

find a gene

```
library(bio3d)
```

```
seq <- read.fasta("fasta")
```

```
mat <- seqidentity(seq)
mat
```

	Homo-sapiens	Mus-musculus	Rattus-norvegicus
Homo-sapiens	1.000	0.839	0.883
Mus-musculus	0.839	1.000	0.938
Rattus-norvegicus	0.883	0.938	1.000
Cricetulus-griseus	0.547	0.899	0.938
Chionomys-nivalis	0.573	0.899	0.938
Phodopus-roborovskii	0.549	0.895	0.934
Peromyscus-californicus-insignis	0.549	0.895	0.934
Mesocricetus-auratus	0.543	0.891	0.930
Myodes-glareolus	0.739	0.895	0.942
Mastomys-coucha	0.543	0.891	0.930
Microtus-ochrogaster	0.733	0.891	0.930
Acomys-russatus	0.386	0.120	0.125
Psammomys-obesus	0.547	0.884	0.922
Neotoma-lepida	0.489	0.880	0.899
Mus-caroli	0.537	0.910	0.934
Mus-pahari	0.541	0.914	0.938
Rattus-rattus	0.558	0.903	0.973
Apodemus-sylvaticus	0.706	0.906	0.946
Meriones-unguiculatus	0.545	0.876	0.914
Arvicanthis-niloticus	0.543	0.903	0.938
Onychomys-torridus	0.553	0.899	0.938
Cricetulus-griseus		Chionomys-nivalis	

Homo-sapiens	0.547	0.573
Mus-musculus	0.899	0.899
Rattus-norvegicus	0.938	0.938
Cricetulus-griseus	1.000	0.724
Chionomys-nivalis	0.724	1.000
Phodopus-roborovskii	0.949	0.712
Peromyscus-californicus-insignis	0.949	0.726
Mesocricetus-auratus	0.978	0.718
Myodes-glareolus	0.724	0.773
Mastomys-coucha	0.658	0.653
Microtus-ochrogaster	0.722	0.771
Acomys-russatus	0.100	0.129
Psammomys-obesus	0.933	0.708
Neotoma-lepida	0.528	0.518
Mus-caroli	0.906	0.697
Mus-pahari	0.916	0.710
Rattus-rattus	0.748	0.726
Apodemus-sylvaticus	0.743	0.706
Meriones-unguiculatus	0.932	0.706
Arvicanthis-niloticus	0.922	0.714
Onychomys-torridus	0.945	0.705

Phodopus-roborovskii

Homo-sapiens	0.549
Mus-musculus	0.895
Rattus-norvegicus	0.934
Cricetulus-griseus	0.949
Chionomys-nivalis	0.712
Phodopus-roborovskii	1.000
Peromyscus-californicus-insignis	0.926
Mesocricetus-auratus	0.947
Myodes-glareolus	0.708
Mastomys-coucha	0.642
Microtus-ochrogaster	0.706
Acomys-russatus	0.102
Psammomys-obesus	0.910
Neotoma-lepida	0.526
Mus-caroli	0.883
Mus-pahari	0.888
Rattus-rattus	0.730
Apodemus-sylvaticus	0.731
Meriones-unguiculatus	0.908
Arvicanthis-niloticus	0.894
Onychomys-torridus	0.924

	Peromyscus-californicus-insignis	
Homo-sapiens	0.549	
Mus-musculus	0.895	
Rattus-norvegicus	0.934	
Cricetulus-griseus	0.949	
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Myodes-glareolus	0.722	
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Acomys-russatus	0.100	
Psammomys-obesus	0.926	
Neotoma-lepida	0.530	
Mus-caroli	0.898	
Mus-pahari	0.912	
Rattus-rattus	0.748	
Apodemus-sylvaticus	0.737	
Meriones-unguiculatus	0.930	
Arvicanthis-niloticus	0.914	
Onychomys-torridus	0.967	
	Mesocricetus-auratus	Myodes-glareolus
Homo-sapiens	0.543	0.739
Mus-musculus	0.891	0.895
Rattus-norvegicus	0.930	0.942
Cricetulus-griseus	0.978	0.724
Chionomys-nivalis	0.718	0.773
Phodopus-roborovskii	0.947	0.708
Peromyscus-californicus-insignis	0.943	0.722
Mesocricetus-auratus	1.000	0.716
Myodes-glareolus	0.716	1.000
Mastomys-coucha	0.650	0.661
Microtus-ochrogaster	0.714	0.978
Acomys-russatus	0.100	0.310
Psammomys-obesus	0.924	0.708
Neotoma-lepida	0.522	0.532
Mus-caroli	0.898	0.698
Mus-pahari	0.906	0.708
Rattus-rattus	0.742	0.720
Apodemus-sylvaticus	0.739	0.869
Meriones-unguiculatus	0.922	0.706
Arvicanthis-niloticus	0.914	0.714

Onychomys-torridus	0.937	0.718
	Mastomys-coucha	Microtus-ochrogaster
Homo-sapiens	0.543	0.733
Mus-musculus	0.891	0.891
Rattus-norvegicus	0.930	0.930
Cricetulus-griseus	0.658	0.722
Chionomys-nivalis	0.653	0.771
Phodopus-roborovskii	0.642	0.706
Peromyscus-californicus-insignis	0.658	0.720
Mesocricetus-auratus	0.650	0.714
Myodes-glareolus	0.661	0.978
Mastomys-coucha	1.000	0.659
Microtus-ochrogaster	0.659	1.000
Acomys-russatus	0.102	0.304
Psammomys-obesus	0.648	0.706
Neotoma-lepida	0.520	0.530
Mus-caroli	0.652	0.694
Mus-pahari	0.661	0.706
Rattus-rattus	0.665	0.714
Apodemus-sylvaticus	0.661	0.869
Meriones-unguiculatus	0.646	0.704
Arvicanthis-niloticus	0.661	0.712
Onychomys-torridus	0.651	0.716
	Acomys-russatus	Psammomys-obesus
Homo-sapiens	0.386	0.547
Mus-musculus	0.120	0.884
Rattus-norvegicus	0.125	0.922
Cricetulus-griseus	0.100	0.933
Chionomys-nivalis	0.129	0.708
Phodopus-roborovskii	0.102	0.910
Peromyscus-californicus-insignis	0.100	0.926
Mesocricetus-auratus	0.100	0.924
Myodes-glareolus	0.310	0.708
Mastomys-coucha	0.102	0.648
Microtus-ochrogaster	0.304	0.706
Acomys-russatus	1.000	0.098
Psammomys-obesus	0.098	1.000
Neotoma-lepida	0.098	0.518
Mus-caroli	0.092	0.904
Mus-pahari	0.092	0.912
Rattus-rattus	0.101	0.738
Apodemus-sylvaticus	0.278	0.733
Meriones-unguiculatus	0.096	0.984

Arvicanthis-niloticus	0.098	0.914	
Onychomys-torridus	0.102	0.922	
	Neotoma-lepida	Mus-caroli	Mus-pahari
Homo-sapiens	0.489	0.537	0.541
Mus-musculus	0.880	0.910	0.914
Rattus-norvegicus	0.899	0.934	0.938
Cricetulus-griseus	0.528	0.906	0.916
Chionomys-nivalis	0.518	0.697	0.710
Phodopus-roborovskii	0.526	0.883	0.888
Peromyscus-californicus-insignis	0.530	0.898	0.912
Mesocricetus-auratus	0.522	0.898	0.906
Myodes-glareolus	0.532	0.698	0.708
Mastomys-coucha	0.520	0.652	0.661
Microtus-ochrogaster	0.530	0.694	0.706
Acomys-russatus	0.098	0.092	0.092
Psammomys-obesus	0.518	0.904	0.912
Neotoma-lepida	1.000	0.522	0.524
Mus-caroli	0.522	1.000	0.961
Mus-pahari	0.524	0.961	1.000
Rattus-rattus	0.518	0.748	0.760
Apodemus-sylvaticus	0.528	0.753	0.765
Meriones-unguiculatus	0.511	0.900	0.908
Arvicanthis-niloticus	0.530	0.935	0.939
Onychomys-torridus	0.538	0.898	0.910
	Rattus-rattus	Apodemus-sylvaticus	
Homo-sapiens	0.558	0.706	
Mus-musculus	0.903	0.906	
Rattus-norvegicus	0.973	0.946	
Cricetulus-griseus	0.748	0.743	
Chionomys-nivalis	0.726	0.706	
Phodopus-roborovskii	0.730	0.731	
Peromyscus-californicus-insignis	0.748	0.737	
Mesocricetus-auratus	0.742	0.739	
Myodes-glareolus	0.720	0.869	
Mastomys-coucha	0.665	0.661	
Microtus-ochrogaster	0.714	0.869	
Acomys-russatus	0.101	0.278	
Psammomys-obesus	0.738	0.733	
Neotoma-lepida	0.518	0.528	
Mus-caroli	0.748	0.753	
Mus-pahari	0.760	0.765	
Rattus-rattus	1.000	0.742	
Apodemus-sylvaticus	0.742	1.000	

Meriones-unguiculatus	0.732	0.729
Arvicanthi-niloticus	0.756	0.759
Onychomys-torridus	0.746	0.729
	Meriones-unguiculatus	Arvicanthi-niloticus
Homo-sapiens	0.545	0.543
Mus-musculus	0.876	0.903
Rattus-norvegicus	0.914	0.938
Cricetulus-griseus	0.932	0.922
Chionomys-nivalis	0.706	0.714
Phodopus-roborovskii	0.908	0.894
Peromyscus-californicus-insignis	0.930	0.914
Mesocricetus-auratus	0.922	0.914
Myodes-glareolus	0.706	0.714
Mastomys-coucha	0.646	0.661
Microtus-ochrogaster	0.704	0.712
Acomys-russatus	0.096	0.098
Psammomys-obesus	0.984	0.914
Neotoma-lepida	0.511	0.530
Mus-caroli	0.900	0.935
Mus-pahari	0.908	0.939
Rattus-rattus	0.732	0.756
Apodemus-sylvaticus	0.729	0.759
Meriones-unguiculatus	1.000	0.912
Arvicanthi-niloticus	0.912	1.000
Onychomys-torridus	0.920	0.914
	Onychomys-torridus	
Homo-sapiens	0.553	
Mus-musculus	0.899	
Rattus-norvegicus	0.938	
Cricetulus-griseus	0.945	
Chionomys-nivalis	0.705	
Phodopus-roborovskii	0.924	
Peromyscus-californicus-insignis	0.967	
Mesocricetus-auratus	0.937	
Myodes-glareolus	0.718	
Mastomys-coucha	0.651	
Microtus-ochrogaster	0.716	
Acomys-russatus	0.102	
Psammomys-obesus	0.922	
Neotoma-lepida	0.538	
Mus-caroli	0.898	
Mus-pahari	0.910	
Rattus-rattus	0.746	

Apodemus-sylvaticus	0.729
Meriones-unguiculatus	0.920
Arvicanthis-niloticus	0.914
Onychomys-torridus	1.000

```
library(ggplot2)
library(reshape2)
library(RColorBrewer)
```

```
melted_mat <- melt(mat)
```

```
color <- brewer.pal(n = 9, name = "YlGnBu")
```

```
ggplot(data = melted_mat, aes(Var1, Var2, fill = value)) +
  geom_tile() +
  scale_fill_gradient2(low = "yellow", high = "red", mid = "orange",
    midpoint = 0, limit = c(-1, 1)) +
  theme(axis.text.x = element_text(angle = 45, vjust = 1,
    size = 8, hjust = 1)) +
  coord_fixed()
```

