Ontology-based Assisted Curation of Biomedical Data with GoGene

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Baumgartner et al., 2007: *Manual curation is not enough!*
Which rat genes have implications in osteoporosis and bone resorption?
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Can we find more?
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142 genes found in 860 abstracts

GoGene has found 142 genes for the query rat osteoporosis bone resorption.
Sort by: Novelty, Community, Volume, Default

1: Pth: parathyroid hormone [Rattus norvegicus]
Community: 4342 Volume: 7650 91
Known as: parathyroid hormone, hypocalcemia; parathyroid hormone, PTH-(1-84), Pth1, Pth1r, Pth,
regulates osteoblast proliferation and differentiation; involved in G-protein coupled receptor mediated adenylate cyclase activation [RGD]
Show details

2: Igf1: insulin-like growth factor 1 [Rattus norvegicus]
Community: 11113 Volume: 14362 85
Known as: Insulin-like growth factor 1, insulin-like growth factor 1, somatomedin, Igf1,
growth factor, plays a major role in mammalian growth [RGD]
Show details

3: Acp5: acid phosphatase 5, tartrate resistant [Rattus norvegicus]
Community: 1001 Volume: 591 81
Known as: TTRAP, Trap, Acp5, acid phosphatase 5, tartrate resistant, acid phosphatase 5, acid phosphatase type V,
tartrate-resistant acid phosphatase; may be involved in bone resorption; 5b isoform is osteoclast-specific and may be a specific marker of bone resorption [RGD]
Show details
Which rat genes have implications in osteoporosis and bone resorption?

5 genes left!

6 of 142 genes related to "bone resorption", "Osteoporosis"

1: Pth: parathyroid hormone (Rattus norvegicus)
   Community: 573 Volume: 765.91
   Known as: parathyroid hormone, hypotalamic parathyroid hormone, PTH(1-84), Pth, Pthr, Pth
   regulates osteoblast proliferation and differentiation; involved in G-protein coupled receptor mediated adenosine cyclase activation [F60]
   Show details

6: Tnfsf11: tumor necrosis factor (ligand) superfamily, member 11 (Rattus norvegicus)
   Community: 573 Volume: 326.96
   Known as: TRAIL, tumor necrosis factor (ligand) superfamily, member 11, Tnfsf11
   induces osteoclast formation and bone resorption; plays a role in regulation of calcium homeostasis and osteoclast function [F60]
   Show details

10: Ctsk: cathepsin K (Rattus norvegicus)
    Community: 342 Volume: 142.95
    Known as: Ctsk, cathepsin K,
    participates in bone remodeling; displays endopeptidase activity and is associated with osteoatrophy when mutated [F60]
    Show details

11: Tnfrsf11b: tumor necrosis factor receptor superfamily, member 11b (osteoprotegerin) (Rattus norvegicus)
    Community: 473 Volume: 297.32
    Known as: Osteoprotegerin, Opg, tumor necrosis factor receptor superfamily, member 11b (osteoprotegerin), TNFRSF11B, Tnfrsf11b, tumor necrosis factor receptor superfamily member 11b,
    plays a role in the negative regulation of bone resorption by inhibiting formation of osteoclasts [F60]
    Show details
GoGene links back to literature to validate extracted annotations

• **Csf1 and osteoporosis:**

  2. [The molecule mechanism of soybean isoflavones antagonizing bone loss induced by postmenopausal osteoporosis](https://doi.org/10.1038/npre.2009.3122.1) Posted 22 Apr 2009

  OBJECTIVE: To observe the effect of the soybean isoflavones on the mRNA expression of Osteoprotegerin (OPG), Osteoclast Differentiation Factor (ODF) and Macrophage Colony Stimulating Factor (M-CSF) in bone tissue of ovariectomized rat, and to investigate the possible molecular mechanism of Soybean isoflavones antagonizing bone loss induced by postmenopausal osteoporosis.

• **Ctsk and osteoporosis:**

  1. [Effect of estrogren on osteoprotegerin, osteoclast differentiation factor and macrophage colony stimulating factor mRNA expressions in ovariectomized rat bone tissue](https://doi.org/10.1038/npre.2009.3122.1) Posted 22 Apr 2009

  OBJECTIVE: To observe the effect of the estrogren on the mRNA expression of osteoprotegerin (OPG), osteoclast differentiation factor (ODF) and macrophage colony stimulating factor (M-CSF) in bone tissue of ovariectomized rats, and investigate the possible pathway of estrogren in preventing and treating postmenopausal osteoporosis.

• **Tnfrsb1 and bone resorption:**

  17. **Immune response: the key to bone resorption in periodontal disease.**

  OBJECTIVE: To investigate the role of RANKL in periodontal bone loss.

  Interference with RANKL by systemic administration of osteoprotegerin (OPG), the decoy receptor for (and inhibitor of) RANKL, resulted in a reduction of periodontal bone resorption in the rat model.

  6. **RANKL inhibition through osteoprotegerin blocks bone loss in experimental periodontitis.**

  OBJECTIVE: To investigate the role of RANKL in periodontal bone loss.

  The receptor activator of nuclear factor-kappa B ligand (RANKL) inhibitor osteoprotegerin (OPG) inhibits osteoclastogenesis and suppresses bone resorption.
GoGene accepts three kinds of queries:

1. PubMed – put a PubMed query to search the literature
2. EntrezGene – search by gene IDs or gene names
3. BLAST – paste a nucleotide or amino acid sequence

http://www.gopubmed.org/gogene
Original Paper

Oncogene (2005) 24, 5079–5088. doi:10.1038/sj.onc.1208696; published online 16 May 2005

Meta-analysis of microarray data on pancreatic cancer defines a set of commonly dysregulated genes

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Copy and paste EntrezGene identifiers into GoGene's query box.
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Problem: Finding annotations for an uncharacterised protein

Copy&Paste sequence of uncharacterised human protein C15orf39
Summary

• Employ ontologies to facilitate search and summarization of information

• Link genes to ontologies via literature

• GoGene: search for genes at http://www.gopubmed.org/gogene


• GoWeb: search the web at http://www.gopubmed.org/goweb
Kindly acknowledged are...

**GoGene:** Jörg Hakenberg    Loic Royer    Rainer Winnenburg

**GoPubMed:** Andreas Doms    Jan Mönnch    Thomas Wächter

Matthias Zschunke

**GoWeb:** Heiko Dietze