allergen challenge and/or cigarette smoking during pregnancy on hepatic inflammation and fibrosis in adult mouse offspring. In the studies reported here, we sought to determine whether fetal stress due to maternal allergy and/or in utero exposure to cigarette	before	OVA (10 mg) + alum (2 mg) i.p. injection on days 0 and 7 of study	50 µl of OVA (2 µg/mL PBS) 1 and 2 weeks after injection	✓		✓	✓

		smoke alters adult off-spring liver fat content, inflammation or cytokine mRNA expression using an animal model							
Babayigit 2008; Non-Randomised experimental study [6]	Mouse (BALB/c)	The aim of this study was to evaluate the histopathologic changes of the lung in newborn mice born from asthmatic mothers	before	OVA (10 μg/0.1 mL) + alum i.p. injection on days 0 and 14 of study	30 min 2.5% OVA in saline three times a week for weeks 3 to 11 of study	✓			✓
Barrett 2003; Non-Randomised experimental study [7]	Dog (Beagle)	Using our canine model of allergic disease, we sought to confirm and further explore these human studies which indicate that parental/maternal allergic status may influence the development of allergic sensitization and asthma in offspring.	before	Ragweed extract (500 μg) + aluminium hydroxide i.p. injection within 24 h of birth and weekly for postnatal weeks 1-4, subcutaneous injections (50 μg ragweed + alum) weekly for weeks 5-8, biweekly weeks 10-22	500 μg ragweed protein during 2 exposures 2 weeks apart, and another 45 days later				✓
Carpe 2012; Non-Randomised experimental study [8]	Rat (Brown Norway) and Lewis)	We aimed to determine whether maternal allergen exposure would influence asthma pathogenesis by reprogramming primary patterns of developmental lung gene expression in progeny.	before	OVA (1 mg) + aluminium hydroxide (100 mg in 1 mL saline) + heat killed *Bordetella pertussis* (2×10^9 in 0.5 mL saline) i.p. injection 14 days prior to mating	30 min 1% OVA in saline on GD 1, 7, 13 and 19				✓
Church 2021; Randomised experimental study [9]	Mouse (C57BL/6J)	The goal of this study was to characterise the developmental impact of repeated allergic asthma inflammation during pregnancy on offspring behavioural outcomes and brain inflammation.	before	OVA (10 μg) + aluminium hydroxide (1 mg) i.p. injection at 6-7 weeks of age – prior to	45 min 1% OVA in saline daily on GD 2-9 (early group) or GD 10-17 (late group) between 0800 h and	✓			✓

				mating at week 8	1000 h				
Clifton 2016; Randomised experimental study [10]	Sheep (Merino)	We aimed to characterise maternal lung and cardio-vascular responses and fetal-placental growth and lung surfactant levels in a sheep model of allergic asthma.	before	HDM (50 μg) + aluminium hydroxide (50 μg) subcutaneous injection x4 fortnightly	1 mg HDM in saline weekly for 8 weeks before mating, then fortnightly during pregnancy	✓	✓	✓	
Clifton 2019; Randomised experimental study [11]	Sheep (Merino)	Our aim was to examine the effect of maternal asthma on placental glucocorticoid receptor profiles using a pregnant sheep model of asthma	before	HDM (50 μg) + aluminium hydroxide (50 μg) subcutaneous injection x4 fortnightly	1 mg HDM in saline weekly for 8 weeks before mating, then fortnightly during pregnancy	✓	✓	✓	
Fedulov 2005; Non-Randomised experimental study [12]	Mouse (BALB/c)	We tested the potential of CpG oligodeoxynucleotides to reverse the increased susceptibility to allergic airways disease in neonatal mice in a model of maternal transmission of asthma risk.	before	OVA (5 μg) + alum (1 mg) i.p. injection at PD 3 and 7	After weaning, 10 min 3% OVA in PBS on 3 consecutive days at 4, 8, 12 weeks of age; mating occurred immediately after				✓
Fedulov 2007; Non-Randomised experimental study [13]	Mouse (BALB/c)	We hypothesised that the suboptimal sensitisation and challenge protocol may be still effective in offspring from asthmatic mothers even if sensitising injection is given much later in life. Therefore, we investigated the duration of increased susceptibility to maternally transmitted asthma	before	OVA (5 μg) + alum (1 mg) i.p. injection at PD 5 and 9	After weaning, 10 min 3% OVA in PBS on 3 consecutive days at 4, 8, 12 weeks of age; mating occurred immediately after				✓
Fedulov 2011; Non-Randomised experimental study [14]	Mouse (BALB/c)	We hypothesised that maternal allergy leads to epigenetic alterations in the dendritic cells of developing neonates.	before	OVA (5 μg) + alum (1 mg) i.p. injection at PD 3 and 7	After weaning, 10 min 3% OVA in PBS on 3 consecutive days at 4, 8, 12 weeks of age	✓			✓
Feng 2012; Randomised	Rat (Sprague-	In this study, we observed the effects of allergisation via OVA on rat pups born of asthmatic dams and the	early	OVA (100 mg) + aluminium hydroxide	30 min 1% OVA daily				✓

experimental study [15]	Dawley)	relatedness between the alteration of adrenal medulla chromaffin cells and increased asthma susceptibility in such offspring has not been established	gestation	(200 mg) + heat-killed *Bordetella pertussis* (6 x 10^9 in 1 mL saline) i.p. injection on GD 0 and 7	from GD 14 to 21				
Gerhold 2012; Non-Randomised experimental study [16]	Mouse (BALB/c)	We investigated the effect of maternal allergen exposures during pregnancy on allergen-induced sensitisation and airway inflammation in the offspring in a murine model.	before	*Not stated*	20 min, OVA, three times per week from GD 7 until delivery	✓			✓
Hamada 2003; Non-Randomised experimental study [17]	Mouse (BALB/c)	This study sought to test the hypothesis that biologic transfer of mediator(s) from mother to child can cause increased susceptibility to development of allergic asthma.	before	OVA (5 µg) + alum (1 mg) i.p. injection at PD 3 and 7	10 min 3% OVA in PBS on 3 consecutive days at 4, 8, 12 weeks of age	✓			✓
Heller 2014; Randomised experimental study [18]	Cat (strain not given)	The aims of this study were to create a more 'natural' model of feline asthma by exposing offspring of asthmatic queens to Bermuda grass allergen by inhalation only, and to investigate maternal-fetal-infant interactions in the development of asthma.	late gestation	*Not applicable - spontaneous asthma protocol*	Bermuda grass allergen (100 g) x3 each 6 days apart during last 20 days of gestation				✓
Herz 2001; Non-Randomised experimental study [19]	Mouse (BALB/c)	We assessed whether allergic sensitisation and allergen exposure during pregnancy favour the postnatal onset of allergy in the neonate.	before	OVA (10 µg) + aluminium hydroxide (1.5 mg) i.p. injection 28, 14, and 7 days prior to mating	20 min 1% OVA in PBS every second day during gestation	✓			✓
Hubeau 2006; Non-Randomised experimental study [20]	Mouse (BALB/c)	We tested the role of allergen-specific T cells in the maternal transmission of asthma risk by modifying a model where offspring of asthmatic mothers are more prone to develop asthma after an intentionally suboptimal asthma induction.	before	OVA specific DO11.10 strain T cells (5 x 10^6) i.p. injection 3 days prior to mating	10 min 3% OVA for days 1-3 prior to mating	✓			✓

Hubeau 2007; Non-Randomised experimental study [21]	Mouse (BALB/c)	In this study, we examined the effects of neonatal antibody treatments targeting T cell populations on the development of an asthma syndrome	before	OVA (5 μg) + aluminium hydroxide (1 mg) i.p. injection on PD 5 and 9	10 min 3% OVA from 3 weeks to 3 months every 4 weeks, prior to mating				✓
Lebold 2022; Non-Randomised experimental study [22]	Mouse (C57Bl/6J mice)	Here we tested whether maternal asthma skews asthma phenotypes in offspring.	before	*Not stated*	HDM (25 μg) + Lipopolysaccharide from E. coli (3857 EU/mg) for 5 days per week for 4 weeks total, before mating, then continuing 5 days per week until delivery	✓			✓
Leme 2006; Non-Randomised experimental study [23]	Mouse (BALB/c)	We sought to experimentally test the potential contribution of breast milk mediator(s) in a mouse model of maternal transmission of asthma risk by evaluating the effect of adoptive nursing on asthma susceptibility in the offspring.	before	OVA (5 μg) + alum (1 mg) i.p. injection at PD 5 and 9	After weaning, 10 min 3% OVA in PBS on 3 consecutive days at 4, 8, and 12 weeks of age				✓
Lenz 2019; Randomised experimental study [24]	Rat (Sprague Dawley)	Mast cells are known for their roles in allergic responses, thus in this study we sought to determine if exposure to an allergic response of the pregnant female in utero would alter the sexual differentiation of the preoptic area of offspring and resulting sociosexual behaviour in later life.	before	OVA (1 mg) + aluminium hydroxide (1 mg) subcutaneous injection, two doses, 3 and 1 week prior to mating	OVA 1% in saline (50 μl per nostril) at GD 15	✓			✓
Lopez-Exposito 2015; Non-Randomised experimental study [25]	Mouse (BALB/c)	In this current report we explored airway responses in offspring to first-ever exposure to maternally encountered and irrelevant antigens without prior sensitization and further investigated their modification by preconception maternal treatment with Anti-asthma Simplified Herbal Medicine	before	OVA (100 μg) + alum (2 mg) i.p. injection	OVA (100 μg) in PBS weekly for 3 weeks, then 4 weeks later 2 further consecutive day challenges	✓			✓

		Intervention or Dexamethasone							
Matson 2007; Non-Randomised experimental study [26]	Mouse (C57BL/6J)	We hypothesized that recall Th1- or Th2-type immune responses during pregnancy would result in transfer of maternal factors that would differentially impact development of immune responsiveness in offspring.	before	OVA (25 μg) + Complete Freund's Adjuvant with *killed Mycobacterium tuberculosis* (250 μg) i.p. injection, then second injection with Incomplete Freund's Adjuvant 7+ days after **OR** OVA (25 μg) + aluminium hydroxide (2 mg) i.p. injection, 2x separated by 7+ days	1 hour 1% OVA in saline for 7 consecutive days, 9-35 days after immunisation, 6-8 weeks before mating	✓			✓
Matson 2009; Non-Randomised experimental study [27]	Mouse (C57BL/6J and B cell-deficient H6AAD)	The aim of this study was to evaluate the contribution of breastmilk and maternal B cell immunity from allergic mothers in the vertical transmission of protection from allergic airway disease.	before	OVA (25 OR 8 μg) + aluminium hydroxide (2 mg) i.p. injection at 6 and 7 weeks of age	1 hour 1% OVA in saline for 7 consecutive days, 7-12 days after immunisation, 42-55 days before mating				✓
Matson 2010; Non-Randomised experimental study [28]	Mouse (C57BL/6J-wildtype and $FcRn^{-/-}$ knockout)	The aim of this study was to investigate the role of offspring neonatal Fc receptor for IgG uptake by intestinal epithelial cells in this breast milk transferred protection from allergy	before	OVA (0.32 μg) + aluminium hydroxide (0.08 mg) per gram body weight i.p. injection, 2x 7 days apart	1 hour 1% OVA in saline for 4 or 7 consecutive days, 10-19 days following second injection	✓			✓
Meakin 2021; Randomised experimental	Sheep (Merino)	Our aim was to explore whether the sheep placenta expresses androgen receptor isoforms and determine if the differential expression of androgen receptor	before	HDM (50 μg) + aluminium hydroxide (50 μg) subcutaneous	1 mg HDM in saline weekly for 8 weeks before mating, then fortnightly during	✓	✓	✓	

study [29]		protein isoforms is altered by maternal asthma.		injection x4 fortnightly	pregnancy				
Nakata 2010; Non-Randomised experimental study [30]	Mouse (C57BL/6, $FcRn^{+/-}$ and $FcRn^{-/-}$ knockouts)	First, we confirmed that the development of allergic airway inflammation is reduced in an FcRn-dependent manner by sensitizing mother mice before pregnancy and inducing allergy. Next, we determined whether antigen-specific IgG in breast milk can reduce the development of allergic airway inflammation in offspring which were sensitized and challenged with OVA.	before	OVA (50 μg) + alum (1 mg) i.p. injections, 2-3 times	30 min 1% OVA in PBS on 3 consecutive days				✓
Pucheu-Haston 2009; Non-Randomised experimental study [31]	Mouse (BALB/c)	We hypothesized that pregnancy would be associated with an enhanced maternal allergic response to *Metarhizium anisopliae* fungal extract	before	*Metarhizium anisopliae* fungus (40 μg) in Hank's buffered salt solution (50 μl) intratracheal aspiration on days 1 and 7 of study to sensitise	Intratracheal *Metarhizium anisopliae* challenges on GD 11, 15, 19	✓			
Pucheu-Haston 2010; Non-Randomised experimental study [32]	Mouse (BALB/c)	In this study, a respiratory allergen exposure model was used to determine the impact of maternal sensitization (with or without additional exposures during pregnancy) on subsequent pup responses to homologous or heterologous allergen.	before	*Metarhizium anisopliae* (40 μg) in Hank's buffered salt solution (50 μl) intratracheal aspiration 14 and 7 days before mating	Intratracheal *Metarhizium anisopliae* challenges on GD 11, 15, 19	✓		✓	✓
Pulczinski 2021; Non-Randomised experimental study [33]	Mouse (C57Bl/6J)	Here we use a mouse model of allergic lung disease to examine the effects of pre- and perinatal HDM allergen exposure on offspring phenotypic and transcriptional outcomes in three generations.	before	HDM (100 μg) i.p. injection, 2 weeks prior to mating	HDM (100 μg) intratracheal instillation 3x per week during pregnancy and 3 weeks postpartum				✓
Schwartzer 2015; Randomised	Mouse (C57Bl/6J)	We used a mouse model of maternal allergic asthma to test this novel hypothesis that early fetal priming with an allergenic exposure during gestation produces	before	OVA (10 μg) + aluminium hydroxide (1 mg) i.p. injection on PD	45 min 1% OVA in PBS on GD 9.5, 12.5, 17.5	✓			✓

experimental study [34]		behavioural deficits in offspring		42 and 49, one week prior to mating					
Schwartzer 2017; Randomised experimental study [35]	Mouse (C57 and FVB/Ant mice)	Based on the distinct allergy-sensitive immune responses of these two strains, we hypothesised that unique developmental consequences would occur in offspring following maternal allergy-asthma exposure.	before	OVA (10 μg) + aluminium hydroxide (1 mg) i.p. injection on PD 42 and 49, one week prior to mating	45 min 1% OVA in PBS on GD 9.5, 12.5, 17.5	✓			✓
Sodemann 2020; Non-Randomised experimental study [36]	Mouse (BALB/c)	Using a mouse model, we examined how maternal allergic airway inflammation during pregnancy influenced offspring experimental asthma severity, as well as maternal and offspring serum IgG antibody glycosylation patterns. Additionally, the effects of maternal and offspring exposure to the same or different allergens were investigated.	before	CAS (10 μg) or OVA (10 μg) adjuvant-free subcutaneous injection at 8, 9, and 10 weeks of age before mating at 12 weeks of age	20 min 1% CAS or OVA on GD 6, 8, 10, 12, 14, 16	✓			
Tamayo 2022; Randomised experimental study [37]	Mouse (C57BL/6J)	To further elucidate if there is neuroinflammation in the fetus following maternal allergic airway disease, we investigated how allergic asthma impacts the maternal environment and inflammatory markers in the placenta and fetal brain during gestation.	before	OVA (10 μg) + aluminium hydroxide (1 mg) i.p. injection at 6 and 7 weeks of age, before mating at 8 weeks	45 min 1% OVA in PBS at GD 9.5, 12.5, 17.5	✓	✓	✓	
Vogel Ciernia 2018; Randomised experimental study [38]	Mouse (C57Bl/6J)	We tested the hypothesis that epigenomic alterations to microglia may be involved in behavioural abnormalities observed in maternal allergic asthma offspring.	early gestation	OVA (10 μg) + aluminium hydroxide (1 mg) i.p. injection at PD 42 and 49, one week prior to mating	45 min 1% OVA in PBS at GD 9.5, 12.5, 17.5				✓
Wooldridge 2019; Randomised experimental study [39]	Sheep (Merino)	We hypothesised that fetal lung structure and immune phenotype in late gestation fetal sheep would be impaired in our sheep model of maternal allergic asthma during pregnancy	before	HDM (50 μg) + aluminium hydroxide (50 μg) subcutaneous injection x4 fortnightly	1 mg HDM in saline weekly for 8 weeks before mating, then fortnightly during pregnancy	✓		✓	

Wu 2011; Randomised experimental study [40]	Rat (Sprague-Dawley)	This study aims to explore the influence of maternal asthma during pregnancy on the development and function of adrenal medulla in offspring from PD 3 to PD 60.	early gestation	OVA (100 mg) + aluminium hydroxide (200 mg) + heat-killed *Bordetella pertussis* (6 x 10^9 in 1 mL saline) i.p. injection on GD 0 and 7	30 min 1% OVA daily from GD 14-21	✓			✓

✓ **=** study explored outcomes in this category, alum = aluminium based adjuvant, FcRn = neonatal Fc Receptor for IgG, GD = days of gestational age, HDM = house dust mite, IgG = immunoglobulin G, i.p. = intraperitoneal OVA = ovalbumin, PBS = phosphate-buffered saline, PD = postnatal day, Th1 = T helper cells type 1, Th2 = T helper cells type 2

Table S4 – Maternal outcomes

Study ID; species; allergen	Outcome name	Brief methods	Pregnancy stage or age at outcome measure; timing of measurements	Findings in asthmatic animals (ref: controls)	Validates asthma phenotype?
Endocrine outcomes					
Church 2021; mouse; OVA[9]	Serum corticosterone concentration	ELISA	Early: GD 2 and GD9. Late: GD9 and GD17; immediately after first or last allergen challenge	Higher corticosterone concentration in PBS and OVA exposed animals at earlier (GD2 and 9) and later time points (GD 9 and 17) compared to controls (~4-5-fold)	N
Wu 2011; rat; OVA[40]	Serum adrenaline concentration	ELISA	*Unclear*; maternal challenges were daily from GD 14-21	No differences	N
Wu 2011; rat; OVA[40]	Serum corticosterone concentration	ELISA	*Unclear*; maternal challenges were daily from GD 14-21	Higher plasma concentrations (~2.4 fold)	N
Wu 2011; rat; OVA[40]	Serum nerve growth factor	ELISA	*Unclear*; maternal challenges were daily from GD 14-21	Higher concentrations (~2.2 fold)	N
Immune outcomes					
Abdala-Valencia 2016; mouse; OVA[3]	OVA-specific IgE	ELISA	GD 18	Higher concentrations in asthmatic mothers from basal diet (~1.5 fold) and 250 mg γ-T diet (~2 fold)	N
Allina 2011; mouse; OVA[5]	OVA-specific IgE concentration	ELISA	before pregnancy; within 24 hours of final challenge	Higher OVA-specific IgE concentration (~5.5 fold)	N
Church 2021; mouse; OVA[9]	Serum cytokines	Multiplex bead-based immunoassay	Early: GD 9. Late: GD17; four hours after last allergen challenge	Higher concentration in early OVA exposed group: IFN-γ (~27 fold), IL-1β (~9 fold), IL-5 (~5 fold), IL-6 (~7 fold), IL-10 (~21 fold), IL-17A (3.5 fold), IL-18 (~7 fold), IL-22 (~23 fold), IL-23 (~20.5 fold), TNFα (3.5 fold). No differences in GM-CSF, IL-2, IL-4, Il-9, IL-12 (p70), IL-13, IL-27	N
Church 2021; mouse; OVA[9]	Serum OVA-specific IgE concentration	ELISA	Early: GD 9. Late: GD 17; four hours after last allergen challenge	~25-fold higher concentration in the OVA challenged groups compared to control PBS group	N
Clifton 2016; sheep; HDM[10]	BAL lung immune response	Kwik-Diff stain and light	Pre-mating, at mid-pregnancy (GD 50-65) and in late pregnancy	Lower percentage of lymphocytes post-challenge at pre-mating timepoint (~0.7 fold). Higher percentage of	Y

		microscopy	(GD 118-132); prior to (0 h) and after (48 h) aerosol challenges	macrophages in late pregnancy for pre-challenges (~1.1 fold) and lower post-challenge (~0.5 fold). Higher percentage of eosinophils after challenge in pre-mating (~4.5 fold) and late pregnancy (~9.5 fold). No differences for neutrophils, or at other time points, pre- or post-challenge.	
Gerhold 2012; mouse; OVA[16]	OVA-specific IgE	ELISA	*Not reported*; after OVA challenges three times a week from GD 7 to 21	No differences in OVA-specific IgE	N
Hamada 2003; mouse; OVA[17]	BAL lung immune response	BALF cell stain & count	4 weeks; after allergen aerosols at weeks 4 (also given weeks 8 and 12)	Higher BAL eosinophil number (~35 fold; similar results at 8, 12, and 2 weeks postnatal but data not shown)	Y
Herz 2001; mouse; OVA[19]	T cell populations in antibody titers	Flow cytometry and ELISA	PD 1-2; OVA challenges every second day during pregnancy	No difference in frequencies of IFN-γ or IL-4 producing T cells	N
Hubeau 2006; mouse; OVA[20]	BAL lung immune cells	BAL stain and cell count	PD 5; aerosol challenged in each of the 3 days prior to mating	Higher total cells count in BAL (~4.4 fold), and higher eosinophils (~13 fold) in asthmatic mothers not a recipient of DO11.1 T cells. No differences were seen in asthmatic mothers that were recipients. No differences observed for macrophages numbers, or lymphocytes in asthmatic mothers with or without the donor cells.	Y
Hubeau 2006; mouse; OVA[20]	Serum cytokines	Immunoassay	PD 5; aerosol challenged in each of the 3 days prior to mating	In asthmatic group that received DO11.1 T cells, higher concentration of: IFN-γ (~3.7 fold), IL-10 (~2.3 fold), IL-4 (~27 fold), and IL-13 (~2.7 fold)	N
Leme 2006; mouse; OVA[23]	Breast milk cytokines	ELISA & flow cytometry	PD 8-9; maternal challenges were week 4, 8, and 12 before mating	No differences in concentration of IFN-γ, IL-2, IL-4, IL-5, TNF-α, and IL-13 in breast milk, or offspring stomach, including no mRNA expression for IL4, IL-5, and IL-13	N
Lenz 2019; rat; OVA[24]	Serum IgE concentration	ELISA	GD 15; blood collected 30 mins after allergen challenge	Higher IgE concentration (~17 fold)	N
Lopez-Exposito 2015; mouse; OVA[25]	Lung inflammation & immune cells	BALF cell count & stain	Protocol day 59; maternal challenges on protocol days 14, 21, 28, 56, and 57	Increased peribronchial and perivascular inflammation; higher percentage of eosinophils (~35 fold)	Y
Matson 2010; mouse; OVA[28]	Immunoglobulins and cytokines	ELISA	24 hours after the first aerosol challenge (5-6 weeks)	No differences in IL-5, OVA-IgG1, OVA-IgE	N
Matson 2010; mouse; OVA[28]	Maternal lung immune response	BAL stain & count and flow cytometry	24 hours after the first aerosol challenge (5-6 weeks)	No differences in eosinophils, CD4+, IL-33R+, CD8+ and OVA Tetramer lymphocytes	N

Schwartzer 2015; mouse; OVA[34]	BAL and serum cytokines	Multiplexing bead immunoassays	GD 17.5; BAL collected 4 hours after challenge on GD 17.5	BAL Higher concentration of IL-4 (~47 fold), IL-5 (~28 fold), IL-6 (~171 fold), IP-10 (~16 fold), MIP-1α (~5.3 fold), and TNF-α (~9 fold). No difference in IL-1β, IL-2, IL-7, IL-10, IL-12 (p40), or IL-13. Serum Higher concentration of IL-4 (~4 fold), IL-5 (~12 fold), IL-10 (~8.7 fold), and IP-10 (~1.3 fold). No difference in IL-1β, IL-2, IL-6, IL-7, IL-10, IL-12 (p40), IL-13, MIP-1α, and TNF-α	Y
Schwartzer 2017; mouse; OVA[35]	Serum cytokines	Immunoassay	GD 17.5; collected 4 hours after challenge on GD 17.5	C57 strain Higher concentration of IL-4 (>10 fold), IL-5 (~13 fold), IFN-γ (~7.1 fold), IL-2 (>40 fold), IL-6 (~27 fold), IL-1β (~12 fold), and IL-17 (~10 fold) but no difference in IL-13 or TNF-α FVB/Ant strain Higher concentration of IL-4 (>10 fold), IL-5 (~40 fold), and IFNγ (~2.9 fold). IL-13 was lower (~0.75 fold) but no difference for IL-2, IL-6, IL-1b, TNFa and IL-17	N
Sodemann 2020; mouse; OVA or CAS[36]	Asn-297 IgG antibody glycosylation	Nano-liquid chromatography	PD 134; maternal allergen recall challenge on PD 131-133	CAS induced maternal asthma and offspring challenged with OVA: no difference in IgG1 with G0, G1S1, or G2S1 glycosylation, but lower for G3S1 (~0.5 fold) and G2S2 (~0.4 fold). No differences to IgG3 G0, G1S1, or G2S1 glycosylation. OVA induced maternal asthma and offspring challenged with OVA: no difference for Ig1 with G0 glycosylation but lower for G1S1 (~0.35 fold), G2S1 (~0.23 fold), G3S1 (~0.29 fold), G2S2 glycosylation (~0.17 fold). No difference in IgG3 G0 glycosylation, but lower for G1S1 (~ fold) and G2S1 (~ fold).	N
Sodemann 2020; mouse; OVA or CAS[36]	Lung inflammation & immune cells	BAL cell stain & count	PD 134; maternal allergen recall challenge on PD 131-133	In offspring of CAS induced asthmatic mothers: Higher concentration of leucocytes (~15 fold), eosinophils (>14 fold), lymphocytes (~9 fold), and lung	Y

				inflammation (~7 fold). No difference in macrophages In offspring of OVA induced asthmatic mothers: Higher concentration of leucocytes (~14 fold), eosinophils (>12 fold), lymphocytes (~8 fold), and lung inflammation (~5 fold). No difference in macrophages	
Sodemann 2020; mouse; OVA or CAS[36]	Serum immunoglobulins	ELISA	PD 134; maternal allergen recall challenge on PD 131-133	In CAS induced asthma, no differences in OVA-IgG1 or OVA-IgE but higher concentration of CAS-IgG1 (~36 fold) and CAS-IgE (~9 fold). No differences in CAS-IgG1 and CAS-IgE. In OVA induced asthma, higher concentration of OVA-IgG1 (>4500 fold) and OVA-IgE (~40 fold).	N
Tamayo 2022; mouse; OVA[37]	Maternal Serum Cytokines	Multiplex bead immunoassay	GD 17.5; 4 hours after challenge on GD 17.5	Higher concentration of IL-4 (~1.9 fold), IL-5 (~4 fold), IL-13 (~2 fold), IL-6 (~5 fold), IL-12 (p40) (~6 fold), IL-17 (~2 fold), and MIP1α (~3 fold)	N
Wooldridge 2019; sheep; HDM[39]	Amniotic cytokines	ELISA	GD 140 ± 1; 17 ± 1 day after late pregnancy allergen challenge	No differences for amniotic cytokines: IL-6, IL-10, IL-13, or TNF-α	N
Wooldridge 2019; sheep; HDM[39]	Maternal cytokines	ELISA	GD 140 ± 1; 17 ± 1 day after late pregnancy allergen challenge	No differences in allergen-specific (house dust mite) total Ig, IgE, IgA or IgM	N
Wu 2011; rat; OVA[40]	Lung immune cells	BALF cell stain & count	24 hours after the last OVA challenge; no offspring challenges. Maternal challenges were daily from GD 14-21	Higher total cell count (~2.3 fold), eosinophils (~3.2 fold) and neutrophils (~6.7 fold)	Y
Other (non-lung) organ outcomes					
Abdala-Valencia 2014; mouse; OVA[2]	Liver α-T	High-pressure liquid chromatography	GD 18; challenged before mating but not during pregnancy	No differences	N
Abdala-Valencia 2016; mouse; OVA[3]	Liver γ-T	High pressure liquid chromatograph	GD 18; challenged before mating but not during pregnancy	No differences	N

		y			
Wu 2011; rat; OVA[40]	Histopathology examination of maternal adrenal medulla	Electron microscopy	24 hours after the last OVA challenge; no offspring challenges, maternal challenges were daily from GD 14-21	Vacuolar degeneration and lipid increases. Mitochondrion swelled, lipid increased and chromaffin granules decreased. Lesions were alleviated and appeared more collagen tissue, which divided adrenal medulla into island	N
Wu 2011; rat; OVA[40]	The expression of nerve growth factor in adrenal medulla	ELISA	*Unclear*; no offspring challenges, maternal challenges were daily from GD 14-21	Higher protein expression (~1.8 fold)	N
Wu 2011; rat; OVA[40]	The expression of phenylethanolamine N-methyltransferase in adrenal medulla	Immunohistochemistry	*Unclear*; no offspring challenges, maternal challenges were daily from GD 14-21	No differences	N
Respiratory outcomes					
Babayigit 2008; mouse; OVA[6]	Histopathological lung parameters	Electron microscopy	PD 1; final challenge was GD 18	Increased basement membrane thickness (~1.5 fold), epithelium thickness (~1.2 fold) and subepithelial smooth muscle thickness (~1.5 fold)	Y
Clifton 2016; sheep; HDM[10]	Baseline lung resistance	Intra and extrathoracic pressures via catheters	pre-mating, at mid-pregnancy (GD 50-65) and in late pregnancy (GD 118-132); prior to (0 h) and after (48 h) aerosol challenges	Lung resistance higher in late pregnancy (~1.8 fold) and increased in mid-late pregnancy compared to early pregnancy (~1.1 fold)	Y
Clifton 2016; sheep; HDM[10]	Lung histological analysis	morphometric image analysis	late pregnancy; 17 ± 1 day after late pregnancy allergen challenge	No differences in granulated mast cells. More smooth muscle accumulation around airways (~1.7 fold)	Y
Hamada 2003; mouse; OVA[17]	Airway responsiveness	Methacholine challenge	4 weeks (data at 8, 12, and 2 weeks postnatal not shown); after allergen aerosols at weeks 4 (also given weeks 8 and 12)	Higher airway hyperresponsiveness at 12, 25, 50, 100 mg/ml methacholine (~2-7 fold)	Y
Hubeau 2006; mouse; OVA[20]	Airway responsiveness	Methacholine challenge	PD 5; after OVA sensitisation injection on day 4 but before challenged	No difference in asthmatic mothers who received DO11.1 T cells, but higher airway hyperresponsiveness in non-recipient asthmatic mothers at 6, 12, 25, 50, and 100 mg/ml methacholine (~2-3 fold)	Y

Lopez-Exposito 2015; mouse; OVA[25]	Airway hyper-responsiveness	Acetylcholine challenge	Protocol day 59; maternal challenges on protocol days 14, 21, 28, 56, and 57	Airway hyperresponsiveness higher (~4.2 fold)	Y
Wu 2011; rat; OVA[40]	Airway responsiveness to histamine	Histamine challenge	24 hours after the last OVA challenge; no offspring challenges, maternal challenges were daily from GD 14-21	Airway responsiveness higher at 0.08, 0.16, and 0.32 mg/ml histamine (~1.7-1.9 fold)	Y
Wu 2011; rat; OVA[40]	Histopathology examination of maternal lung	Electron microscopy	24 hours after the last OVA challenge; no offspring challenges, maternal challenges were daily from GD 14-21	Bronchial epithelial shedding, eosinophil and neutrophils infiltration surrounding airway	Y

BAL = bronchoalveolar lavage, CAS = casein, ELISA = enzyme-linked immunosorbent assay, GD = day of gestation, GM-CSF = Granulocyte-macrophage colony-stimulating factor, HDM = house dust mite, IFN = interferon, Ig = immunoglobulin, IL = interleukin, MIP = macrophage inflammatory protein, N = No, NGF = nerve growth factor, OVA = ovalbumin, PD = postnatal day, TNF = tumour necrosis factor, y = yes

Table S5 – Placental outcomes

Study ID	Outcome name	Brief methods	Pregnancy stage or age; timing of measurement	Findings in asthmatic animals (ref: controls)	Sex-specific?
Immune outcomes					
Akkoc 2008; mouse; OVA[4]	Cytokine levels of placental lymphocytes	ELISA	GD 18; OVA challenged every second day during pregnancy, unclear if measurement before or after challenge	In OVA and M. vaccae immunised group: lower OVA-specific IL-5 (~0.14 fold) and IL-5/IFN-γ ratio (~0.7 fold)	No
Tamayo 2022; mouse; OVA[37]	Placental cytokines	Multiplex bead immunoassay	GD 17.5; 4 hours after maternal challenge on GD 17.5	In females, lower concentration of MCP-1 (~0.5 fold) and IL-17 (~0.8 fold) In males, lower expression of IL-4 (~0.8 fold), IP-10 (~0.5 fold), RANTES (~0.4 fold), and IL-17 (~0.8 fold)	Yes
Endocrine outcomes					
Clifton 2019; sheep; HDM[11]	Placental GR isoforms	Western blot	GD 140 ± 1 days; 17 ± 1 day after late pregnancy allergen challenge	CYTOSOLIC fraction Cot A: No differences for GRα-C1-3, GR-A, or GRα-D1 Cot B higher expression of GRγ (~3 fold), GRα-A (~3 fold), and GR-P (~3.5 fold) Cot D higher expression of GR-P (~3 fold) but no difference for GRα-A or GR-γ NUCLEAR fraction In Cot A: higher expression of GRα-C1-3 (~3 fold), GR-A (~2.2 fold), GRα-D1 (~1.2 fold) In Cot B: higher expression of GRγ (~2 fold) but no difference for GRα-A or GR-P In Cot D: no differences for GRγ, GRα-A, GR-P	No
Meakin 2021; sheep; HDM[29]	Placental AR isoform expression	Western blot	GD 140 ± 1 days; 17 ± 1 day after late pregnancy allergen challenge	Nuclear protein expression: AR-45 lower (~0.45 fold, Cots A-D) Cytoplasmic protein expression: AR-v1 lower (~0.6 fold, Cots A-D)	No

				Cot B: cytoplasmic AR-45 (~0.4 fold) and AR-FL (~0.3 fold) lower in asthma Cot D: cytoplasmic AR-v1 lower in asthma (~0.6 fold)	
Meakin 2021; sheep; HDM[29]	Placental AR isoform subcellular distribution	Western blot	GD 140 ± 1 days; 17 ± 1 day after late pregnancy allergen challenge	In asthma group only, nuclear vs cytoplasmic: AR-45: higher Cot C (~3 fold) and D (~5.5 fold) AR-v7: lower in Cot A (~0.09 fold), B (~0.14 fold), C (~0.14 fold), and D (~0.22 fold) AR-v1: lower in Cot A (~0.2 fold), B (~0.3 fold), and D (~0.3 fold) AR-FL: lower in Cot A (~0.1 fold)	No
Anatomical outcomes					
Clifton 2016; sheep; HDM[10]	Placental weight and phenotype	Placentome weighed/scored	GD 140 ± 1 days; 17 ± 1 day after late pregnancy allergen challenge	Higher proportion of Type B (~2 fold) and Type C (~2.2 fold) placentomes. Type A total weight was lower (~0.3 fold)	No
Clifton 2019; sheep; HDM[11]	Placenta weights	Weighing at postmortem	GD 140 ± 1 days; 17 ± 1 day after late pregnancy allergen challenge	No difference in placental weight	No
Clifton 2019; sheep; HDM[11]	Placental phenotypes	Placental phenotyping	GD 140 ± 1 days; 17 ± 1 day after late pregnancy allergen challenge	Higher proportion of Type B (~2 fold) and Type C (~2.5 fold) placentomes	No
Clifton 2019; sheep; HDM[11]	Placental volume density	Placental histology	GD 140 ± 1 days; 17 ± 1 day after late pregnancy allergen challenge	Lower placenta volumes of: trophoblasts (~0.8 fold), fetal connective tissue (~0.8 fold), maternal epithelium (~0.8 fold), maternal capillaries (~0.7 fold), and maternal connective tissue (~0.8 fold). No differences in volume density.	No

AR = androgen receptor, cot = cotyledonary placenta, ELISA = enzyme-linked immunosorbent assay, GD = days of gestation, GR = glucocorticoid receptor, HDM = house dust mite, IFN = interferon, IL = interleukin, IP = induced protein, MCP = monocyte chemoattractant protein, OVA = ovalbumin, RANTES = regulated on activation normal T cell

expressed and secreted

Table S6 – Pregnancy and Fetal outcomes

Study ID	Outcome name	Brief methods	Pregnancy stage or age; timing of measurement	Findings in asthmatic animals (ref: controls)	Sex-specific?
Endocrine outcomes					
Wooldridge 2019; sheep; HDM[39]	Cortisol	ELISA	GD 140 ± 1; 17 ± 1 day after late pregnancy allergen challenge	Lower maternal plasma cortisol (~0.26 fold) but not fetal	No
Genetic & epigenetic outcomes					
Clifton 2016; sheep; HDM[10]	Lung gene expression	RNA extraction	GD 140 ± 1 days; 17 ± 1 day after late pregnancy allergen challenge	Fetal lung gene expression of surfactant protein B was reduced (~0.6 fold)	No
Immune outcomes					
Tamayo 2022; mouse; OVA[37]	Whole-Brain Fetal Cytokines	Multiplex bead immunoassay	GD 17.5, 4 hours after maternal challenge	Higher in males and females: GM-CSF (~2-2.5 fold), IFNγ (~1.7-2.3 fold), IL-1α (~1.5-2.5 fold), IL-6 (~1.3-1.7 fold), TNFa (~4-5 fold) Lower in males and females: IL-9 (~0.4 fold) Lower in males only: IL-1β (~0.7 fold), IP-10 (~0.4 fold) Higher in males only: MIP-2 (~1.3 fold) Higher in females only: KC (~3.8 fold)	Yes
Wooldridge 2019; sheep; HDM[39]	Fetal plasma cytokines	ELISA	GD 140 ± 1; 17 ± 1 day after late pregnancy allergen challenge	No differences in allergen-specific total Ig, IgE, IgA, or IgM	No
Wooldridge 2019; sheep; HDM[39]	Lung tissue immune cells	Immunohistochemistry & cell count	GD 140 ± 1; 17 ± 1 day after late pregnancy allergen challenge	No difference in CD45+ Leucocytes or CD163+ macrophages	No
Wooldridge 2019; sheep; HDM[39]	Thymus and spleen tissue immune cells	Flow cytometry	GD 140 ± 1; 17 ± 1 day after late pregnancy allergen challenge	CD44+ lymphocytes (%) were higher (~4 fold)	No

Respiratory outcomes					
Wooldridge 2019; sheep; HDM[39]	Lung structure histology	Histological image analysis	GD 140 ± 1; 17 ± 1 day after late pregnancy allergen challenge	Lung tissue to airspace ratio: no difference Density of surfactant protein C positive type II epithelial cells was lower (~0.7 fold)	No
Size outcomes					
Abdala-Valencia 2014; mouse; OVA[2]	Pup body weight	Weight at post-mortem	PD 13; 24 hours after pups challenged days 10-12	No differences based on maternal or offspring OVA challenges, basal diet, or different doses of α-T diet (150, 250, or 500mg)	No
Abdala-Valencia 2016; mouse; OVA[3]	Pup body weight	Weight at post-mortem	PD 13; pups challenged days 10-12	No differences in number of pups, litter size or weight based on asthma status or diet alone.	No
Allina 2011; mouse; OVA[5]	Pup bodyweight	Delivery records and weighing	PD 7; maternal challenges all premating, no offspring challenges	No differences in mass/pup/litter, average litter size, percentage of male to female pups or treatment interaction	Yes
Clifton 2016; sheep; HDM[10]	Fetal weight (absolute and relative)	Weighing at delivery	GD 140 ± 1 day; 17 ± 1 day after late pregnancy allergen challenge	Lower fetal:maternal weight ratio (~0.8 fold)	No
Clifton 2019; sheep; HDM[11]	Body weights	Weight at post-mortem	GD 140 ± 1 day; 17 ± 1 day after late pregnancy allergen challenge	No differences for: maternal weight, gestational age, or fetal weight Lower fetal:maternal weight ratio (~0.8 fold)	No
Wooldridge 2019; sheep; HDM[39]	Body and organ weights	Weight at postmortem	GD 140 ± 1; 17 ± 1 day after late pregnancy allergen challenge	No differences absolute or relative weights: ewe body weight, fetal lungs, fetal spleen, and fetal thymus Lower fetal:maternal weight ratio (~0.8 fold)	No
Survival outcomes					

Abdala-Valencia 2016; mouse; OVA[3]	Pup viability	Weight at post-mortem	PD 13; pups challenged days 10-12	Only in asthmatic mothers fed 250 mg γ-T were there fewer pups (~0.5 fold)	No
Allina 2011; mouse; OVA[5]	Pup litter size	Delivery records	PD 7; maternal challenges all premating, no offspring challenges	No differences average litter size or effect of sex	Yes
Pucheu-Haston 2009; mouse; Metarhizium anisopliae fungus[31]	Pup viability and litter size	Implantation sites count	PD 51-59; one group had pre-breeding challenges only; another had 3 post-breeding challenges to mimic exacerbation	No differences in percentage of successful pregnancies, or viable pups per litter	No
Pucheu-Haston 2010; mouse; Metarhizium anisopliae fungus[32]	Pup viability and litter size	Implantation sites count	GD 21; some mothers only received premating challenges and others had gestational challenges on days 11, 15 and 19	No differences in percentage of successful pregnancies or viable pups per litter dependent on number of allergen exposure or type of allergen	No

BAL = bronchoalveolar lavage, CAS = casein, ELISA = enzyme-linked immunosorbent assay, GD = day of gestation, GM-CSF = Granulocyte-macrophage colony-stimulating factor, HDM = house dust mite, IFN = interferon, Ig = immunoglobulin, IL = interleukin, IP = induced protein, KC = keratinocyte derived cytokine, MIP = macrophage inflammatory protein, OVA = ovalbumin, PD = postnatal day, TNF = tumour necrosis factor

Table S7 – Postnatal progeny outcomes

Study ID	Outcome name	Brief methods	Pregnancy stage or age; timing of measurement	Findings in asthmatic animals (ref: controls)	Sex specific ?
Behavioural outcomes					
Church 2021; mouse; OVA[9]	Anxiety behaviours	Elevated plus maze & marble burying	8 weeks; offspring not postnatally challenged	In early and late OVA-challenge, results were comparable. In males, time in open arm was lower (~0.7 fold), time in closed arm higher (~1.5 fold), percentage exploration was lower (~0.7 fold) and marble burying was higher (~4-6 fold) in early challenge (GD2-9) but not different in late challenge (GD10-17). In females, there was no difference for time in open or closed arm, percentage exploration, or marble burying.	Yes
Church 2021; mouse; OVA[9]	Locomotor & social activity	Video & score	PD 21; offspring not postnatally challenged	No differences in locomotor activity, social sniff, body contact, or approach	Yes
Lenz 2019; rat; OVA[24]	Female preference	Olfactory preference test	PD 60; offspring not challenged, last maternal challenge was GD 15	In males, there was a lower female preference (~0.35 in controls but -0.02 in OVA group) but no difference in female mice	Yes
Lenz 2019; rat; OVA[24]	Male typical reproductive behaviours	Sexual behaviour testing	PD 60-80; offspring not challenged, last maternal challenge was GD 15	In males, no difference in latency to mount or mount rate. In females, latency to mount was lower (~0.4 fold) and mount rate was higher (~6 fold)	Yes
Schwartzer 2015; mouse; OVA[34]	Anxiety-like behavior	Elevated plus maze	Week 8; offspring not challenged. Final challenge was maternal on GD 17.5	No differences in time in open arm, entries into open arm, or total entries. No sex effects	Yes
Schwartzer 2015;	Learning & memory	Novel object	Week 10; offspring not challenged. Final challenge	No difference. No sex effects	Yes

mouse; OVA[34]		recognition	was maternal on GD 17.5		
Schwartzer 2015; mouse; OVA[34]	Locomotor activity	Arena exploration	Week 10; offspring not challenged. Final challenge was maternal on GD 17.5	Distance travelled: no difference. Average velocity: no difference. No sex effects	Yes
Schwartzer 2015; mouse; OVA[34]	Repetitive behaviours (marble burying and grooming)	Video score & number of marbles buried	9 weeks + 10 weeks; offspring not challenged. Final challenge was maternal on GD 17.5	In offspring of asthmatic mothers, marble burying was higher (~1.6 fold), and grooming was lower than offspring of controls (~0.8 fold). Males had a higher burying rate and spent more time grooming than females	Yes
Schwartzer 2015; mouse; OVA[34]	Social behaviour	Social approach and dominance tube tests	Cohort 1: week 8 and Cohort 2: week 9 Offspring not challenged. Final challenge was maternal on GD 17.5	Sociability score: lower (~0.7 fold). Chamber exploration no difference for reduced time with novel mouse but increased time with novel object (~1.4 fold). Social dominance: no differences. No sex effects.	Yes
Schwartzer 2017; mouse; OVA[35]	Anxiety-like behaviours	Elevated plus-maze & open field	8 weeks; offspring not challenged. Final challenge was maternal on day 17.5 of gestation	In C57 mice, no differences in percentage time in open arms of the maze or in the centre of the open field area. In FVB/Ant mice, the percentage time spent in open arms was not different, but higher percentage of time in the centre of the open field (~1.05 fold).	No
Schwartzer 2017; mouse; OVA[35]	Locomotor behaviour	Horizontal locomotor activity	8 weeks; offspring not challenged. Final challenge was maternal on day 17.5 of gestation	In C57 mice, there was no difference in velocity or distance travelled. In FVB/Ant mice, the velocity was higher (~1.1 fold) but no difference in distance travelled.	No
Schwartzer 2017; mouse; OVA[35]	Repetitive behaviours (marble burying and grooming)	Video score & number of marbles buried	8 weeks; offspring not challenged. Final challenge was maternal on day 17.5 of gestation	Results were consistent in both strains of mice (C57 mice and FVB/Ant), less grooming behaviour (~0.6-0.7 fold) and higher percentage of marbles buried (~1.7 fold). No sex differences.	Yes

Schwartzer 2017; mouse; OVA[35]	Social interactions	Reciprocal social interaction task	PD 21; offspring not challenged. Final challenge was maternal on day 17.5 of gestation	In C57 mice, lower total social time (~0.8 fold) and body sniff (~0.7 fold) but no difference in following behaviours. No sex differences In FVB/Ant mice, total social time (~2 fold) and body sniff were higher (~2.6 fold), but no difference in following behaviour. No sex differences	Yes
Endocrine outcomes					
Allina 2011; mouse; OVA[5]	Hepatic fibrosis-related mRNA expression	RT-qPCR	8 weeks postnatal; maternal challenges all premating, no offspring challenges	Results in mice exposed to air and cigarette smoke were the same. In male offspring of asthmatic mothers compared to smoke exposed offspring of non-asthmatic mothers, higher mRNA expression of Collagen 1A1 (~2 fold). In air exposed mice, offspring of asthmatic mothers compared to controls had reduced expression of platelet-derived growth factor receptor-β (~0.08 fold). In females, no difference in expression of Collagen 1A1 and in smoke exposed offspring, reduced expression of platelet-derived growth factor receptor-β in offspring of asthmatic mothers (~0.17 fold).	Yes
Fedulov 2011; mouse; OVA[14]	Genotype profiling of splenic dendritic cells	Flow cytometry	PD 14; offspring challenged at 13-15 days with suboptimal protocol	No reproducible genotype differences.	No
Fedulov 2011; mouse; OVA[14]	Whole genome epigenomic differences	Genome-wide assay	PD 14; offspring challenged at 13-15 days with suboptimal protocol	Cytosine-phosphate-guanosine island and other locations differentially methylated - 40 different sites very different. Each sample in the asthma-susceptible group had a higher level of methylation. Fold change varied from 8.9 to 716.7.	No
Feng 2012; rat; OVA[15]	Serum epinephrine, corticosterone, and nerve growth factor concentrations	ELISA	*Unclear*; offspring protocol began 6-8 weeks, with daily aerosol challenge on protocol days 14-21	Epinephrine: lower (~0.9 fold) Corticosterone: no difference Nerve growth factor: higher (~1.1 fold)	No

Genetic & epigenetic outcomes					
Pulczinski 2021; mouse; HDM[33]	mRNA expression of airway hyperresponsive phenotypic genes in different generation progenies	RT-qPCR	6 weeks + 23 days; offspring challenge (all generations) on 6 weeks + 14, 18, and 21 days	FIRST GENERATION No differences for first generation allergen-challenged offspring of asthmatic mothers: Ccnd1, Pcna, Col1a, Col3a, Muc5b, Sma, Camk2d, Mylk, Dnmt1, Dnmt3a, Dnmt3b, Mecp2, Tet1, Tet2, Dpy19|1, Lars2, Nron, and Oasl2. Lower expression of Erdr1 (~0.26 fold), but higher expression of Kcnh1 (~1.9 fold) and Spag17 (~1.8 fold). SECOND GENERATION No differences for second generation offspring of challenged generation 0 and 1: Ccnd1, Pcna, Col1a, Muc5b, Sma, Camk2d, Mylk. Higher expression of Col3a (~2.1 fold) and Kcnh1 (~1.5 fold) but no difference in Spag17. THIRD GENERATION No differences for third generation offspring of challenged generation 0 and 1: Ccnd1, Pcna, Col1a, Col3a, Muc5b, Sma, Camk2d, and Mylk. Higher concentration of Kcnh1 (~1.3 fold) but no difference in Spag17.	Male only
Schwartzer 2015; mouse; OVA[34]	Serotonin transporter in cortex	Immunoblot analysis	Week 11; offspring not challenged. Final challenge was maternal on GD 17.5	Protein expression of serotonin transporter was greater (~1.3 fold). No sex differences	Yes
Vogel Ciernia 2018; mouse; OVA[38]	Differentially expressed genes in microglial isolations	RNA sequencing differential expression analysis	PD 35; offspring not challenged. Final challenge was maternal on GD 17.5	162 differentially expressed genes. 157 asthma > control, with Hspalb concentration reaching significance	Female only
Vogel Ciernia 2018; mouse;	Differentially methylated regions in microglia	Whole genome bisulfite sequencing and RT-qPCR	PD 35; offspring not challenged. Final challenge was maternal on GD 17.5	Hypomethylated genes in control group: (558 control > asthma) including zinc finger and LIM homeobox protein. Hypermethylated genes in the asthma group (626 asthma > control) including RUNX1, PU.1, IRF8, NF-κB,	Female only

OVA[38]				and MAFB	
Vogel Ciernia 2018; mouse; OVA[38]	Microglial methylome and transcriptome	Whole genome bisulfite sequencing and RT-qPCR	PD 35; offspring not challenged. Final challenge was maternal on GD 17.5	No significant differences in sequencing coverage, bisulfite conversion, or in the global percentage of CG, CHG, or CHH methylation. Microglia showed similar concentration of mCG and mCH	Female only
Wu 2011; rat; OVA[40]	Serum corticosterone	ELISA	PD 3, 7, 14, 30, 60; no offspring challenges, maternal challenges were daily from GD 14-21	Higher concentrations from PD 3 to 60 (~1.2-1.6 fold)	Male only
Wu 2011; rat; OVA[40]	Serum epinephrine	ELISA	PD 3, 7, 14, 30, 60; no offspring challenges, maternal challenges were daily from GD 14-21	Lower concentrations from PD 3 to 14 (~0.5-0.8 fold)	Male only
Wu 2011; rat; OVA[40]	Serum nerve growth factor concentration	ELISA	PD 3, 7, 14, 30, 60; no offspring challenges, maternal challenges were daily from GD 14-21	Overall concentration higher at days 3-7 (~1.6-2.0 fold)	Male only
Immune outcomes					
Abdala-Valencia 2014; mouse; OVA[2]	BAL immune cells (2nd pregnancy, switched diets)	BAL stain and cell count	PD 13; 24 hours after pups challenged days 10-12	Asthmatic, basal diet compared to saline basal diet: higher numbers of eosinophils (~60 fold), monocytes (~2 fold), lymphocytes (~10 fold), and neutrophils (~12.5 fold) Asthmatic mice switched onto 500mg α-T (from basal diet) compared to saline basal diet: no differences	No

Abdala-Valencia 2014; mouse; OVA[2]	BAL immune cells (cross fostering)	BAL stain and cell count	PD 13; 24 hours after pups challenged days 10-12	Saline basal diet pups: 1) fostered on OVA basal: higher monocytes (~2 fold) than saline groups but no differences in eosinophils, lymphocytes and neutrophils 2) fostered on OVA 250 αT: no differences Asthmatic mother basal diet pups: 1) kept on mum: higher eosinophils (~22 fold), monocytes (~6 fold), lymphocytes (~11 fold), and neutrophils (~14 fold) 2) fostered on saline basal: no differences 3) Fostered on OVA 250 αT: higher eosinophils (~2 fold) and monocytes (~3.5 fold) than saline groups but no differences in lymphocytes and neutrophils Asthma and 250 αT diet pups: 1) kept on mum: higher eosinophils (~4 fold) and monocytes (~2.5 fold) no differences in lymphocytes and neutrophils 2) fostered on saline basal: higher eosinophils (~4 fold) and monocytes (~2.5 fold) than saline groups but no differences in lymphocytes and neutrophils 3) Fostered on OVA basal: no differences	No
Abdala-Valencia 2014; mouse; OVA[2]	Cytokines, chemokines, indolamine dioxygenase and MHCII (2nd pregnancy, switched diets)	RT-qPCR and ELISA	PD 13; 24 hours after pups challenged days 10-12	Asthmatic, basal diet compared to saline basal diet: higher concentrations of indolamine dioxygenase (~2 fold), IL-4 (~6 fold), CCL11 (~2 fold), CCL24 (~3 fold), TSLP (~1.5 fold), and IL-2 (~3 fold) but no difference for MCHII, IL-33, TNF-α, IL-10, IFN-γ. Asthmatic mice switched onto 500mg α-T (from basal diet) compared to saline basal diet: lower indolamine dioxygenase (~2.5 fold) and IL-33 (~2 fold). No other differences	No

Abdala-Valencia 2014; mouse; OVA[2]	Dendritic cell subsets	Flow cytometry	PD 13; 24 hours after pups challenged days 10-12	Of CD11b+ subsets in the pup lung (basal diet), higher number of resident cDCs (~1.3 fold) and alveolar DCs (~1.3 fold), but not monocyte derived DCs. No differences in 250 α-T group. Of the CD11b- subsets in the pup lung (basal diet), lower alveolar DCs (~0.8 fold) but no differences in pDCs, CD103+ resident DCs, or alveolar macrophages. Only alveolar DCs were lower in 250 α-T group (~0.7 fold). Of CD11b+ subsets in the pup liver (basal and 250 α-T diet), no differences in mDCs or subtypes. Of the CD11b- subsets in the pup liver (basal diet), higher numbers of resident DCs (~1.4 fold), CD86+ resident DCs (~2.0 fold), and the mean fluorescence intensity of CD86 on resident DCs (~1.3 fold) and CD80 on resident DCs (~1.3 fold). No differences in 250 α-T group.	
Abdala-Valencia 2014; mouse; OVA[2]	Lung and BAL cytokines and chemokines	RT-qPCR	PD 13; 24 hours after pups challenged days 10-12	Asthmatic mothers on basal diet: higher concentration from lung of IL-4 (~8 fold), IL-33 (~2 fold), CCL11 (~5.5 fold), CCL24 (~8 fold), and higher lavage concentration of CCL24 (~5 fold). Asthmatic mothers on 150, 250, or 500mg αT diet: no differences	No
Abdala-Valencia 2014; mouse; OVA[2]	Lung immune cells	BAL stain and cell count	PD 13; 24 hours after pups challenged days 10-12	Asthmatic mothers on basal diet: higher percentage of eosinophils (~6 fold), and higher number of eosinophils, (~15 fold) monocytes (~3 fold), lymphocytes (~10 fold), and neutrophils (~10 fold) Asthmatic mothers on 150, 250, or 500mg αT diet: no difference in number of macrophages, lymphocytes, neutrophils, or eosinophils number or percentage	No
Abdala-Valencia 2014; mouse; OVA[2]	OVA-specific serum IgE	ELISA	PD 13; 24 hours after pups challenged days 10-12	Asthmatic mothers on basal diet: higher IgE concentration (~3-4 fold) Asthmatic mothers on 150, 250, or 500mg αT diet: no difference	No

Abdala-Valencia 2016; mouse; OVA[3]	BAL lung immune cell response in allergen challenge pups	BAL stain & count	PD 13; pups challenged days 10-12	Asthmatic, basal diet: higher numbers of eosinophils (~17 fold), monocytes (~2.5 fold), lymphocytes (~7.5 fold), and neutrophils (~21 fold) Asthmatic, 250 γT diet compared to saline group with 250 γT diet: higher numbers of eosinophils (~16 fold), monocytes (~2.5 fold), lymphocytes (~8 fold), and neutrophils (~5.5 fold)	No
Abdala-Valencia 2016; mouse; OVA[3]	Lung and BAL cytokines and chemokines	ELISA/protein array	PD 13; pups challenged days 10-12	Asthmatic, basal diet: in BAL higher CCL11 (~3 fold), CCL24 (~1.5 fold), IL-5 (~3 fold), and in lung tissue higher amphiregulin (~1.5 fold), but no difference in ActivinA or GM-CSF. Asthmatic, 250 γ-T diet: in BAL higher CCL11 (~4 fold), CCL24 (~1.5 fold), IL-5 (~3 fold), and in lung tissue higher amphiregulin (~2 fold) and ActivinA (~1.5 fold) but no difference in GM-CSF.	No
Abdala-Valencia 2016; mouse; OVA[3]	OVA-specific IgE in allergen-challenged pups	ELISA	PD 13; pups challenged days 10-12	Asthmatic basal diet and asthma + 250 γT: higher concentrations (~50 fold)	No
Akkoc 2008; mouse; OVA[4]	Cytokine concentration of splenocytes	ELISA	PD 2 and 28; last challenge was day 20 of pregnancy, no offspring challenges	Asthmatic with m. vaccae immunization on day 2: higher M.vaccae-specific IFN-γ (~7.5 fold) but lower IL-5 (~0.14 fold), IL-5/IFNγ ratio (~0.09 fold), and M vaccae specific IL-5/IFNγ ratio (~0.02 fold) Asthmatic with m. vaccae immunization on day 28: higher PHA-specific IFNγ (~2.5 fold), but lower OVA-specific IL-5/IFNγ ratio (~4 fold)	No
Barrett 2003; dog; ragweed[7]	BAL lung immune cells	BAL cell stain & count	Baseline 1: 24 weeks, Baseline 2: 28-29 weeks, days 1-4 after ragweed instillation	Asthmatic mother, control offspring: no difference in eosinophil number but neutrophils higher at day 1 timepoint (~20 fold) Asthmatic mother, allergic offspring: eosinophil number higher at baseline 2 (~3 fold), day 1 (~4 fold), and day 4 (~10 fold). Neutrophils higher at day 4 only (~5 fold) *Graphs too small to estimate magnitude of change*	No

Barrett 2003; dog; ragweed[7]	Serum immunoglobulins	ELISA	4, 6, 8, 12, 16, 20, 24, 28 weeks; postnatal ragweed challenges 24 hours after birth and then weekly for 4 weeks	Asthmatic mother, control offspring: no differences in IgE or Ragweed-specific IgE. Ragweed-specific IgG was higher at 24 weeks only (~4 fold). Asthmatic mother, allergic offspring: no differences for IgE or Ragweed-specific IgE, but Ragweed-specific IgG: higher at 4 and 6 weeks (~3.6-4.0 fold)	No
Carpe 2012; rat; OVA[8]	BAL lung immune cells	BAL cell stain & count	PD 1, 7, 14; last challenge was GD 19, no offspring challenges	In Lewis rats compared to Lewis controls: higher number of neutrophils at day 14 (>500 fold) and proportion at day 7 (~2.2 fold) & 14 (>12 fold), but no difference in eosinophils number or proportion. In Brown Norway rats compared to Brown Norway controls: higher neutrophil number higher at days 1 (~9.5 fold) & 7 (~3 fold) and proportion at days 1 (~4.5 fold) & 7 (~3.5 fold) but not 14. Number of eosinophils higher at days 1 (~2 fold) & 7 (~5 fold) but not day 14, and proportion higher at days 7 (~6.5 fold) & 14 (~2 fold) but not day 1.	No
Carpe 2012; rat; OVA[8]	Serum OVA-specific IgE & cytokines	ELISA	PD 14; last challenge was GD 19, no offspring challenges	In Lewis rats compared to Lewis controls: higher IgE (~1.5 fold), but no difference for IL-1, TNF-α, and GRO/KC. In Brown Norway rats compared to Brown Norway controls: higher IgE (~2 fold), IL-1β (~1.4 fold), TNF-α (~1.4 fold), and GRO/KC (~1.3 fold)	No
Fedulov 2007; mouse; OVA[13]	BAL lung immune response	BAL differential cell count	0-2, 3-5, 6-8, 10-12 weeks postnatally; offspring challenged at 0, 3, 6 or 8 weeks with suboptimal protocol	Eosinophils number higher at weeks 0-2 (~11 fold), 3-5 (~10 fold), 6-8 (~100 fold), 10-12 weeks (~40 fold). Eosinophil percentage higher at weeks 0-2 (~8.5 fold), 3-5 (~35 fold), 6-8 (~50 fold), 10-12 weeks (~45 fold).	No
Fedulov 2007; mouse; OVA[13]	Lung inflammation	Histology inflammatory index	0-2, 3-5, 6-8, 10-12 weeks postnatally; offspring challenged at 0, 3, 6 or 8 weeks with suboptimal protocol	Inflammation higher at weeks 0-2 (~12 fold), 3-5 (~10 fold), 6-8 (~25 fold), 10-12 weeks (~13 fold)	No

Fedulov 2011; mouse; OVA[14]	Antigen presenting splenic dendritic cells	Counts per minute	PD 14; offspring challenged at 13-15 days with suboptimal protocol	Increased activity of antigen presenting cells (~4 fold)	No
Fedulov 2011; mouse; OVA[14]	Lung immune response in CAS model of asthma	BAL cell count and inflammatory index	After PD 15; offspring challenged at 13-15 days with suboptimal protocol	In CAS challenged offspring who received donor dendritic cells from pups of asthmatic mothers: eosinophils were higher (~4.5 fold)	No
Fedulov 2011; mouse; OVA[14]	Lung immune response in OVA model of asthma	BAL cell count and inflammatory index	PD 14; offspring challenged at 13-15 days with suboptimal protocol	In OVA challenged offspring who received donor dendritic cells from pups of asthmatic mothers: higher eosinophil number (~2.8 fold) and inflammation index (~1.8 fold)	No
Fedulov 2011; mouse; OVA[14]	Phenotype profiling of splenic dendritic cells	Flow cytometry	PD 14; offspring challenged at 13-15 days with suboptimal protocol	No differences in surface profiling of naïve d14 dendritic cells	No
Gerhold 2012; mouse; OVA[16]	IL-10 and T(reg) cells in spleen and bronchial lymph nodes	Flow cytometry	PD 21; before offspring aerosol change and sensitisation	In control offspring of asthmatic mothers: spleen T-reg cells higher (~1.7 fold), and IL-10 in spleen mononuclear cells higher (~2.8 fold) In asthmatic offspring of asthmatic mothers: no difference bronchial lymph node T-reg cells	No
Gerhold 2012; mouse; OVA[16]	OVA-specific cytokines (short term)	ELISA	PD 52; offspring challenged on days 48-50	In control offspring of asthmatic mothers: no difference in IL-5, IL-13, and IFN-γ but IL-10 higher (~2 fold) In asthmatic offspring of asthmatic mothers, all cytokines higher: IL-5 (~30 fold), IL-13 (~4 fold), IL-10 (~15 fold), IFN-γ (~120 fold?)	No
Gerhold 2012; mouse; OVA[16]	Serum IgE and BAL immune cells (long term)	ELISA, lavage, morphometric analysis	PD 147; offspring challenged on days 143-145	In asthmatic offspring of asthmatic mothers: no difference in IgE, IL-5, leucocytes, but higher number of eosinophils	No

Gerhold 2012; mouse; OVA[16]	Serum IgE and BAL immune cells (short term)	ELISA, lavage, morphometric analysis	PD 52; offspring challenged on days 48-50	In control offspring of asthmatic mothers: no differences for IgE, Leucocytes, or eosinophils but IL-5 higher (~2.3 fold) In asthmatic offspring of asthmatic mothers: higher IgE (~2 fold) and IL-5 (~1.7 fold), but no difference in leucocytes or eosinophils	No
Hamada 2003; mouse; OVA[17]	BAL immune response	BAL cell stain & count	PD 15; offspring aerosol challenge PDs 12-14	Higher eosinophil number (~9-100 fold) and proportion (~6-30 fold) in asthmatic offspring of asthmatic mothers, and when offspring asthma was induced with CAS instead of OVA (~9 and ~6 fold respectively); results were irrespective of pregnancy exposures. No difference in control offspring of asthmatic mothers.	No
Hamada 2003; mouse; OVA[17]	Serum OVA-specific IgE	ELISA	PD 15; offspring aerosol challenge PDs 12-14	Higher IgE concentration in control and asthmatic offspring of asthmatic mothers (not detectable inn controls), irrespective of pregnancy exposures.	No
Heller 2014; cat; bermuda grass[18]	BAL eosinophil response	BAL cell count	3, 4, 6, 8 months; aerosol challenge twice weekly for 12 weeks	For control offspring of asthmatic mothers: eosinophil proportion higher at 8 months (~22 fold) than sensitised control offspring, but no differences at 3, 4, 6 months. No differences in eosinophils for asthmatic offspring of asthmatic mothers.	No
Heller 2014; cat; bermuda grass[18]	BGA-Specific Immunoglobulins	ELISA & Intradermal testing	3, 4, 6, 8 months; aerosol challenge twice weekly for 12 weeks	In control offspring of asthmatic mothers: BGA-specific IgE was detectable in all. In asthmatic offspring of asthmatic mothers: BGA-specific IgE was undetectable in all.	No
Herz 2001; mouse; OVA[19]	Serum anti-BLG IgG1	ELISA	PDs 1, 7, 14, and 21; mothers OVA challenged every second day during pregnancy, no offspring challenges	No differences on day 1 but higher at days 7 (~4 fold), 14 (~4 fold), and 21 (~3 fold).	No

Herz 2001; mouse; OVA[19]	Serum cytokine profile	ELISA	End of pregnancy, PD 1 and 28; mothers OVA challenged every second day during pregnancy, no offspring challenges	IFN-γ lower at day 1 (~0.18 fold) but not day 28. No differences in IL-4 on day 1 or 28.	No
Herz 2001; mouse; OVA[19]	T cell populations	Flow cytometry and ELISA	PD 1-2; mothers OVA challenged every second day during pregnancy, no offspring challenges	Thy1+ cells produce less IFN-γ upon stimulation (~0.2 fold)	No
Hubeau 2006; mouse; OVA[20]	BAL cytokines	Immunoassay	Postnatal 16 offspring aerosol challenged days 12-14	In OVA challenge pups of recipient asthmatic mothers of DO11.1 T cells, there was no difference in IFNγ, IL-10, IL-4 but higher concentrations of IL-5 (~1.6 fold) and IL-13 (~5.5 fold)	No
Hubeau 2006; mouse; OVA[20]	Lung immune cells	BAL stain and cell count	PD 16 offspring aerosol challenged days 12-14	In OVA challenged offspring of asthmatic DO11.1 T cell recipient mothers, higher total cell count (~2.9 fold) and eosinophils (~6 fold), but no difference for macrophages or lymphocytes. No differences for CAS challenged pups of asthmatic mothers who received BALB/c T cells. In CAS challenged pups of recipient asthmatic of DO11.1 T cells, higher total cell count (~5.3 fold), eosinophils (~6.4 fold), and lymphocytes (~3 fold), but macrophages were no different. Inflammatory infiltration of mononuclear cells and eosinophils only observable in pups from recipient mothers	No
Hubeau 2007; mouse; OVA[21]	BAL lung immune cells	BAL cell stain & count	PDs 15-16 offspring aerosol challenged days 12-14	In untreated offspring of asthmatic mothers there was “substantial” inflammatory infiltration in the airways. No differences in macrophages, eosinophils, or lymphocyte proportions reported.	No
Hubeau 2007; mouse;	Spleen cellularity and T cell subsets	trypan blue staining & flow cytometry	PD 7; after day 5 OVA injection but before challenges	Cellularity overall, T cells overall and Foxp3-/CD25- T cell subset were higher in untreated offspring of asthmatic mothers without antibodies (~2.1 fold). No differences were observed in other T cell subsets.	No

OVA[21]					
Lebold; mouse; HDM[22]	Chemokines and cytokines transcripts	RT-qPCR	8 weeks + 18 days; offspring challenged at 8 weeks + 14-17 days	In offspring of asthmatic mothers without offspring allergen challenges: 17 transcripts were different. 8 upregulated and 9 downregulated. In offspring of asthmatic mothers that were allergen challenged: 25 genes differentially regulated compared to both reference groups	No
Lebold; mouse; HDM[22]	Immune response - inflammatory cells	BAL stain & cell counting	8 weeks; offspring challenged at 8 weeks + 14-17 days	No differences between untreated offspring of asthmatic mothers and untreated offspring of control mothers. Relative to challenged offspring of control mothers, allergen challenged offspring of asthmatic mothers had higher total cells (~2.7 fold) and eosinophils (~3.1 fold) but not neutrophils or macrophages.	No
Leme 2006; mouse; OVA[23]	Lung immune cells	BAL stain & cell count	PDs 16-17; offspring challenged days 13-15	Whether born to asthmatic mothers or nursed by asthmatic mothers, higher eosinophils numbers (~40-100 fold) and proportions (~14-20 fold). Results were similar when offspring were CAS challenged, instead of OVA (~40-100 and ~17-21 fold respectively). Likewise, eosinophil numbers and proportions were higher when adoptive nursing was delayed by 3 days (~200-250 fold). Eosinophil and mononuclear cell accumulation were observed around airways and vessels.	No
Lenz 2019; rat; OVA[24]	Mast cells and microglia	Staining and stereology	PD 4 and 5; offspring not challenged, last maternal challenge was GD 15	In males, no difference in overall mast cell number but higher proportion of degranulated mast cells (~1.2 fold). No differences in proportion of ameboid microglia In females, higher overall mast cell number (~1.5 fold), proportion of degranulated mast cells (~1.3 fold) and proportion of ameboid microglia (~1.7 fold)	Yes
Lopez-Exposito 2015; mouse;	BAL inflammatory cells	BAL cell stain & count	PD 16; offspring challenged PDs 12-14	In offspring of asthmatic mothers, there were higher total cells (~6 fold), macrophages (~5.4 fold), eosinophils (~16 fold), neutrophils (~19 fold), and lymphocytes (~16 fold), irrespective of comparisons with offspring of control mothers having allergen or sham challenge	No

OVA[25]					
Lopez-Exposito 2015; mouse; OVA[25]	BAL inflammatory cells (variable offspring OVA exposure)	BAL cell stain & count	PD 16; offspring challenged PDs 12-14	With low dose OVA allergen exposure, higher numbers of lymphocytes (~25 fold), eosinophils (~27 fold) and neutrophils (~22 fold) but not macrophages. There were no differences in offspring challenged with PBS or ragweed. With higher dose exposure, no differences were reported between asthma and controls.	No
Lopez-Exposito 2015; mouse; OVA[25]	Serum cytokines	ELISA	PD 16; offspring challenged PDs 12-14	Higher concentrations of IL-10 (~2.5 fold), but lower concentration of IFN-γ (~0.23 fold), irrespective of control pup challenge. No differences in IL-13 concentration or IL-10/IL-13 or IFN-γ/IL-13 ratios. No reported differences between asthma and control for CXCL1/KC and Eotaxin-1.	No
Lopez-Exposito 2015; mouse; OVA[25]	Serum OVA-specific immunoglobulins	ELISA	PD 16; offspring challenged PDs 12-14	Higher concentration of IgG1, IgG2a, and IgG1:IgG2a ratio, irrespective of offspring of control mothers having allergen or sham challenge (minimal detection in control offspring)	No
Matson 2007; mouse; OVA[26]	BAL lung immune cells	BAL stain & cell count	24 hours after last challenge; pups challenged at postnatal week 6-7 for 7 days	No differences in OVA-$Al(OH)_3$ challenged progeny of OVA-$Al(OH)_3$ challenged mothers. In OVA-$Al(OH)_3$ challenged progeny of OVA-CFA challenged mothers, lower numbers of eosinophils (~0.5 fold) and CD4+ lymphocytes (~0.4 fold) and CD8+ lymphocytes (~0.3 fold) but no differences for macrophages or total lymphocytes. In a second cohort of OVA-$Al(OH)_3$ challenged progeny from OVA-CFA challenged mothers, lower numbers of eosinophils (~0.04 fold) and total lymphocytes (~0.25 fold) but no difference in individual populations of	No

				CD4+ and CD8+ lymphocytes or macrophages.	
Matson 2007; mouse; OVA[26]	OVA-specific serum immunoglobulins	ELISA	24 hours after last challenge; pups challenged at postnatal week 6-7 for 7 days	No difference in offspring of Bovine Specific Antigen challenged mothers with OVA-CFA. In offspring of OVA challenged mothers with OVA-CFA, IgE was lower in pups (~0.2 fold). No differences in IgG1, IgG2a, or IgA. In offspring of OVA challenged mothers with OVA-Al$(OH)_3$ challenge, there was no difference in IgE.	No
Matson 2009; mouse; OVA[27]	BAL lung immune cells and IL-5	Flow cytometry	24 hours after final challenge; postnatal challenges were postnatal week 6-8	Control offspring nursed by asthmatic mothers: lower numbers of eosinophils (~0.1 fold), CD4+ lymphocytes (~0.3 fold) and CD8+ lymphocytes (~0.25 fold). Control offspring nursed by B cell deficient asthmatic mothers: no differences Offspring of asthmatic mothers, nursed by asthmatic mothers: eosinophils lower (~0.4 fold)	No
Matson 2009; mouse; OVA[27]	OVA-specific serum immunoglobulins and IL-5	ELISA	24 hours after final challenge; postnatal challenges were postnatal week 6-8	Control offspring nursed by asthmatic mothers: IgG1 and IgA were higher (not detectable in controls), but IgE (<0.02 fold) and IL-5 lower. Control offspring nursed by B cell deficient asthmatic mothers: IgE was higher (~1.6 fold) but no difference in IL-5. Offspring of asthmatic mothers, nursed by asthmatic mothers: IgG1 and IgA were higher (not detectable in controls), but IgE lower (<0.01 fold).	No
Matson 2010; mouse; OVA[28]	Adult serum OVA-specific IgE concentration	ELISA	PD 59; after 4 day aerosol challenge in offspring	Same genotype as control ($FcRn^{+/-}$) but nursed by asthmatic mother: lower IgE (~0.17 fold). $FcRn^{+/+}$ genotype nursed by asthmatic mother: lower IgE (~0.08 fold)	No

Matson 2010; mouse; OVA[28]	BAL lung immune cells	BAL stain & count and flow cytometry	PD 59; after 4 day aerosol challenge in offspring	Control offspring of same genotype ($FcRn^{+/-}$) but nursed by asthmatic mother: fewer eosinophils (~0.2 fold), CD4+ (~0.4 fold), IL33R+ (~0.5 fold), and CD8+ B cells (~0.2 fold) Offspring of asthmatic mothers with $FcRn^{+/+}$ genotype nursed by asthmatic mother: fewer eosinophils (~0.2 fold), CD4+ (~0.4 fold), IL33R+ (~0.5 fold), and CD8+ B cells (~0.4 fold)	No
Matson 2010; mouse; OVA[28]	Lung inflammation	Lung histology (H&E stain)	PD 59; after 4 day aerosol challenge in offspring	Histologically, perivascular and peribronchiolar cuffing & eosinophilic inflammation in $FcRn^{-/-}$ control offspring nursed by asthmatic mother, but reduced inflammation in $FcRn^{+/-}$ control offspring nursed by asthmatic mother and $FcRn^{+/+}$ offspring of asthmatic mothers nursed by asthmatic mother.	
Nakata 2010; mouse; OVA[30]	BAL lung immune cells	BAL cell stain & count	PD 46; offspring challenged days 43-45	Lower total cell count (~0.25 fold) and eosinophil number (~0.14 fold) in Wild Type FcRn+/+ offspring of OVA sensitised mothers. Also lower in offspring of mothers administered i.v or oral OVA-specific IgG1 No different in FcRn-/- offspring of sensitised mothers.	No
Nakata 2010; mouse; OVA[30]	Serum OVA-specific IgE	ELISA	PD 42; offspring challenged days 43-45	Lower IgE concentration (~0.12 fold) in Wild Type ($FcRn^{+/+}$) offspring of OVA sensitised $FcRn^{+/+}$ mothers. IgE lower in offspring of mothers administered i.v or oral OVA-specific IgG1 (~0.25-0.35 fold) No different in $FcRn^{-/-}$ offspring of sensitised mothers.	No
Pucheu-Haston 2010; mouse; Metarhizium anisopliae fungus[32]	BAL lung immune cells	BAL stain & count	PD 71; offspring challenges on PDs 49, 62, and 69	Compared to Hank's buffered saline solution vehicle control: higher total BAL protein (~1.8 fold), total cells (~11 fold), macrophages (~4.7 fold), lymphocytes (~27 fold), and eosinophils (~34 fold), irrespective of offspring allergen exposure. No difference in neutrophils for MACA exposed offspring but higher in dust mite exposed offspring (~14 fold). No sex differences.	Yes

Pucheu-Haston 2010; mouse; Metarhizium anisopliae fungus[32]	Immune response – MACA-specific BAL cells	BAL cell count	PD 71; offspring challenges on PDs 49, 62, and 69	No difference in total protein, total BAL cells, macrophages, neutrophils, lymphocytes, or eosinophils	Yes
Pucheu-Haston 2010; mouse; Metarhizium anisopliae fungus[32]	Lactate dehydrogenase activity & Serum IgE	ELISA and protein assay	PD 71; offspring challenges on PDs 49, 62, and 69	Compared to Hank's buffered saline solution vehicle control: No differences for Lactate dehydrogenase activity and serum IgE was higher in females (~2.2 fold) in MACA and HDM groups but not control group, and no treatment effect	Yes
Pucheu-Haston 2010; mouse; Metarhizium anisopliae fungus[32]	LDH activity & Serum IgE - MACA exposed offspring	ELISA and protein assay	PD 71; offspring challenges on PDs 49, 62, and 69	No difference between maternal treatment groups for LDH activity, total serum IgE, or MACA-specific IgE	Yes
Pulczinski 2021; mouse; HDM[33]	BAL lung immune cells - all generations	BALF cell stain & count	6 weeks + 23 days; offspring (all generations) challenge on 6 weeks + 14, 18, and 21 days	Total BAL cells were higher in challenged offspring of asthmatic mothers in generation 1 (~1.7 fold), 2 (~1.5 fold), and 3 (~1.2 fold). No difference between offspring of controls and asthmatics when offspring were not challenged.	Male only
Sodemann 2020; mouse; OVA or CAS[36]	BAL (BAL) lung immune cells	BAL cell stain & count	PD 49; offspring OVA aerosol challenges on PDs 46-48	In offspring of CAS challenged mothers: no difference in leucocytes, eosinophils, lymphocytes, or macrophages In offspring of OVA challenged mothers: higher numbers of leucocytes (~2.8 fold), eosinophils (~3 fold), lymphocytes (~5 fold), and macrophages (~2.7 fold)	Female only

Sodemann 2020; mouse; OVA or CAS[36]	Serum immunoglobulins	ELISA	PD 49; offspring OVA aerosol challenges on PDs 46-48	In offspring of CAS challenged mothers: higher concentration of total IgG1 (~1.7 fold), and OVA-IgG1 (~4.5 fold) but no difference for OVA-IgE In offspring of OVA challenged mothers: no difference in total IgG1, higher concentration of OVA-IgG1 (~1.5 fold), but lower concentration of OVA-IgE (~0.3 fold)	Female only
Sodemann 2020; mouse; OVA or CAS[36]	T-regulatory cells	Immunohistochemistry	PD 49; offspring OVA aerosol challenges on PDs 46-48	In offspring of CAS challenged mothers: no difference in lung or lymph node T-reg cells In offspring of OVA challenged mothers: lower numbers of lung (~0.6 fold) and lymph node T-reg cells (~0.5 fold)	Female only
Sodemann 2020; mouse; OVA or CAS[36]	Asn-297 IgG antibody glycosylation	Nano-liquid chromatography	PD 49; offspring OVA aerosol challenges on PDs 46-48	In offspring of CAS challenged mothers: no significant difference in IgG1 G0, or G2S1 glycosylation, but less G1S1 (~ fold), G3S1 (~ fold) and G2S2 (~ fold). In offspring of OVA challenged mothers: higher concentration of IgG1 G0, but lower G1S1 (~ fold), G3S1 (~ fold) and G2S2 (~ fold) glycosylation.	Female only
Other (non-lung) organ outcomes					
Abdala-Valencia 2014; mouse; OVA[2]	Liver α-T	High-pressure liquid chromatography	PD 13; 24 hours after pups challenged days 10-12	No differences	No
Abdala-Valencia 2016; mouse; OVA[3]	Liver γ-T	High pressure liquid chromatography	PD 13; pups challenged days 10-12	Higher in asthma with 250 γT than basal diets (~1.5 fold), but no other differences	No
Allina 2011; mouse; OVA[5]	Hepatic fibrosis score	Histological analysis (H+E stain)	8 weeks postnatal; maternal challenges all premating, no offspring challenges	Only male offspring of asthmatic and smoke-exposed mothers had a stage 2 hepatic fibrosis score with increased collagen (~3 fold). Females and all other groups were no different	Yes
Church 2021;	Hypothalamus cytokine	Multiplex bead-based	9 weeks; offspring not postnatally challenged	In early OVA exposed asthmatic group, there was lower concentration of G-CSF (~0.13-0.14 fold), IL-7 (~0.3 fold), IL-4 (~0.3-0.5 fold), and IFN-γ (~0.7	Yes

mouse; OVA[9]	concentrations	immunoassay		fold) in males and females, but TNFα was only lower in males (~0.5 fold). Late females had lower IL-7 concentrations than late males (~0.5 fold), irrespective of treatment.	
Feng 2012; rat; OVA[15]	Adrenal medulla tissue microscopy	Light and electron microscopy	*Unclear*; offspring protocol began 6-8 weeks, with daily aerosol challenge on protocol days 14-21	Light microscopy: worsened vacuolar degeneration and lipids Electron microscopy: severe degranulation of chromaffin granules, swollen cytoplasm	No
Feng 2012; rat; OVA[15]	Anti-phenylethanolamine-n-methyl transferase immunostaining of adrenal medulla	Immunohistochemistry	*Unclear*; offspring protocol began 6-8 weeks, with daily aerosol challenge on protocol days 14-21	No difference	No
Feng 2012; rat; OVA[15]	Peripherin expression in adrenal medulla	Western blotting and RT-qPCR	*Unclear*; offspring protocol began 6-8 weeks, with daily aerosol challenge 14-21 days later	Peripherin: higher gene (~1.1 fold) and protein expression (~1.2 fold)	No
Lebold; mouse; HDM[22]	Nerve morphology	3D modelling	8 weeks + 18 days; offspring challenged at 8 weeks + 14-17 days	Higher nerve length (~2 fold) and nerve branch points (~1.7 fold) for offspring of asthmatic mothers, irrespective of offspring challenge or not	No
Lenz 2019; rat; OVA[24]	Neuronal spine density	Golgi-Cox staining and stereology	PD 4-5 (neonatal), day 90 (adult) ; offspring not challenged, last maternal challenge was GD 15	As neonates, no difference in total dendritic length, cell body area, but spine density was lower in males (~0.7 fold) and higher in females (~1.4 fold). In adulthood, spine density was not different in males but higher in females (~1.7 fold).	Yes
Wu 2011; rat; OVA[40]	Adrenal medulla histological changes	Electron microscopy	PD 3, 7, 14, 30, 60; no offspring challenges, maternal challenges were daily from GD 14-21	Adrenal medulla cells showed cytoplasm and mitochondrial oedema, some spindle shape chromaffin cells with decreased particles and a small amount of connective tissue, vacuolar degeneration, deceased EPI secretory granule, chromaffin cells fibre outgrowth and changed into spindle shape with long fusiform	Male only
Wu 2011; rat; OVA[40]	Adrenal medulla: protein expression of nerve growth factor in adrenal medulla	ELISA	PD 3, 7, 14, 30, 60; no offspring challenges, maternal challenges were daily from GD 14-21	Higher expression at days 3-14 (~1.3-1.5 fold)	Male only

Wu 2011; rat; OVA[40]	Adrenal medulla: protein expression of phenylethanolamine N-methyltransferase	Immunohistochemistry	PD 3, 7, 14, 30, 60; no offspring challenges, maternal challenges were daily from GD 14-21	Lower expression from days 3-14 (~0.7 fold)	Male only
Respiratory outcomes					
Babayigit 2008; mouse; OVA[6]	Histopathological lung parameters	Electron Microscopy	PD 1; final challenge was GD 18, no offspring challenges	Thicker basement membrane (~2.5 fold), epithelium (~1.5 fold), and subepithelial smooth muscle layer (~1.5 fold)	No
Carpe 2012; rat; OVA[8]	Airway responsiveness	Methacholine challenge	PD 14; last challenge was GD 19, no offspring challenges	In Lewis rats, higher resistance at 12.5mg methacholine (~2.5 fold), but not baseline, 25, or 50 mg. In Brown Norway rats, higher resistance at 50mg methacholine (~2 fold), but not baseline, 12.5, or 25 mg.	No
Fedulov 2005; mouse; OVA[12]	Airway responsiveness – different allergen for offspring	Methacholine challenge	PD 15; offspring challenged at days 13-15 with suboptimal protocol	In pups of asthmatic mothers also having non-CpG ODN treatment (pups given CAS not OVA): higher at 25, 50, 100 mg/ml methacholine but not lower concentrations (~2-3 fold)	No
Fedulov 2005; mouse; OVA[12]	Airway responsiveness and long-term effect	Methacholine challenge	2, 4, 6 weeks; offspring challenged at days 13-15 with suboptimal protocol	At 2 weeks higher at 25, 50, 100 mg/ml methacholine offspring of asthmatic mothers, irrespective of offspring diet (~4-6 fold). Results not ameliorated by non-CpG ODN treatment	No
Fedulov 2007; mouse; OVA[13]	Airway responsiveness	Methacholine test	0-2, 3-5, 6-8, 10-12 weeks postnatally; offspring challenged at 0, 3, 6 or 8 weeks with suboptimal protocol	In challenged offspring of asthmatic mothers compared to challenged controls, higher resistance at 0-2 (~4 fold), 3-5 (~3.5 fold), and 6-8 weeks (~2.7 fold) but no difference at 10-12 weeks	No
Fedulov 2011; mouse; OVA[14]	Airway responsiveness	Methacholine challenge	After PD 15; offspring challenged at 13-15 days with suboptimal protocol	OVA challenged offspring who received dendritic cell transplant had higher responsiveness at 100 mg/ml than challenged recipient offspring of control mothers (~2 fold)	No
Fedulov 2011; mouse; OVA[14]	Airway responsiveness	Methacholine challenge	After PD 15; offspring challenged at 13-15 days with suboptimal protocol	CAS challenged offspring who received dendritic cell transplant had higher responsiveness at 100 mg/ml than OVA-challenged recipient offspring of control mothers (~2 fold)	No

Fedulov 2011; mouse; OVA[14]	Airway responsiveness	Methacholine challenge	After PD 15; offspring challenged at 13-15 days with suboptimal protocol	Higher responsiveness in dendritic cells recipients of asthmatic mothers (~1.5-2 fold). No differences for recipients of macrophages, CD4+ T cells or dendritic cell flow through	No
Fedulov 2011; mouse; OVA[14]	Lung immune response and BAL cells	BAL cell count and inflammatory index	After PD 15; offspring challenged at 13-15 days with suboptimal protocol	CAS challenged offspring who received dendritic cell transplant had higher eosinophil number (~4 fold) and a higher inflammatory index (~1.3 fold)	No
Feng 2012; rat; OVA[15]	Airway responsiveness	Histamine challenge	8 weeks (24 hr after last OVA challenge); offspring protocol began 6-8 weeks, with daily aerosol challenge on protocol days 14-21	No difference at 0, 0.02, and 0.04 mg/ml concentrations but higher resistance at 0.08 (~1.3 fold), 0.16 (~1.1 fold) and 0.32 mg/ml (~1.05 fold)	No
Feng 2012; rat; OVA[15]	Lung tissue morphology	H&E and light microscopy	*Unclear*; offspring protocol began 6-8 weeks, with daily aerosol challenge on protocol days 14-21	Pathophysiological changes around airways observed: mucous plug and swollen walls	No
Hamada 2003; mouse; OVA[17]	Airway responsiveness (with antibody exposures)	Methacholine challenge	PD 15; offspring aerosol challenge PDs 12-14	No difference in airway responsiveness for groups given anti-IL4. There was a higher persistence of anti-IL-4 in CAS challenged offspring of asthmatic mothers, with a higher serum rat IgG (~13 fold) on day 3. Neonatal mice of asthmatic mothers without pregnancy exposure but with added neonatal control IgG had higher airway responsiveness at 25-100 mg/ml (~1.6-3.2 fold) than challenged offspring of asthmatic mothers given anti-IL-4, or challenge offspring of control mothers.	No
Hamada 2003; mouse; OVA[17]	Airway responsiveness (without antibody exposures)	Methacholine challenge	PD 15; offspring aerosol challenge PDs 12-14	Higher in offspring of asthmatic mothers at 12-100 mg/ml (~2-2.5 fold), with or without pregnancy aerosol challenge, when offspring are also sensitised and challenged. In offspring sensitised and challenged with OVA or CAS, offspring of asthmatic mothers with more pregnancy aerosol challenges, had higher airway responsiveness at 12-100 mg/ml methacholine (~2-4 fold).	No
Hamada 2003; mouse; OVA[17]	Lung histopathological changes	Inflammatory index	PD 15; offspring aerosol challenge PDs 12-14	Higher inflammation index (~3 fold) and goblet cell index (~2 fold) in OVA sensitised and challenged offspring of asthmatic mothers with and without OVA pregnancy exposures. Similar results were seen in CAS sensitised and challenged offspring of asthmatic mothers (~1.8 and 1.8-2.7-fold respectively) with and without pregnancy OVA exposures.	No

Hubeau 2006; mouse; OVA[17]	Airway responsiveness	Methacholine challenge	PD 15; offspring aerosol challenged days 12-14	Airways were more responsive at 12, 25, 50, 100, mg/ml methacholine in offspring of DO11.1 T cell recipient asthmatic mothers challenged with OVA (~2.4-5 fold) or CAS (~1.4-3.3 fold). Offspring of BALC/c T cell recipient asthmatic mothers had no difference in airway hyperresponsiveness when challenged with CAS.	No
Hubeau 2007; mouse; OVA[21]	Airway responsiveness	Methacholine challenge	PD 15 offspring aerosol challenged days 12-14	Asthmatic offspring had higher airway responsiveness at 10, 25, 50, and 100 mg/ml methacholine (~3-5 fold). No differences in anti-CTLA-4 or anti-GITR pre-treated offspring of asthmatic mothers	No
Lebold; mouse; HDM[22]	Airway responsiveness	Serotonin challenge	8 weeks; offspring challenged at 8 weeks + 14-17 days	Higher responsiveness in challenged offspring of asthmatic mothers than challenged and unchallenged offspring of control mothers (~1.1-1.3 fold).	No
Leme 2006; mouse; OVA[23]	Airway responsiveness	Methacholine challenge	PDs 16-17; offspring challenged days 13-15	Higher responsiveness at 12-100 mg/ml methacholine when born to asthmatic mothers or nursed by asthmatic mothers (~2-5 fold). Higher responsiveness for CAS challenged pups instead of OVA (~2-5.5 fold) and if adoptive nursing is delayed by 3 days (~2-4 fold).	No
Leme 2006; mouse; OVA[23]	Lung histopathology	Inflammation index	PDs 16-17; offspring challenged days 13-15	Higher lung inflammation index when born to asthmatic mothers or nursed by asthmatic mothers (index 2.3-3.8 compared to 0 in control). Same results for CAS challenged pups instead of OVA.	No
Pucheu-Haston 2010 mouse; Metarhizium anisopliae fungus[32]	Airway responsiveness	Methacholine challenge	PD 71; offspring challenges (all generations) on PDs 49, 62, and 69	In house dust mite challenged males, at 12.5 and 25 non-specified units of methacholine, responsiveness was higher than male Hank's buffered saline solution controls (~2.1-3.1 fold). At 25 responsiveness was also higher than females (~1.4 fold).	Yes
Pulczinski 2021; mouse; HDM[33]	Airway responsiveness - all generations	Methacholine challenge	6 weeks + 23 days; offspring challenge on 6 weeks + 14, 18, and 21 days	In house dust mite challenged offspring of asthmatic mothers, airway responsiveness was higher in generations 1 (~1.6 fold) and 3 (~1.7 fold) but not generation 2 when compared to HDM challenged offspring of control mothers. No difference between offspring of controls and asthmatics when offspring were not challenged.	Male only
Size outcomes					
Schwartzer 2015; mouse;	Developmental growth trajectories	Growth measurements	PDs 4-16, adult weight at 10 weeks; offspring not challenged. Final challenge was maternal on day 17.5 of	Pup length higher in offspring of asthmatic mothers at all postnatal time points: days 4, 6, 8, 10, 12, 14, 16 (~1.05 fold). Pup weight in offspring of asthmatic mothers higher at all postnatal time points: days 4, 6, 8, 10, 12,	No

OVA[34]			gestation	14, 16 (~1.2 fold). Adult weight: no difference	

α-T = alpha tocopherol, BAL = bronchoalveolar lavage, CAS = casein, CCL = C-C motif chemokine ligand, CFA = complete Freund's adjuvant, DC = dendritic cell, ELISA = enzyme-linked immunosorbent assay, FcRn = neonatal Fc receptor for IgG, GD = day of gestation, GM-CSF = Granulocyte-macrophage colony-stimulating factor, GRO = growth-regulated oncogene, HDM = house dust mite, H&E = haematoxylin and eosin stain, IFN = interferon, Ig = immunoglobulin, IL = interleukin, i.v. = intravenous, MACA = Metarhizium anisopliae crude antigen, M. vaccae = mycobacterium vaccae, OVA = ovalbumin, OVA-AI$(OH)_3$ = ovalbumin with aluminium hydroxide adjuvant, PD = postnatal day, RT-qPCR = real time quantitative polymerase chain reaction, TNF = tumour necrosis factor, T-reg = regulatory T cell, TSLP = Thymic stromal lymphopoietin, γ-T = gamma tocopherol

Table S8 - Quality assessment – ARRIVE 2.0 Essential 10

Table S7 - Quality assessment – ARRIVE 2.0 Essential 10																						
Study ID	1a	1b	2a	2b	3a	3b	3c	4a	4b	5	6a	6b	7a	7b	8a	8b	9a	9b	9c	9d	10a	10b	Total of 22 (%)
Before ARRIVE guidelines																							
Herz 2001[19]	✓	✓	×	×	×	×	×	×	×	×	✓	✓	×	×	×	×	✓	✓	×	✓	×	--	7 (31.8)
Barrett 2003[7]	✓	✓	✓	×	×	✓	✓	×	✓	×	✓	✓	×	×	×	✓	✓	✓	✓	✓	×	--	13 (59.1)
Hamada 2003[17]	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	✓	×	×	✓	✓	✓	✓	✓	✓	--	12 (54.5)
Fedulov 2005[12]	✓	✓	✓	×	✓	×	×	×	×	×	✓	✓	✓	×	×	×	✓	✓	✓	✓	×	--	11 (50.0)
Hubeau 2006[20]	✓	✓	×	×	×	×	×	×	×	×	✓	✓	✓	×	×	×	✓	✓	✓	✓	×	--	9 (40.9)
Leme 2006[23]	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	✓	×	×	✓	✓	✓	✓	✓	✓	--	12 (54.5)
Fedulov 2011[14]	✓	✓	×	×	×	×	✓	×	×	×	✓	✓	✓	✓	×	×	✓	✓	×	✓	×	×	10 (45.5)
Hubeau 2007[21]	✓	✓	×	×	×	×	×	×	×	×	✓	✓	✓	×	×	×	✓	✓	✓	✓	×	--	9 (40.9)
Matson 2007[26]	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	✓	×	×	✓	✓	✓	✓	✓	×	--	11 (50.0)
Akkoc 2008[4]	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	✓	×	✓	×	✓	✓	✓	✓	×	--	11 (50.0)
Babayigit 2008[6]	✓	✓	✓	×	✓	✓	✓	×	✓	?	✓	✓	✓	×	✓	×	✓	✓	✓	✓	✓	--	16 (72.7)
Fedulov 2007[13]	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	×	--	12 (54.5)
Matson 2009[27]	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	✓	×	×	×	✓	✓	✓	✓	×	--	10 (45.5)
Pucheu-Haston 2009[31]	✓	✓	✓	×	✓	×	✓	×	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	--	16 (72.7)
ARRIVE 1.0 Guidelines introduced in 2010																							
Matson 2010[28]	✓	✓	×	×	×	×	×	×	✓	✓	✓	✓	✓	×	×	✓	✓	✓	✓	✓	×	--	12 (54.5)
Nakata 2010[30]	✓	✓	×	×	×	×	×	×	×	×	✓	✓	×	×	×	×	×	✓	×	×	×	--	5 (22.7)
Pucheu-Haston 2010[32]	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	✓	×	×	✓	✓	✓	✓	✓	×	--	11 (50.)
Allina 2011[5]	✓	✓	×	×	×	×	×	×	✓	×	✓	✓	×	✓	✓	×	✓	✓	✓	✓	✓	--	12 (54.05)
Wu 2011[40]	✓	✓	✓	×	✓	×	?	×	×	✓	✓	✓	×	×	×	×	✓	✓	×	✓	✓	--	11 (50.0)
Carpe 2012[8]	✓	✓	×	×	×	×	×	×	×	×	✓	✓	×	×	×	×	✓	✓	✓	✓	×	--	8 (36.4)

Feng 2012[15]	✓	✓	✓	×	✓	×	✓	✓	×	✓	✓	✓	×	×	×	×	✓	✓	✓	✓	×	--	13 (59.1)
Gerhold 2012[16]	✓	✓	×	×	×	×	✓	×	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	×	--	13 (59.1)
Abdala-Valencia 2014[2]	✓	✓	×	×	✓	✓	×	×	×	×	✓	✓	✓	×	✓	×	✓	✓	✓	✓	✓	--	13 (59.1)
Heller 2014[18]	✓	✓	✓	×	✓	×	✓	×	×	×	✓	✓	×	×	×	×	✓	✓	✓	✓	×	--	11 (50.0)
Lopez-Exposito 2015[25]	✓	✓	×	×	×	×	×	×	×	×	✓	✓	✓	×	×	×	✓	✓	×	✓	✓	--	9 (40.9)
Schwartzer 2015[34]	✓	✓	✓	×	×	×	×	×	✓	×	✓	✓	✓	×	✓	×	✓	✓	✓	✓	×	--	12 (54.5)
Abdala-Valencia 2016[3]	✓	✓	×	×	×	×	×	×	×	×	✓	✓	✓	×	✓	×	✓	✓	✓	✓	×	--	10 (45.5)
Clifton 2016[10]	✓	✓	✓	✓	✓	✓	✓	×	✓	×	✓	✓	✓	?	✓	✓	✓	✓	✓	✓	✓	--	18 (81.8)
Schwartzer 2017[35]	✓	✓	✓	×	×	×	×	×	✓	×	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	--	14 (63.6)
Vogel Ciernia 2018[38]	✓	✓	×	×	✓	✓	✓	×	✓	×	✓	✓	?	×	✓	×	✓	✓	✓	✓	×	--	13 (59.1)
Clifton 2019[11]	✓	✓	✓	×	✓	✓	✓	×	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	--	17 (77.3)
Lenz 2019[24]	✓	✓	×	×	×	×	✓	×	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	×	✓	15 (68.2)
Wooldridge 2019[39]	✓	✓	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	--	18 (81.8)
ARRIVE 2.0 Guidelines introduced 2020																							
Sodemann 2020[36]	✓	✓	×	×	×	×	×	×	✓	✓	✓	✓	✓	×	×	×	✓	✓	✓	✓	×	--	11 (50.0)
Church 2021[9]	✓	✓	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	--	19 (86.4)
Meakin 2021[29]	✓	✓	✓	×	--	×	✓	×	--	--	✓	✓	×	×	✓	×	✓	✓	--	✓	✓	--	11 (50.0)
Pulczinski 2021[33]	✓	✓	×	×	✓	×	✓	×	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	×	--	14 (63.6)
Lebold 2022[22]	✓	✓	×	×	✓	×	×	×	✓	×	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	×	--	13 (59.1)
Tamayo 2022[37]	✓	✓	✓	×	×	×	✓	×	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	17 (77.3)
Total of 39 (%)	39 (100)	39 (100)	15 (38.5)	1 (2.6)	14 (35.9)	8 (20.5)	16 (41.0)	1 (2.6)	25 (64.1)	7 (17.9)	39 (100)	39 (100)	29 (74.4)	7 (17.9)	20 (51.3)	15 (38.5)	38 (97.4)	39 (100)	33 (84.6)	38 (97.4)	15 (38.5)	2 (5.1)	

✓ = Yes; × = No; ? = Unclear; -- = N/A. Totals are sum of "Yes"

Table S9 - Quality assessment – ARRIVE 2.0 Recommended Set

Table S7 - Quality assessment – ARRIVE 2.0 Recommended Set																	
Study ID	**11**	**12a**	**12b**	**13**	**14**	**15**	**16a**	**16b**	**16c**	**17a**	**17b**	**18**	**19**	**20**	**21a**	**21b**	**Total of 16 (%)**
Before ARRIVE guidelines																	
Herz 2001[19]	×	✓	×	✓	×	×	×	×	×	×	×	×	×	×	×	✓	3 (18.8)
Barrett 2003[7]	×	✓	✓	✓	✓	✓	✓	×	×	✓	×	✓	×	×	×	×	8 (50.0)
Hamada 2003[17]	×	✓	×	✓	✓	✓	×	×	×	✓	✓	✓	×	×	×	✓	8 (50.0)
Fedulov 2005[12]	✓	✓	✓	✓	✓	✓	✓	×	×	✓	✓	✓	×	×	✓	✓	12 (75.0)
Hubeau 2006[20]	×	✓	✓	✓	✓	✓	×	×	×	✓	×	✓	×	×	×	✓	8 (50.0)
Leme 2006[23]	×	✓	✓	✓	✓	✓	×	×	×	✓	×	✓	×	×	✓	✓	9 (56.3)
Fedulov 2011[14]	×	✓	×	✓	✓	×	×	×	×	✓	✓	✓	×	×	✓	✓	8 (50.0)
Hubeau 2007[21]	×	✓	✓	✓	✓	×	×	×	×	✓	×	×	×	×	✓	✓	7 (43.8)
Matson 2007[26]	×	✓	✓	✓	×	✓	✓	×	×	✓	×	✓	×	×	✓	✓	9 (56.3)
Akkoc 2008[4]	✓	✓	×	✓	✓	×	×	×	×	✓	×	✓	×	✓	×	✓	8 (50.0)
Babayigit 2008[6]	✓	✓	✓	✓	✓	✓	×	×	×	✓	✓	✓	×	×	×	×	9 (56.3)
Fedulov 2007[13]	✓	✓	✓	✓	✓	✓	×	×	×	✓	✓	✓	×	×	×	✓	10 (62.5)
Matson 2009[27]	×	✓	✓	✓	×	✓	×	×	×	✓	×	✓	×	×	✓	✓	8 (50.0)
Pucheu-Haston 2009[31]	✓	✓	×	✓	✓	✓	✓	×	×	✓	✓	✓	×	×	✓	✓	11 (68.8)
ARRIVE 1.0 Guidelines introduced 2010																	
Matson 2010[28]	×	✓	×	✓	×	✓	✓	×	×	✓	×	✓	×	×	✓	✓	8 (50.0)
Nakata 2010[30]	×	✓	×	✓	✓	×	×	×	×	✓	×	✓	×	×	×	✓	6 (37.5)
Pucheu-Haston 2010[32]	✓	✓	✓	✓	×	✓	✓	×	×	✓	✓	✓	×	×	✓	✓	11 (68.8)
Allina 2011[5]	✓	✓	×	✓	✓	✓	✓	×	×	✓	×	?	×	×	✓	✓	9 (56.3)
Wu 2011[40]	✓	✓	×	✓	✓	×	×	×	×	✓	×	×	×	×	✓	✓	7 (43.8)
Carpe 2012[8]	×	✓	✓	✓	✓	×	✓	×	×	✓	✓	✓	×	×	✓	✓	10 (62.5)
Feng 2012[15]	✓	✓	×	✓	✓	×	✓	×	×	✓	×	×	×	×	✓	✓	8 (50.0)
Gerhold 2012[16]	✓	✓	✓	✓	×	✓	×	×	×	✓	×	✓	×	✓	✓	✓	10 (62.5)
Abdala-Valencia 2014[2]	✓	✓	✓	✓	✓	×	×	×	×	✓	×	✓	×	✓	✓	✓	10 (62.5)

Heller 2014[18]	×	✓	✓	✓	✓	×	✓	×	×	✓	×	✓	×	×	×	×	7 (43.8)
Lopez-Exposito 2015[25]	×	✓	×	×	×	×	×	×	×	✓	×	×	×	✓	×	✓	4 (25.0)
Schwartzer 2015[34]	✓	✓	✓	✓	✓	✓	✓	×	×	✓	✓	✓	×	✓	✓	✓	13 (81.3)
Abdala-Valencia 2016[3]	×	✓	✓	✓	✓	×	×	×	×	✓	×	✓	×	×	✓	✓	8 (50.0)
Clifton 2016[10]	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	×	✓	✓	✓	14 (87.5)
Schwartzer 2017[35]	✓	✓	✓	✓	✓	✓	✓	×	×	✓	✓	✓	×	×	✓	✓	12 (75.0)
Vogel Ciernia 2018[38]	✓	✓	✓	✓	✓	✓	✓	×	×	✓	×	✓	×	✓	✓	✓	12 (75.0)
Clifton 2019[11]	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	×	×	×	✓	12 (75.0)
Lenz 2019[24]	✓	✓	×	✓	✓	✓	✓	×	×	✓	×	✓	×	✓	✓	✓	11 (68.8)
Wooldridge 2019[39]	✓	✓	✓	✓	✓	✓	×	✓	×	✓	✓	✓	×	×	✓	✓	12 (75.0)
ARRIVE 2.0 Guidelines introduced 2020																	
Sodemann 2020[36]	×	✓	✓	✓	×	×	✓	×	×	✓	×	×	×	✓	✓	✓	8 (50.0)
Church 2021[9]	✓	✓	✓	✓	✓	✓	✓	×	×	✓	✓	✓	×	✓	×	✓	12 (75.0)
Meakin 2021[29]	✓	✓	✓	✓	✓	--	✓	--	--	✓	--	✓	×	×	✓	✓	10 (62.5)
Pulczinski 2021[33]	✓	✓	✓	✓	✓	✓	✓	×	×	✓	×	✓	×	✓	✓	✓	12 (75.0)
Lebold 2022[22]	✓	✓	×	✓	✓	✓	✓	×	×	✓	×	✓	×	✓	×	✓	10 (62.5)
Tamayo 2022[37]	✓	✓	✓	✓	✓	✓	✓	×	×	✓	✓	✓	×	×	✓	✓	12 (75.0)
Total of 39 (%)	23 (59.0)	39 (100.0)	26 (66.7)	38 (97.4)	31 (79.5)	25 (64.1)	22 (56.4)	3 (7.7)	0 (0.0)	38 (97.4)	15 (38.5)	32 (82.1)	0 (0.0)	12 (30.8)	26 (66.7)	36 (92.3)	
✓ = Yes; × = No; ? = Unclear; -- = N/A. Totals are sum of "Yes"																	

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