Complete search strategies for each database in accordance with PRISMA-S

Information sources and search platforms: Searches were conducted separately in PubMed (National Library of Medicine), MEDLINE (Ovid), and Scopus (Elsevier). All databases were searched from inception to 1 November 2026.

Search strategy development: Database-specific strategies combined terms relating to human milk oligosaccharides and their individual constituents with neuroimaging modalities and brain-related outcomes using Boolean operators (AND/OR). Searches employed title and abstract fields in PubMed, title, abstract, and keyword fields in Scopus, and text-word fields in Ovid MEDLINE. No controlled vocabulary terms or published methodological search filters were incorporated.

Search limits and restrictions: No language, publication-date, document-type, population, or study-design restrictions were applied at the database-search stage.

Additional information sources: Reference lists of included studies were not systematically searched, and no additional studies were identified through citation searching.

Search updates: Searches were conducted on 1 November 2026.

Search strategy peer review: Two reviewers independently screened titles and abstracts and subsequently assessed full texts articles against predefined PICOS eligibility criteria.

Record management and deduplication: Records retrieved from the three databases were imported into Covidence for duplicate identification and removal before title and abstract screening. [The database searches identified 797 records (PubMed: 220; Scopus: 432; Ovid MEDLINE: 145). After removing 322 duplicates, 475 unique records were screened.]

Pubmed

("human milk oligosaccharides"[tiab] OR "human milk oligosaccharide"[tiab] OR “HMOs” OR “HMO” OR "2'-fucosyllactose"[tiab] OR "2'-FL"[tiab] OR "3'-sialyllactose"[tiab] OR "6'-sialyllactose"[tiab] OR sialyllactose[tiab] OR "3'-SL"[tiab] OR "6'-SL"[tiab] OR "lacto-N-tetraose"[tiab] OR LNT[tiab] OR "lacto-N-neotetraose"[tiab] OR LNnT[tiab]) AND ("magnetic resonance imaging"[tiab] OR MRI[tiab] OR "diffusion tensor imaging"[tiab] OR DTI[tiab] OR "magnetic resonance spectroscopy"[tiab] OR MRS[tiab] OR neuroimaging[tiab] OR "diffusion MRI"[tiab] OR "myelin water fraction"[tiab] OR "voxel-based morphometry"[tiab] OR "brain development"[tiab] OR "neurodevelopment"[tiab] OR "brain volumes"[tiab] OR "brain metabolism"[tiab])

Scopus

TITLE-ABS-KEY("human milk oligosaccharides" OR "human milk oligosaccharide" OR “HMOs” OR “HMO” OR "2'-fucosyllactose" OR "2'-FL" OR "3'-sialyllactose" OR "6'-sialyllactose" OR sialyllactose OR "3'-SL" OR "6'-SL" OR "lacto-N-tetraose" OR LNT OR "lacto-N-neotetraose" OR LNnT) AND TITLE-ABS-KEY("magnetic resonance imaging" OR MRI OR "diffusion tensor imaging" OR DTI OR "magnetic resonance spectroscopy" OR MRS OR neuroimaging OR "diffusion MRI" OR "myelin water fraction" OR "voxel-based morphometry" OR "brain development" OR "neurodevelopment" OR "brain volumes" OR "brain metabolism")

Ovid MEDLINE(R)

1 ("human milk oligosaccharides" or "human milk oligosaccharide" or HMOs or HMO or "2'-fucosyllactose" or "2'-FL" or "3'-sialyllactose" or "6'-sialyllactose" or sialyllactose or "3'-SL" or "6'-SL" or "lacto-N-tetraose" or LNT or "lacto-N-neotetraose" or LNnT).tw.

2 ("magnetic resonance imaging" or MRI or "diffusion tensor imaging" or DTI or "magnetic resonance spectroscopy" or MRS or neuroimaging or "diffusion MRI" or "myelin water fraction" or "voxel-based morphometry" or "brain development" or "neurodevelopment" or "brain volumes" or "brain metabolism").tw.

3 1 and 2