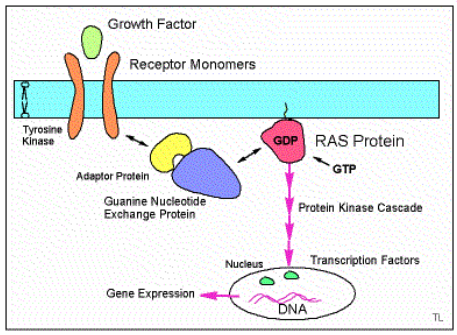
Small G proteins GTP/GDP binding sites



Guerric Anies
Karine Schouwey
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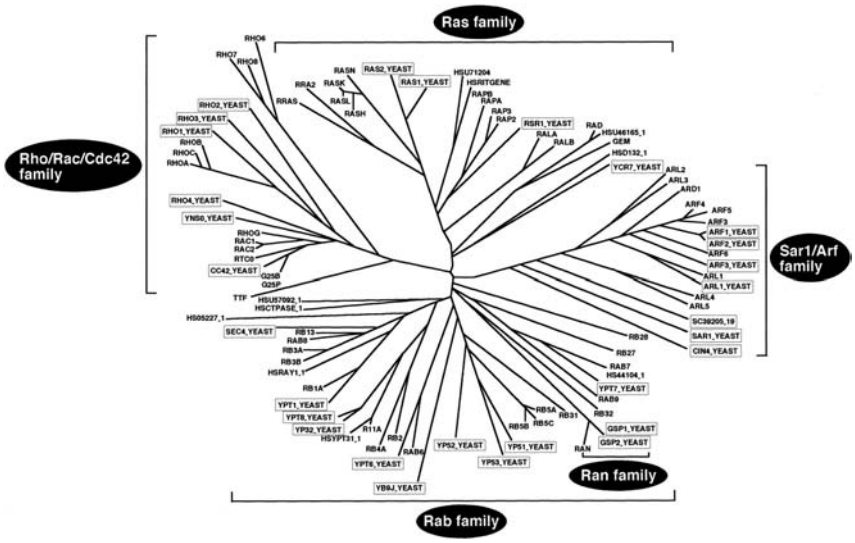
Nathalie Leresche
Christian Geest

Dendrogram of small G protein family



Takai et al. *Phys Rev* 81:153-206, 2001

Conserved GTP-GDP Binding seq

```
                 G1                  G2                  G3
AQRIKLVVVGDGAVGKTCLLISYTTNAFPEEYVPTVFENYVADVEVD--GKPVELGLWDT 58   Consensus
AIRKKLVIVGDVACGKTCLLIVFSKDQFPEVYVPTVFENYVADIEVD--GKQVELALWDT 61   RhoA
MQTIKCVVVGDGAVGKTCLLISYTTNKFpseYVPTVFDNYAVTVMIG--GEPYTLGLFDT 58   Cdc42
MQAIKCVVVGDGAVGKTCLLISYTTNAFpgeYIPTVFDNYSANVMVD--GKPVNLGLWDT 58   Rac1
AIRKKLVIVGDVACGKTCLLIVFSKDQFpevYVPTVFENYVADIEVD--GKQVELALWDT 61   RhoA
ELRRKLVIVGDGACGKTCLLIVFSKGTFpevYVPTVFENYVADVEVD--GRHVELALWDT 61   Rho1
ETSKKLVVVGDGGCGKTCLLIVFSSGTFperYVPTVFENYITDITYGpnSKVIELALWDT 73   Rho1-like protein
```

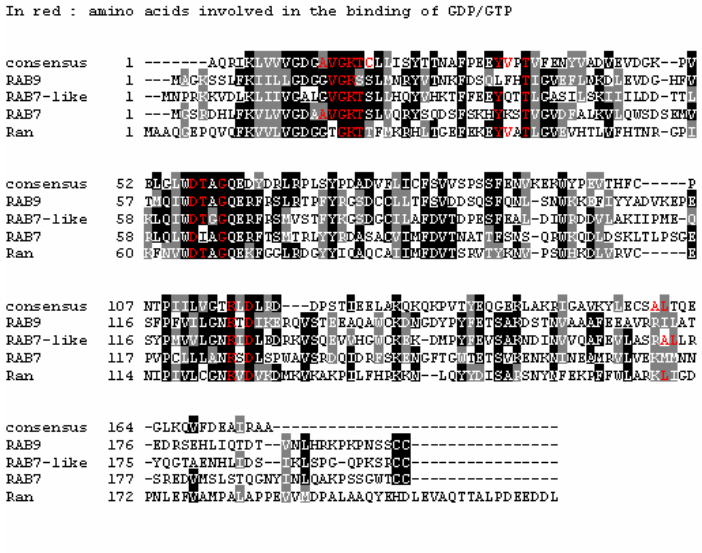
Sequence alignment of Rho subfamily members

```
                                                    G4
AGQEDYDRLRPLSYPDADVFLICFSVVSPSSFENVKEKWYPEVTHFCPNTPIILVGTKLD 118   Consensus
AGQEDYDRLRPLSYPDTDVILMCFSIDSPDSLENIPEKWTPEVKHFCPNVPIILVGNKKD 121   RhoA
AGQEDYDRLRPLSYPQTDVFLVCFSVVSPSSFENVKEKWVPEITHHCPKTPFLLVGTQID 118   Cdc42
AGQEDYDRLRPLSYPQTDVFLICFSLVSPASFENVRAKWYPEVRHHCPNTPIILVGTKLD 118   Rac1
AGQEDYDRLRPLSYPDTDVILMCFSIDSPDSLENIPEKWTPEVKHFCPNVPIILVGNKKD 121   RhoA
AGQEDYDRLRPLSYPDSHVILICFAVDSPDSLDNVQEKWISEVLHFCSSLPILLVACKAD 121   Rho1
AGQEEYDRLRPLSYPNSNVILLCFSIDCPASLNNVTEKWYPEVQHFCPRTPIVLVGLKAD 133   Rho1-like protein
```

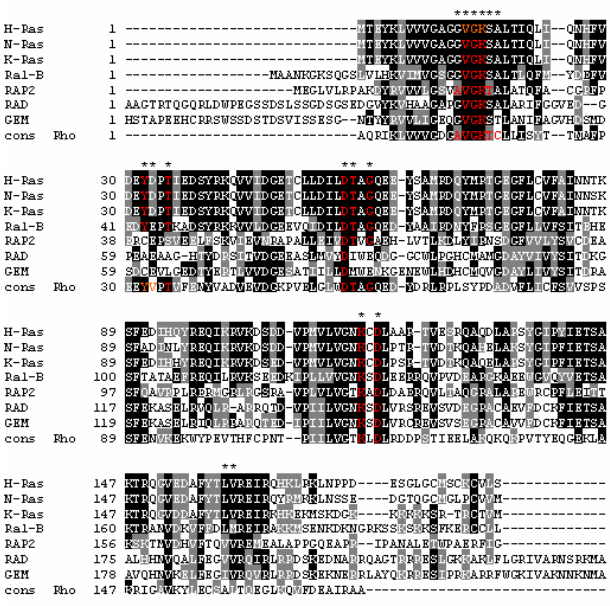
```
                                                    G5
LRDDPSTIEELAKQKQKPVTYEQGEKLAKRIGAVKYLECSALTQEGLKQVFDEAIRAA 176   Consensus
LRNDEHTRRELAKMKQEPVKPEEGRDMANRIGAFGYMECSAKTKDGVREVFEMATRAA 179   RhoA
LRddpstieklaknkqkpiTPETAEKLARDLKAvKYVECSALTQKGLKNVFDEAILAA 176   Cdc42
LRddkdtieklkekkltpiTYPQGLAMAKEIGAvKYLECSALTQRGLKTVFDEAIRAV 176   Rac1
LRndehtrrelakmkqepvKPEEGRDMANRIGAfGYMECSAKTKDGVREVFEMATRAA 179   RhoA
LRndpkiieelsktnqhpvTTEEGQAVAQKIGAyKYLECSAKTNEGVREVFESATRAA 179   Rho1
LRkdrnatevlrtqgltpvTYQQAQSVALSMNA-PYVECSAKENTGVNEVFQLAVGLT 190   Rho1-like protein
```

AVGKTC----YV-T----DT-G---K-D---AL

Sequence alignment of Ran family

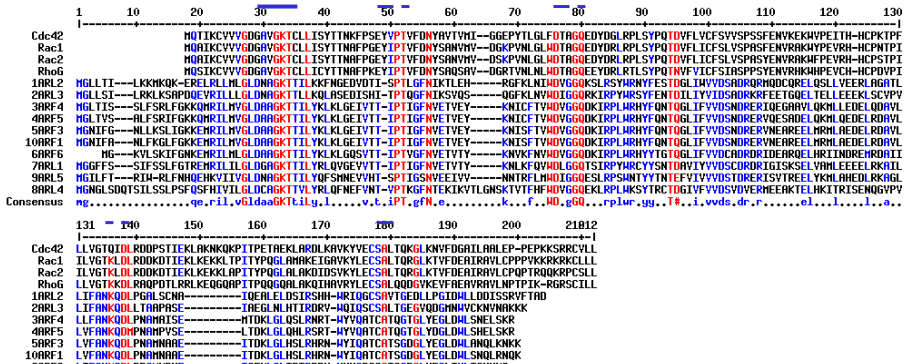


Sequence alignment of Ras family

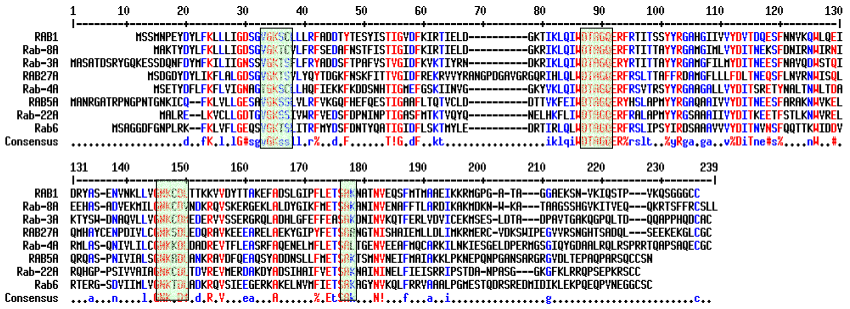


Sequence alignment of Arf family

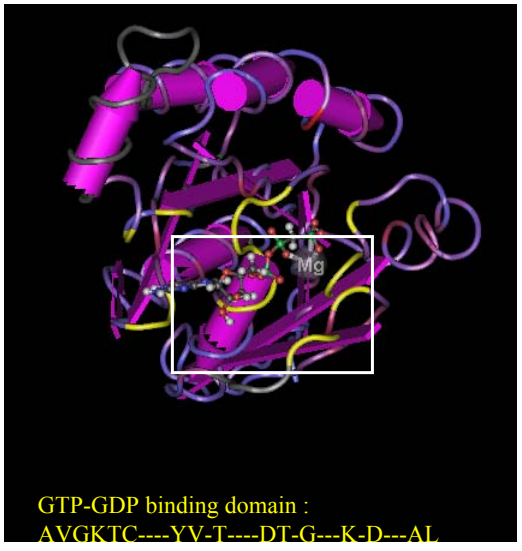
GTP-GDP binding site for the Rho family : AVGKTC---YV-T---DT-G-----K-D-----AL
GTP-GDP binding site for the Arf family : AAGKTT-----IP-T---DV-G-----K-D-----AT

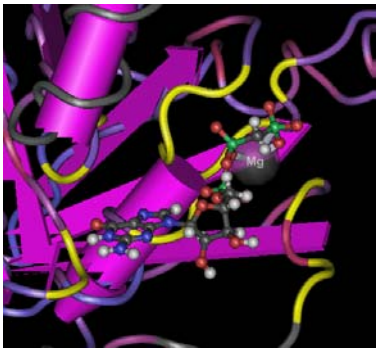


Sequence alignment of Rab family

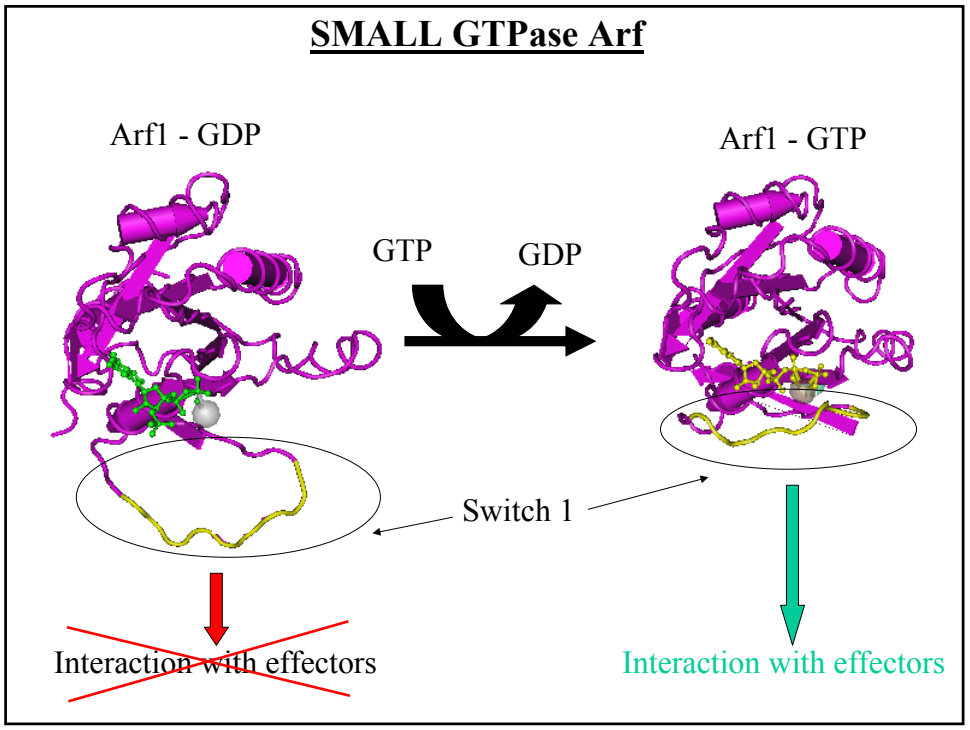


3D structure of the consensus sequence of Rho family






```
Rho  AVGKTC----YV-T----DT-G---K-D---AL
Arf  AAGKTT----IP-T----DV-G---K-D---AT
Ran  GVGKT-----Y?-T----DT-G---K-D---AL
Rab  GVGKT---- Y--T----DT-G---K-D---AK
RaS  GVGK(T/S)-Y--T----DT-G---K-D---??
```


SMALL GTPase Arf
Arf1 - GDP
Arf1 - GTP
GTP
GDP
Switch 1
Interaction with effectors
Interaction with effectors