

## Supplementary Material

### Changes in bone turnover and calcium homeostasis during pregnancy and lactation in mammals: a meta-analysis

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#### Data S1. Search keywords.

##### KEYWORD USED IN PUBMED

#1 ("bone remodeling"[MeSH Terms] OR "bone and bones"[MeSH Terms] OR "bone density"[MeSH Terms] OR "Skeleton"[MeSH Terms] OR "bone remodeling"[TIAB] OR "bone and bones"[TIAB] OR "bone density"[TIAB] OR "Skeleton"[TIAB] OR "Bone turnover"[TIAB] OR "Bone Mineral content"[TIAB] OR "Bone Loss"[TIAB])

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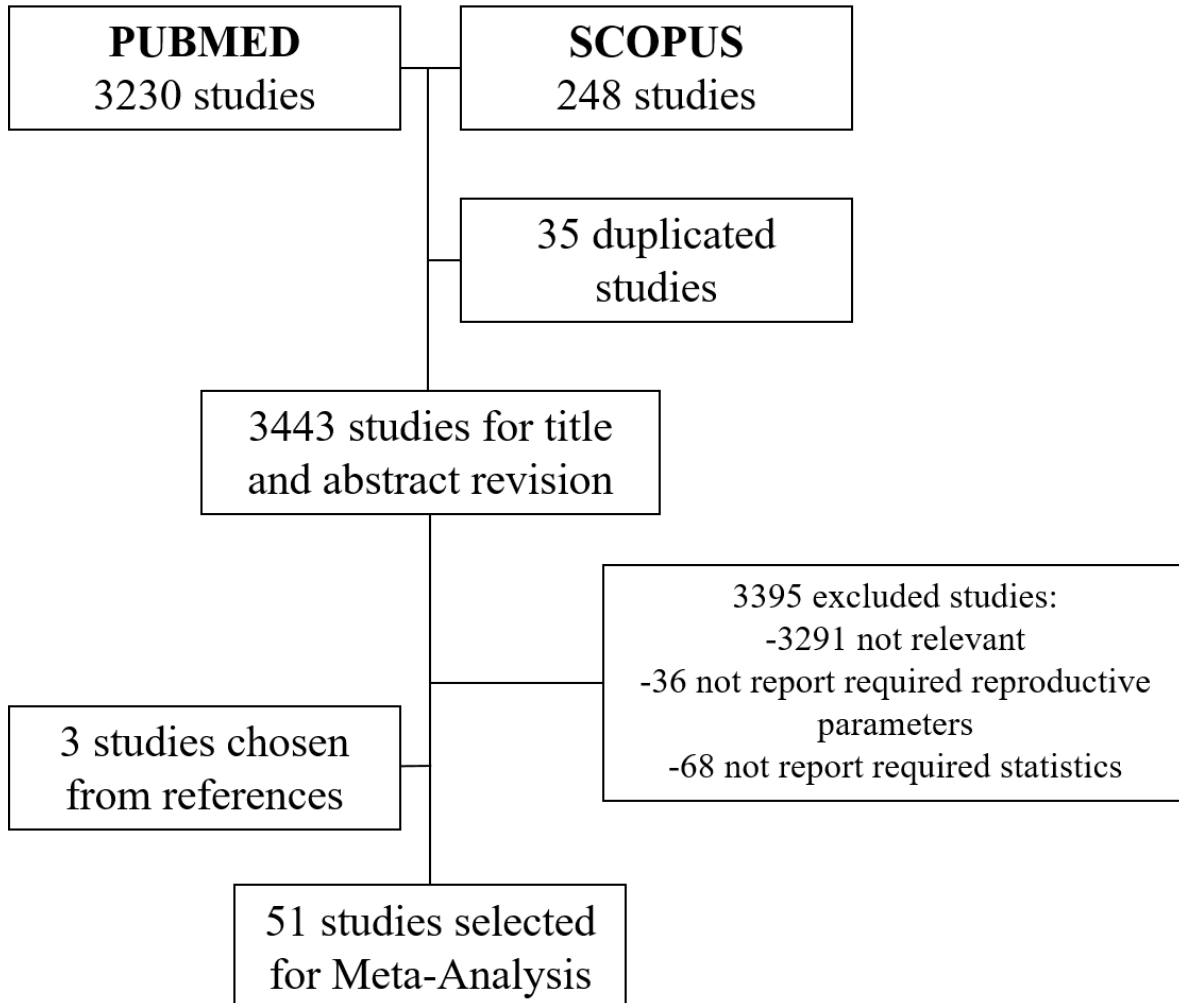
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#### **KEYWORDS USED IN SCOPUS**

(TITLE-ABS-KEY("Reproduction") OR TITLE-ABS-KEY("Lactation") OR TITLE-ABS-KEY("Pregnancy")) AND (TITLE-ABS-KEY("bone remodeling") OR TITLE-ABS-KEY("bone") OR TITLE-ABS-KEY("bone density") OR TITLE-ABS-KEY("Skeleton")) AND (TITLE-ABS-KEY("mammals"))

**Data S2.** Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) illustrating the process of study selection.



**Data S3.** Calcium effect sizes in relation to control.

	Species	n	effect size	SMD	Lower CI	Upper CI	p-value
<b>Early Pregnancy</b>	Human	5		-0.488	-1.617	0.64	0.396
	Rat	1		0	-1.048	1.048	
	Pig	4		-0.474	-1.243	0.295	0.227
	<b>Total</b>	<b>10</b>		<b>-0.434</b>	<b>-1.041</b>	<b>0.174</b>	<b>0.162</b>
<b>Mid Pregnancy</b>	Human	7		-1.144	-2.003	-0.285	0.009
	Southern pig-tailed macaque	1		-1.055	-1.572	-0.537	
	Pig	3		-0.049	-0.851	0.754	0.906
	<b>Total</b>	<b>12</b>		<b>-0.695</b>	<b>-1.202</b>	<b>-0.188</b>	<b>0.007</b>
<b>Late Pregnancy</b>	Cow	1		-0.397	-1.054	0.259	
	Guinea Pig	1		-0.662	-1.091	-0.232	
	Human	6		-1.013	-1.489	-0.536	< 0.001
	Crab-eating macaque	2		-0.872	-1.994	0.249	0.127
	Mice	2		-0.084	-1.126	0.958	0.875
	Rat	3		-1.475	-2.293	-0.657	< 0.001
	Pig	4		-0.74	-1.037	-0.443	< 0.001
<b>Total</b>	<b>19</b>		<b>-0.808</b>	<b>-1.022</b>	<b>-0.594</b>	<b>&lt; 0.001</b>	
<b>Pregnancy</b>	<b>Total</b>	<b>41</b>		<b>-0.704</b>	<b>-0.956</b>	<b>-0.452</b>	<b>&lt; 0.001</b>
<b>Early Lactation</b>	Dog	1		-0.312	-1.706	1.083	
	Guinea Pig	1		-0.374	-0.795	0.048	
	Human	5		0.224	-0.374	0.822	0.463
	Crab-eating macaque	1		0.074	-0.554	0.702	
	Pig	9		-1.188	-1.678	-0.698	< 0.001
<b>Total</b>	<b>17</b>		<b>-0.596</b>	<b>-0.972</b>	<b>-0.22</b>	<b>0.002</b>	
<b>Mid Lactation</b>	Dog	1		-1.123	-2.614	0.368	
	Guinea Pig	1		-0.063	-1.077	0.952	
	Human	2		-0.312	-3.353	2.729	0.841
	Crab-eating macaque	2		0.444	-0.559	1.448	0.386
	Rat	2		-1.318	-2.201	-0.435	0.003
	Mice	1		1.456	0.486	2.425	
Pig	1		-1.206	-1.898	-0.513		
<b>Total</b>	<b>10</b>		<b>-0.277</b>	<b>-1.042</b>	<b>0.488</b>	<b>0.477</b>	
<b>Late Lactation</b>	Guinea Pig	1		-0.680	-1.723	0.363	
	Human	1		0.216	-0.405	0.838	
	Mice	2		0	-0.806	0.806	1
	Crab-eating macaque	2		-0.315	-2.245	1.616	0.749
	Southern pig-tailed macaque	1		-0.417	-0.937	0.104	
	Rat	4		0.182	-0.957	1.322	0.754
<b>Total</b>	<b>11</b>		<b>-0.086</b>	<b>-0.527</b>	<b>0.355</b>	<b>0.701</b>	
<b>Lactation</b>	<b>Total</b>	<b>38</b>		<b>-0.374</b>	<b>-0.655</b>	<b>-0.092</b>	<b>0.009</b>

**Data S4.** Calcium effect sizes in relation to late pregnancy.

	Species	n effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Rat	1	3.139	1.574	4.704	
	Dog	1	0.354	-0.633	1.342	
	Deer	1	-1.898	-3.567	-0.229	
	Pig	3	0.604	0.085	1.124	0.023
	Human	5	0.857	0.11	1.604	0.025
	<b>Total</b>	<b>11</b>	<b>0.701</b>	<b>0.189</b>	<b>1.214</b>	<b>0.007</b>
<b>Mid Pregnancy</b>	Dog	1	0.222	-0.761	1.205	
	Deer	1	0	-1.386	1.386	
	Guinea Pig	1	1.503	1.027	1.979	
	Pig	3	0.738	0.034	1.443	0.04
	Human	6	-0.29	-1.152	0.573	0.51
	<b>Total</b>	<b>12</b>	<b>0.219</b>	<b>-0.303</b>	<b>0.742</b>	<b>0.411</b>
<b>Pregnancy</b>	<b>Total</b>	<b>23</b>	<b>0.448</b>	<b>0.087</b>	<b>0.809</b>	<b>0.015</b>
<b>Early Lactation</b>	Dog	1	-0.111	-1.092	0.87	
	Deer	1	3.195	1.104	5.285	
	Guinea Pig	1	0.189	-0.23	0.608	
	Crab-eating macaque	1	1.348	0.643	2.052	
	Bufalo	3	0.841	-0.384	2.067	0.178
	Goat	3	1.278	0.56	1.996	< 0.001
	Human	4	0.682	-0.148	1.513	0.107
	Sheep	7	0.504	-0.051	1.059	0.075
	Pig	8	-0.317	-0.717	0.083	0.12
	Horse	8	0.005	-0.259	0.269	0.97
	<b>Total</b>	<b>37</b>	<b>0.282</b>	<b>0.05</b>	<b>0.515</b>	<b>0.017</b>
<b>Mid Lactation</b>	Rat	1	1.186	0.05	2.322	
	Human	1	-0.076	-0.817	0.665	
	Dog	1	0.374	-0.615	1.362	
	Sheep	1	1.13	-0.088	2.349	
	Bufalo	2	0.217	-0.406	0.841	0.495
	Horse	2	0.301	-0.226	0.827	0.263
	Crab-eating macaque	2	2.127	0.908	3.347	< 0.001
	Goat	3	0.668	-0.01	1.345	0.053
<b>Total</b>	<b>13</b>	<b>0.747</b>	<b>0.305</b>	<b>1.19</b>	<b>&lt; 0.001</b>	
<b>Late Lactation</b>	Dog	1	-0.35	-1.338	0.637	
	Crab-eating macaque	2	1.498	-0.775	3.772	0.196
	Rat	2	0.6	-0.555	1.755	0.309
	Mice	3	-0.009	-0.998	0.98	0.985
	<b>Total</b>	<b>8</b>	<b>0.492</b>	<b>-0.256</b>	<b>1.24</b>	<b>0.197</b>
<b>Lactation</b>	<b>Total</b>	<b>58</b>	<b>0.42</b>	<b>0.215</b>	<b>0.625</b>	<b>&lt; 0.001</b>

**Data S5.**

**Bone mineral density effect sizes in relation to control**

	Species	n effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Rat	4	-0.955	-1.492	-0.417	< 0.001
<b>Mid Pregnancy</b>	Human	3	-0.049	-0.414	0.315	0.79
<b>Late Pregnancy</b>	Rat	17	-0.46	-0.81	-0.109	0.01
	Human	2	-0.427	-1.054	0.2	0.182
	Cavia	1	-0.128	-1.058	0.803	
<b>Pregnancy</b>	Total	20	-0.431	-0.728	-0.133	0.005
<b>Early Lactation</b>	Total	27	-0.444	-0.684	-0.204	< 0.001
	Human	7	-0.335	-0.575	-0.095	0.006
	Rat	2	-2.816	-5.285	-0.348	0.025
	Total	9	-0.61	-1.07	-0.151	0.009
<b>Mid Lactation</b>	Rat	2	-1.939	-2.837	-1.04	< 0.001
	Human	2	-0.892	-1.504	-0.28	0.004
	Total	4	-1.225	-1.843	-0.608	< 0.001
<b>Late Lactation</b>	Human	2	-1.018	-2.13	0.095	0.073
	Rat	12	-1.374	-2.016	-0.732	< 0.001
	Total	14	-1.287	-1.81	-0.764	< 0.001
<b>Lactation</b>	Total	27	-1.044	-1.364	-0.724	< 0.001

**Bone mineral density effect sizes in femur, tibia and lumbar vertebrae in relation to control**

		n effect size	SMD	Lower IC	Upper IC	p-value
<b>Pregnancy</b>	Femur	6	-0.411	-1.111	0.289	0.249
	Tibia	5	-0.846	-1.592	-0.099	0.026
	Lumbar vertebrae	7	-0.37	-1.016	0.277	0.262
<b>Lactation</b>	Femur	5	-1.425	-2.088	-0.762	< 0.001
	Tibia	6	-1.421	-2.687	-0.155	0.028
	Lumbar spine	10	-1.087	-1.677	-0.498	< 0.001

**Data S6.** Parathyroid hormone effect sizes in relation to control.

	Species	n	effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Mice	1		-0.088	-1.101	0.924	
	Human	4		-0.537	-0.971	-0.102	0.015
	<b>Total</b>	<b>5</b>		<b>-0.467</b>	<b>-0.866</b>	<b>-0.068</b>	<b>0.022</b>
<b>Mid Pregnancy</b>	Southern pig-tailed macaque	1		0.068	-0.427	0.563	
	Human	4		-0.822	-1.265	-0.38	< 0.001
	<b>Total</b>	<b>5</b>		<b>-0.57</b>	<b>-1.08</b>	<b>-0.06</b>	<b>0.028</b>
<b>Late Pregnancy</b>	Cow	1		-0.033	-0.932	0.865	
	Rat	2		0.462	-4.724	5.648	0.861
	Mice	3		-0.634	-1.238	-0.03	0.04
	Human	3		-0.242	-0.783	0.299	0.38
	<b>Total</b>	<b>9</b>		<b>-0.261</b>	<b>-0.951</b>	<b>0.429</b>	<b>0.459</b>
<b>Pregnancy</b>	<b>Total</b>	<b>19</b>		<b>-0.426</b>	<b>-0.75</b>	<b>-0.101</b>	<b>0.01</b>
<b>Early Lactation</b>	Mice	1		-1.107	-2.278	0.063	
	Cow	2		0.229	-0.41	0.869	0.482
	Human	3		-0.215	-0.704	0.273	0.388
	<b>Total</b>	<b>6</b>		<b>-0.156</b>	<b>-0.525</b>	<b>0.212</b>	<b>0.406</b>
<b>Late Lactation</b>	Southern pig-tailed macaque	1		-0.218	-0.735	0.299	
	Rat	2		0.454	-0.912	1.82	0.515
	Mice	2		-1.043	-1.802	-0.285	0.007
	<b>Total</b>	<b>5</b>		<b>-0.279</b>	<b>-0.948</b>	<b>0.39</b>	<b>0.414</b>
	<b>Lactation</b>	<b>Total</b>	<b>11</b>		<b>-0.216</b>	<b>-0.547</b>	<b>0.114</b>

**Data S7.** Parathyroid hormone effect sizes in relation to late pregnancy.

	Species	n	effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Deer	1		-2.633	-4.527	-0.740	
	Mice	1		0	-1.187	1.187	
	Human	4		-0.233	-0.656	0.19	0.28
	<b>Total</b>	<b>6</b>		<b>-0.348</b>	<b>-0.824</b>	<b>0.129</b>	<b>0.152</b>
<b>Mid Pregnancy</b>	Deer	1		-2.423	-4.248	-0.598	
	Dog	1		0.07	-0.91	1.05	
	Human	4		-0.524	-0.949	-0.098	0.016
	<b>Total</b>	<b>6</b>		<b>-0.537</b>	<b>-0.973</b>	<b>-0.101</b>	<b>0.016</b>
<b>Pregnancy</b>	<b>Total</b>	<b>12</b>		<b>-0.389</b>	<b>-0.673</b>	<b>-0.106</b>	<b>0.007</b>
<b>Early Lactation</b>	Mice	1		0.046	-1.044	1.137	
	Dog	1		-0.746	-1.76	0.267	
	Deer	1		-0.261	-1.652	1.131	
	Cow	2		0.293	-0.123	0.708	0.167
	Horse	2		0.082	-0.693	0.857	0.835
	Sheep	3		10.085	8.093	12.077	< 0.001
	Human	3		0.016	-0.489	0.52	0.951
	Buffalo	5		0.087	-0.306	0.48	0.663
<b>Total</b>	<b>18</b>		<b>0.645</b>	<b>0.06</b>	<b>1.231</b>	<b>0.031</b>	
<b>Mid Lactation</b>	Dog	1		-0.308	-1.294	0.677	
	Horse	2		0.019	-1.678	1.717	0.982
	<b>Total</b>	<b>3</b>		<b>-0.11</b>	<b>-1.061</b>	<b>0.841</b>	<b>0.821</b>
<b>Late Lactation</b>	Dog	1		-0.415	-1.406	0.575	
	Rat	2		-0.444	-4.135	3.248	0.814
	Mice	3		0.245	-0.421	0.912	0.471
	<b>Total</b>	<b>6</b>		<b>-0.041</b>	<b>-0.976</b>	<b>0.895</b>	<b>0.932</b>
<b>Lactation</b>	<b>Total</b>	<b>27</b>		<b>0.37</b>	<b>-0.075</b>	<b>0.816</b>	<b>0.103</b>



Data S8.

**Calcitonin effect sizes in relation to control**

	Species	n effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Human	1	-0.242	-1.016	0.532	
<b>Mid Pregnancy</b>	Human	1	-0.628	-1.418	0.161	
<b>Late Pregnancy</b>	Rat	1	-0.214	-1.141	0.712	
	Human	1	-0.55	-1.35	0.249	
	<b>Total</b>	2	-0.407	-1.012	0.198	0.188
<b>Pregnancy</b>	<b>Total</b>	4	-0.42	-0.828	-0.012	0.044
<b>Early Lactation</b>	Human	1	-0.187	-0.96	0.586	
<b>Late Lactation</b>	Rat	1	-0.02	-0.944	0.904	
<b>Lactation</b>	<b>Total</b>	2	-0.118	-0.711	0.475	0.696

**Calcitonin effect sizes in relation to late pregnancy**

	Species	n effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Dog	1	0.125	-0.856	1.106	
	Deer	1	0.261	-1.131	1.652	
	Human	1	0.273	-0.486	1.031	
	<b>Total</b>	3	0.224	-0.327	0.775	0.425
<b>Mid Pregnancy</b>	Dog	1	-0.158	-1.14	0.823	
	Deer	1	0.549	-0.862	1.961	
	Human	1	0	-0.755	0.755	
	<b>Total</b>	3	0.034	-0.517	0.585	0.904
<b>Pregnancy</b>	<b>Total</b>	6	0.129	-0.261	0.519	0.516
<b>Early Lactation</b>	Dog	1	-0.65	-1.656	0.355	
	Deer	1	2.362	0.557	4.168	
	Human	1	0.202	-0.555	0.959	
	Buffalo	5	0.888	0.475	1.301	< 0.001
	<b>Total</b>	8	0.68	0.194	1.167	0.006
<b>Mid Lactation</b>	Dog	1	0.561	-0.438	1.56	
<b>Late Lactation</b>	Dog	1	-0.423	-1.414	0.568	
	Rat	1	0.232	-0.695	1.159	
	<b>Total</b>	2	-0.074	-0.751	0.603	0.831
<b>Lactation</b>	<b>Total</b>	11	0.524	0.128	0.92	0.009

**Data S9.** Calcitriol effect sizes in relation to control.

	Species	n	effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Human	3		0.032	-2.239	2.304	0.978
	Guinea Pig	1		1.558	0.503	2.612	
	Pig	1		0.427	-0.176	1.03	
	<b>Total</b>	<b>5</b>		<b>0.401</b>	<b>-1.134</b>	<b>1.937</b>	<b>0.609</b>
<b>Mid Pregnancy</b>	Human	3		2.46	1.306	3.615	< 0.001
	Southern pig-tailed macaque	1		0.94	0.427	1.453	
	<b>Total</b>	<b>4</b>		<b>2.036</b>	<b>0.657</b>	<b>3.414</b>	<b>0.004</b>
<b>Late Pregnancy</b>	Cow	1		0.199	-0.453	0.852	
	Guinea Pig	1		1.245	0.236	2.255	
	Pig	1		0.885	0.216	1.553	
	Rat	2		2.6	1.629	3.571	< 0.001
	Mice	2		2.396	1.246	3.545	< 0.001
	Human	3		3.083	0.098	6.067	0.043
	<b>Total</b>	<b>10</b>		<b>2.149</b>	<b>0.732</b>	<b>3.566</b>	<b>0.003</b>
<b>Pregnancy</b>	<b>Total</b>	<b>19</b>		<b>1.659</b>	<b>0.63</b>	<b>2.689</b>	<b>0.002</b>
<b>Early Lactation</b>	Guinea Pig	1		1.077	0.089	2.066	
	Pig	1		0.825	0.16	1.49	
	Human	3		1.648	-2.252	5.549	0.408
	<b>Total</b>	<b>5</b>		<b>1.373</b>	<b>-0.888</b>	<b>3.635</b>	<b>0.234</b>
<b>Late Lactation</b>	Southern pig-tailed macaque	1		-0.298	-0.816	0.22	
	Rat	2		4.16	-2.315	10.636	0.208
	<b>Total</b>	<b>3</b>		<b>1.869</b>	<b>-0.402</b>	<b>4.14</b>	<b>0.107</b>
<b>Lactation</b>	<b>Total</b>	<b>8</b>		<b>1.634</b>	<b>-0.007</b>	<b>3.274</b>	<b>0.051</b>

**Data S10.** Calcitriol effect sizes in relation to late pregnancy.

	Species	n	effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Sheep	1		-7.033	-9.177	-4.888	
	Goat	1		-1.215	-2.086	-0.345	
	Guinea Pig	1		0.015	-0.909	0.939	
	Pig	1		-0.86	-1.567	-0.153	
	Human	3		-2.22	-4.51	0.071	0.058
	<b>Total</b>	<b>7</b>		<b>-2.084</b>	<b>-3.442</b>	<b>-0.725</b>	<b>0.003</b>
<b>Mid Pregnancy</b>	Sheep	2		-3.388	-7.265	0.488	0.087
	Goat	2		-0.329	-1.128	0.47	0.42
	Human	3		-1.004	-2.348	0.34	0.143
	<b>Total</b>	<b>7</b>		<b>-1.35</b>	<b>-2.309</b>	<b>-0.39</b>	<b>0.006</b>
<b>Pregnancy</b>	<b>Total</b>	<b>14</b>		<b>-1.7</b>	<b>-2.49</b>	<b>-0.91</b>	<b>&lt; 0.001</b>
<b>Early Lactation</b>	Guinea Pig	1		-0.535	-1.476	0.405	
	Pig	1		-0.036	-0.751	0.68	
	Human	3		-1.319	-2.526	-0.112	0.032
	Sheep	4		-2.426	-2.99	-1.863	< 0.001
	Goat	4		1.685	0.53	2.84	0.004
	<b>Total</b>	<b>13</b>		<b>-0.592</b>	<b>-1.498</b>	<b>0.314</b>	<b>0.2</b>
<b>Mid Lactation</b>	Sheep	3		-2.538	-3.07	-2.005	< 0.001
	Goat	2		2.893	2.083	3.702	< 0.001
	<b>Total</b>	<b>5</b>		<b>-0.11</b>	<b>-2.413</b>	<b>2.193</b>	<b>0.926</b>
<b>Late Lactation</b>	Goat	1		1.978	1.002	2.955	
	Rat	1		-1.306	-2.329	-0.283	
	<b>Total</b>	<b>2</b>		<b>0.34</b>	<b>-2.879</b>	<b>3.558</b>	<b>0.836</b>
<b>Lactation</b>	<b>Total</b>	<b>20</b>		<b>-0.382</b>	<b>-1.189</b>	<b>0.424</b>	<b>0.353</b>

**Data S11.** Osteocalcin effect sizes in relation to control.

	Species	n	effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Sheep	1		-4.083	-5.027	-3.139	
	Rat	1		0.589	-0.412	1.59	
	Mice	1		-0.263	-1.315	0.789	
	Pig	1		0.093	-0.59	0.776	
	Human	4		-1.119	-2.038	-0.199	0.017
	<b>Total</b>	<b>8</b>		<b>-1.043</b>	<b>-2.028</b>	<b>-0.057</b>	<b>0.038</b>
<b>Mid Pregnancy</b>	Guinea Pig	1		-3.064	-4.557	-1.57	
	Southern pig-tailed macaque	1		-2.059	-2.635	-1.482	
	Human	4		-1.49	-2.426	-0.553	0.002
	<b>Total</b>	<b>6</b>		<b>-1.79</b>	<b>-2.559</b>	<b>-1.022</b>	<b>&lt; 0.001</b>
<b>Late Pregnancy</b>	Pig	1		-0.285	-0.983	0.412	
	Guinea Pig	1		-2.849	-4.288	-1.411	
	Rat	3		-0.591	-3.333	2.152	0.673
	Mice	3		-0.871	-1.59	-0.152	0.018
	Human	4		-0.6	-1.35	0.149	0.117
	<b>Total</b>	<b>12</b>		<b>-0.839</b>	<b>-1.647</b>	<b>-0.03</b>	<b>0.042</b>
<b>Pregnancy</b>	<b>Total</b>	<b>26</b>		<b>-1.109</b>	<b>-1.576</b>	<b>-0.642</b>	<b>&lt; 0.001</b>
<b>Early Lactation</b>	Sheep	1		-1.049	-1.961	-0.137	
	Rat	1		0.97	-0.066	2.005	
	Pig	2		-1.165	-1.692	-0.637	< 0.001
	Human	4		0.498	-0.047	1.044	0.073
	<b>Total</b>	<b>8</b>		<b>-0.087</b>	<b>-0.781</b>	<b>0.607</b>	<b>0.806</b>
<b>Mid Lactation</b>	Human	1		0.342	-0.253	0.937	
	Mice	1		1.968	0.667	3.269	
	<b>Total</b>	<b>2</b>		<b>1.048</b>	<b>-0.531</b>	<b>2.627</b>	<b>0.193</b>
<b>Late Lactation</b>	Cow	1		-1.684	-2.426	-0.942	
	Southern pig-tailed macaque	1		1.249	0.695	1.804	
	Human	1		0.024	-0.567	0.615	
	Rat	1		1.089	0.039	2.139	
	Mice	2		-0.536	-2.552	1.481	0.603
	<b>Total</b>	<b>6</b>		<b>-0.044</b>	<b>-1.089</b>	<b>1.002</b>	<b>0.935</b>
<b>Lactation</b>	<b>Total</b>	<b>16</b>		<b>0.069</b>	<b>-0.448</b>	<b>0.587</b>	<b>0.793</b>

**Data S12.** Osteocalcin effect sizes in relation to late pregnancy.

	Species	n	effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Goat	1		0.57	-0.246	1.386	
	Sheep	1		1.843	0.888	2.798	
	Mice	1		0.714	-0.411	1.838	
	Rat	1		0.258	-0.726	1.242	
	Pig	1		0.395	-0.317	1.106	
	Human	4		-0.409	-0.945	0.126	0.134
	<b>Total</b>	<b>9</b>		<b>0.194</b>	<b>-0.326</b>	<b>0.714</b>	<b>0.465</b>
<b>Mid Pregnancy</b>	Guinea Pig	1		0.1	-0.948	1.148	
	Goat	3		0.834	0.351	1.318	< 0.001
	Sheep	3		0.812	0.33	1.295	< 0.001
	Human	4		-0.727	-1.097	-0.358	< 0.001
	<b>Total</b>	<b>11</b>		<b>0.173</b>	<b>-0.321</b>	<b>0.667</b>	<b>0.493</b>
<b>Pregnancy</b>	<b>Total</b>	<b>20</b>		<b>0.182</b>	<b>-0.167</b>	<b>0.53</b>	<b>0.307</b>
<b>Early Lactation</b>	Buffalo	5		1.378	0.546	2.21	0.001
	Goat	14		0.632	0.148	1.116	0.01
	Horse	10		0.218	-0.031	0.467	0.086
	Human	4		1.015	0.634	1.396	< 0.001
	Sheep	16		-0.686	-1.498	0.127	0.098
	Rat	1		0.393	-0.596	1.383	
	Pig	2		-0.734	-1.254	-0.214	0.006
	<b>Total</b>	<b>52</b>		<b>0.333</b>	<b>0.045</b>	<b>0.62</b>	<b>0.023</b>
<b>Mid Lactation</b>	Goat	6		0.28	-0.763	1.323	0.598
	Horse	4		-0.065	-0.5	0.371	0.771
	Human	1		0.193	-0.399	0.785	
	Shep	4		0.592	-0.893	2.077	0.435
	<b>Total</b>	<b>15</b>		<b>0.244</b>	<b>-0.281</b>	<b>0.769</b>	<b>0.362</b>
<b>Late Lactation</b>	Goat	1		0.221	-0.582	1.023	
	Human	1		-0.135	-0.726	0.457	
	Rat	1		0.572	-0.428	1.571	
	Mice	2		0.235	-0.999	1.47	0.709
	<b>Total</b>	<b>5</b>		<b>0.121</b>	<b>-0.267</b>	<b>0.509</b>	<b>0.54</b>
<b>Lactation</b>	<b>Total</b>	<b>72</b>		<b>0.309</b>	<b>0.074</b>	<b>0.544</b>	<b>0.01</b>

**Data S13.** Alkaline phosphatase effect sizes in relation to control.

	Species	n effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Rat	1	1.701	0.558	2.845	
	Human	3	-0.228	-1.461	1.005	0.717
	<b>Total</b>	<b>4</b>	<b>0.224</b>	<b>-1.073</b>	<b>1.521</b>	<b>0.735</b>
<b>Mid Pregnancy</b>	Human	3	0.879	-0.065	1.823	0.068
	Guinea Pig	1	-0.136	-0.56	0.287	
	<b>Total</b>	<b>4</b>	<b>0.544</b>	<b>-0.09</b>	<b>1.178</b>	<b>0.093</b>
<b>Late Pregnancy</b>	Guinea Pig	1	-0.14	-0.439	0.159	
	Cow	1	0.186	-0.466	0.838	
	Crab-eating Macaque	2	-1.011	-1.564	-0.457	< 0.001
	Rat	2	0.017	-3.435	3.47	0.992
	Human	3	1.949	1.025	2.873	< 0.001
	<b>Total</b>	<b>9</b>	<b>0.487</b>	<b>-0.323</b>	<b>1.297</b>	<b>0.238</b>
<b>Pregnancy</b>	<b>Total</b>	<b>17</b>	<b>0.454</b>	<b>-0.07</b>	<b>0.978</b>	<b>0.089</b>
<b>Early Lactation</b>	Human	2	1.565	0.203	2.927	0.024
	Guinea Pig	1	-2.144	-2.674	-1.613	
	Crab-eating Macaque	1	-0.272	-0.903	0.359	
	Rat	1	1.398	0.305	2.491	
	<b>Total</b>	<b>5</b>	<b>0.415</b>	<b>-1.128</b>	<b>1.959</b>	<b>0.598</b>
<b>Mid Lactation</b>	Dog	1	1.422	-0.129	2.973	
	Human	1	3.914	2.418	5.411	
	Crab-eating Macaque	3	0.245	-0.27	0.759	0.352
	<b>Total</b>	<b>5</b>	<b>1.159</b>	<b>0.006</b>	<b>2.313</b>	<b>0.049</b>
<b>Late Lactation</b>	Dog	1	3.347	1.2	5.495	
	Crab-eating Macaque	1	0.552	-0.419	1.524	
	Rat	2	2.048	1.164	2.931	< 0.001
	<b>Total</b>	<b>4</b>	<b>1.787</b>	<b>0.71</b>	<b>2.865</b>	<b>0.001</b>
<b>Lactation</b>	<b>Total</b>	<b>14</b>	<b>1.078</b>	<b>0.252</b>	<b>1.904</b>	<b>0.011</b>

**Data S14.** Alkaline phosphatase effect sizes in relation to late pregnancy.

	Species	n	effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Rat	1		-0.125	-1.106	0.856	
	Human	3		-2.318	-2.764	-1.873	< 0.001
	Deer	1		-1.838	-3.491	-0.186	
	<b>Total</b>	<b>5</b>		<b>-1.815</b>	<b>-2.714</b>	<b>-0.915</b>	<b>&lt; 0.001</b>
<b>Mid Pregnancy</b>	Human	3		-1.654	-2.639	-0.67	< 0.001
	Guinea Pig	1		-0.181	-0.605	0.243	
	Deer	1		-1.224	-2.735	0.286	
	<b>Total</b>	<b>5</b>		<b>-1.235</b>	<b>-2.029</b>	<b>-0.441</b>	<b>0.002</b>
<b>Pregnancy</b>	<b>Total</b>	<b>10</b>		<b>-1.526</b>	<b>-2.185</b>	<b>-0.866</b>	<b>&lt; 0.001</b>
<b>Early Lactation</b>	Deer	1		-1.851	-3.507	-0.195	
	Guinea Pig	1		-2.77	-3.362	-2.178	
	Crab-eating Macaque	1		0.82	0.158	1.482	
	Rat	1		-0.529	-1.526	0.468	
	Buffalo	5		4.081	3.133	5.029	< 0.001
	Human	2		-0.52	-0.983	-0.058	0.027
	<b>Total</b>	<b>11</b>		<b>1.333</b>	<b>-0.059</b>	<b>2.725</b>	<b>0.06</b>
<b>Mid Lactation</b>	Human	1		-0.925	-1.848	-0.003	
	Crab-eating Macaque	3		1.267	0.837	1.697	< 0.001
	<b>Total</b>	<b>4</b>		<b>0.753</b>	<b>-0.206</b>	<b>1.712</b>	<b>0.124</b>
<b>Late Lactation</b>	Crab-eating Macaque	1		1.235	0.453	2.017	
	Rat	2		1.22	-1.633	4.073	0.402
	<b>Total</b>	<b>3</b>		<b>1.176</b>	<b>-0.255</b>	<b>2.607</b>	<b>0.107</b>
<b>Lactation</b>	<b>Total</b>	<b>18</b>		<b>1.14</b>	<b>0.26</b>	<b>2.02</b>	<b>0.011</b>

**Data S15.**

**Bone-specific alkaline phosphatase effect sizes in relation to control**

	Species	n effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Human	3	-0.249	-0.736	0.237	0.315
<b>Mid Pregnancy</b>	Human	3	0.144	-0.678	0.967	0.731
<b>Late Pregnancy</b>	Cow	1	-6.154	-7.975	-4.333	
	Human	3	1.657	-0.161	3.475	0.074
	<b>Total</b>	<b>4</b>	<b>-0.097</b>	<b>-2.88</b>	<b>2.686</b>	<b>0.946</b>
<b>Pregnancy</b>	<b>Total</b>	<b>10</b>	<b>-0.015</b>	<b>-0.892</b>	<b>0.862</b>	<b>0.973</b>
<b>Early Lactation</b>	Cow	2	-6.564	-7.938	-5.189	< 0.001
	Human	2	2.22	0.521	3.919	0.01
	<b>Total</b>	<b>4</b>	<b>-2.066</b>	<b>-6.605</b>	<b>2.473</b>	<b>0.372</b>
<b>Mid Lactation</b>	Human	1	0.495	-0.395	1.385	
<b>Lactation</b>	<b>Total</b>	<b>5</b>	<b>-0.43</b>	<b>-1.402</b>	<b>0.542</b>	<b>0.386</b>

**Bone-specific alkaline phosphatase effect sizes in relation to late pregnancy**

	Species	n effect size	SMD	Lower IC	Upper IC	p-value
<b>Early Pregnancy</b>	Human	3	-1.983	-3.801	-0.165	0.033
<b>Mid Pregnancy</b>	Goat	2	2.587	0.612	4.562	0.01
	Sheep	2	0.82	0.23	1.41	0.006
	Human	3	-1.707	-3.251	-0.163	0.03
	<b>Total</b>	<b>7</b>	<b>0.226</b>	<b>-1.104</b>	<b>1.557</b>	<b>0.739</b>
<b>Pregnancy</b>	<b>Total</b>	<b>10</b>	<b>-0.434</b>	<b>-1.546</b>	<b>0.678</b>	<b>0.444</b>
<b>Early Lactation</b>	Goat	10	-0.391	-0.88	0.099	0.118
	Sheep	11	-0.35	-1.203	0.503	0.421
	Cow	2	-6.564	-7.938	-5.189	< 0.001
	Human	2	-0.297	-2.45	1.856	0.787
	<b>Total</b>	<b>25</b>	<b>-0.726</b>	<b>-1.276</b>	<b>-0.176</b>	<b>0.01</b>
<b>Mid Lactation</b>	Sheep	4	0.264	-0.715	1.244	0.597
	Goat	4	-0.438	-1.442	0.567	0.393
	Human	1	-0.145	-1.023	0.732	
	<b>Total</b>	<b>9</b>	<b>-0.088</b>	<b>-0.695</b>	<b>0.518</b>	<b>0.775</b>
<b>Late Lactation</b>	Goat	1	-0.131	-0.932	0.67	
<b>Lactation</b>	<b>Total</b>	<b>35</b>	<b>-0.526</b>	<b>-0.942</b>	<b>-0.109</b>	<b>0.013</b>



**Data S16.** Sixty studies selected for meta-analysis: 51 studies from literature search and 9 women studies chosen by authors.

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