

### Literature search method

This narrative review was conducted following the PRISMA guidelines to ensure transparency and rigor in the selection of relevant studies. A comprehensive literature search was performed across multiple electronic databases and websites, including PubMed, Web of Science, Scopus, and Google Scholar, using specific keywords such as "mammary gland development," "mammary hormone regulation," "molecular signaling pathways," "stages of mammary gland development," and "transcription factors in mammary gland development." The focus was primarily on large dairy animals to align with the objectives of this review. Exclusion of studies unrelated to mammary gland development, non-English publications, and studies focusing on non-mammalian animals. The search process was conducted systematically, applying the aforementioned keywords and criteria to identify and select relevant studies, ensuring that the literature review was comprehensive and aligned with the research objectives.