

**Hands-on exercises** to the lecture „Modern Methods in Drug Discovery“ WS13/14

1. The common degu (*Octodon degus*) develops diabetes quickly upon sugar containing nutrients. Therefore it has been suggested as potential model organism for the study of diabetes and corresponding drugs that i.e. influence insulin.

Retrieve the amino acid sequences (FASTA format) of insulin of the following species from UniProt ([www.uniprot.org](http://www.uniprot.org)) and perform a multiple alignment with CLUSTALW ([www.ebi.ac.uk/Tools/msa/clustalw2/](http://www.ebi.ac.uk/Tools/msa/clustalw2/)). Have a look at the clustering. Using the sequence alignment argue if the degu would be a suitable model organism.

human (homo sapiens) INS\_HUMAN  
pig (sus scrofa) INS\_PIG  
degu (Octodon degus) INS\_OCTDE  
chinese hamster (Cricetus longicaudatus) INS\_CRILO  
chinchilla (chinchilla chinchilla)  
rabbit (oryctolagus cuniculus)  
mouse (mus musculus) INS1\_MOUSE  
rat (rattus norvegicus) INS1\_RAT  
chimpanzee (pan troglodytes)  
Lowland gorilla (gorilla gorilla gorilla)  
guinea pig (cavia porcellus)  
dog (canis familiaris)  
bovine (bos taurus)  
sheep (ovis aries)

Construct a phylogenetic tree (hierarchical clustering, cladogram, or phylogram) using ClustalW (<http://www.ebi.ac.uk/Tools/msa/clustalw2/>).

Which species (except chimpanzee and gorilla) is thus closest related to human?

Argue upon the sequence alignment if the degu would be a suitable model organism?