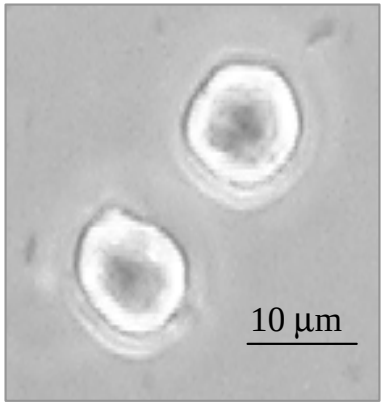
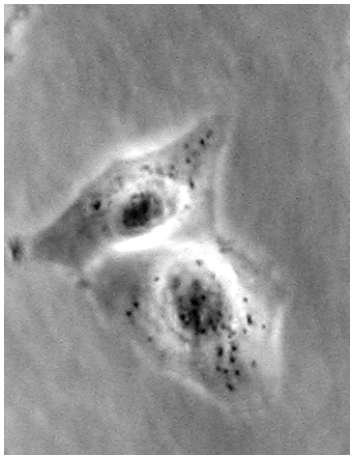
A sejtek „szilárd" környezete
A sejtadhézió és sejt-vándorlás alapjelenségei

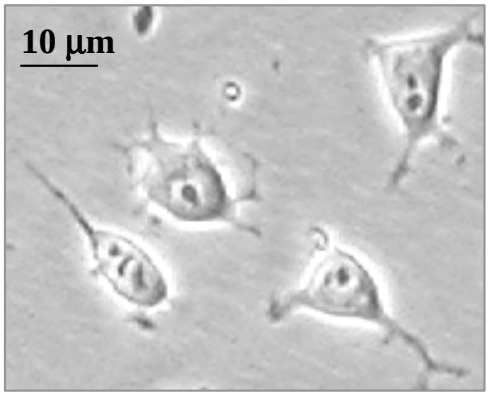


Szuszpenzióban a sejtek gömbszerű alakot vesznek fel;
sejttípustól függetlenül

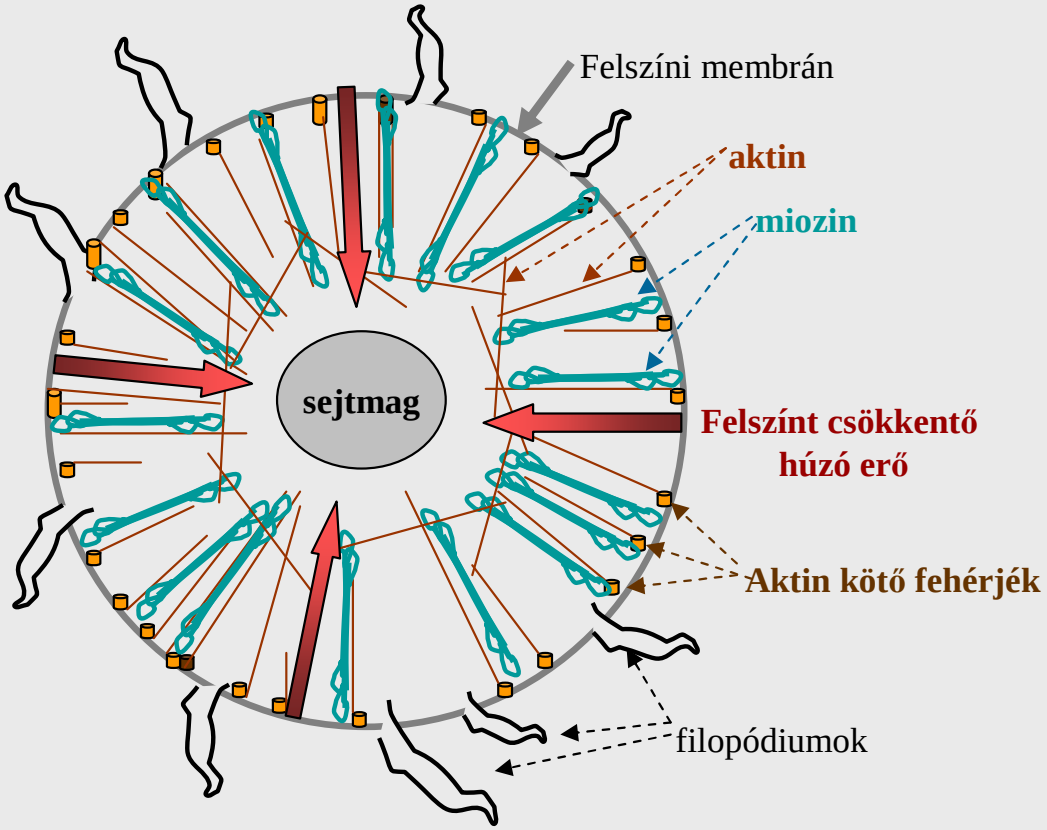
Szöveti sejtek 6-8 óránál hosszabb időt letapadás nélkül nem élnek túl:
„anoikis"

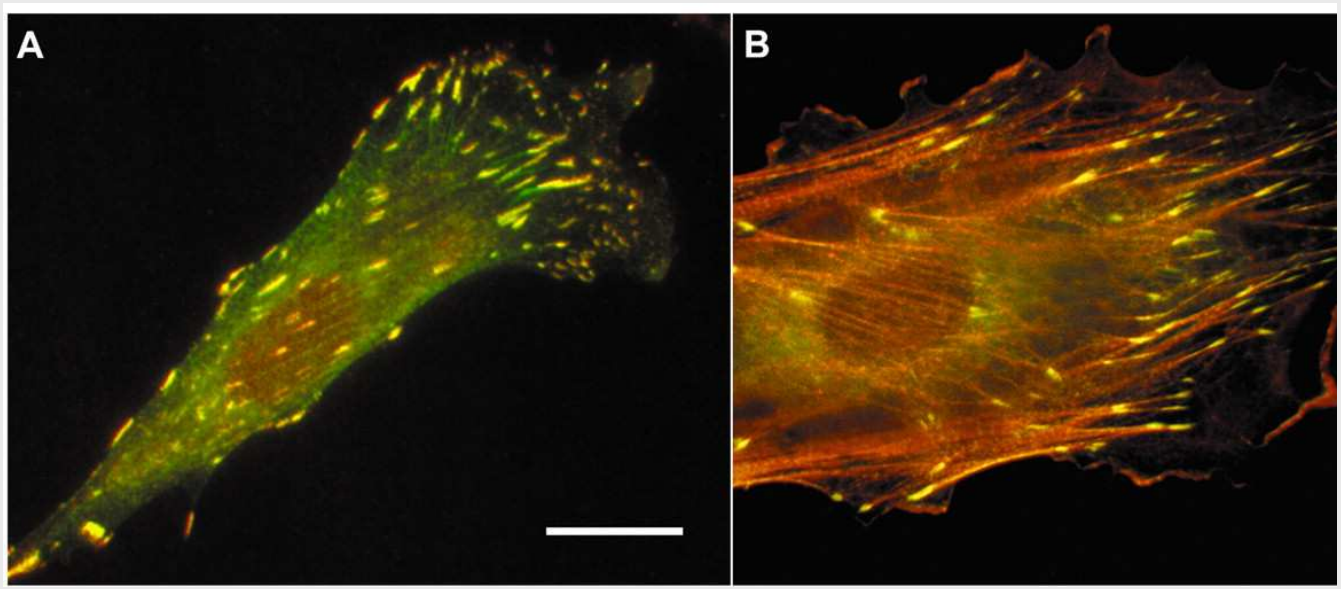


Megfelelő szilárd „aljzaton",
a **sejt-felszín / sejttömeg arány nő**;
A sejtalak az aljzat és sejt sajátságaitól függ

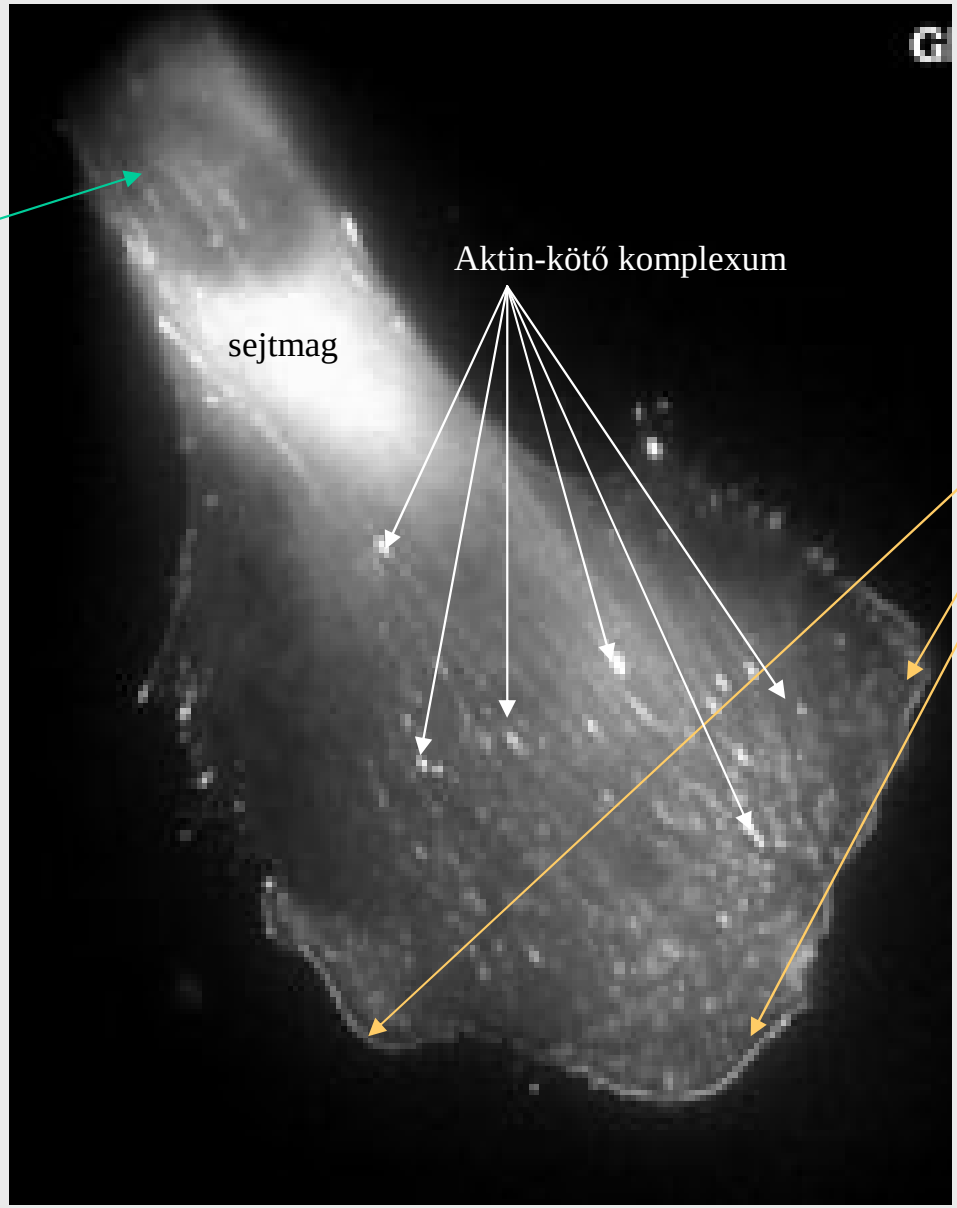


A sejtfelszín kiterjedését a **cytoskeletalis aktivitás** és a **külső letapadási pontok** szabályozzák

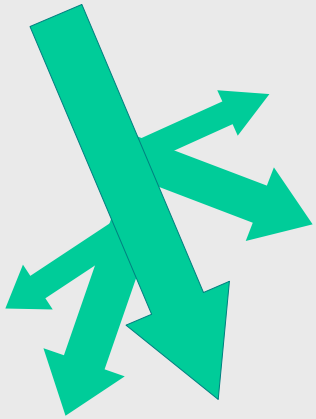




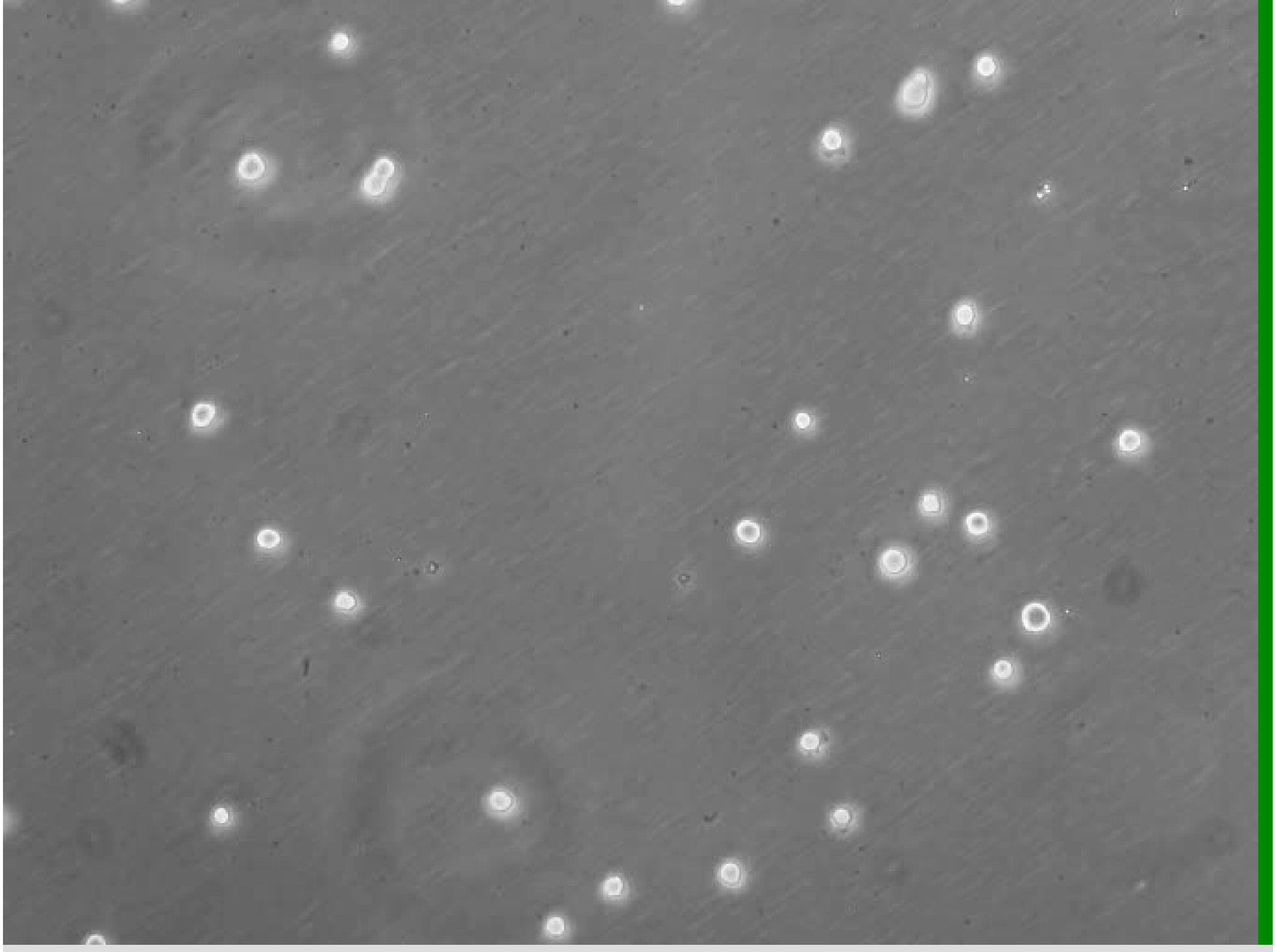
Mesterséges sík aljzaton vándorló sejt

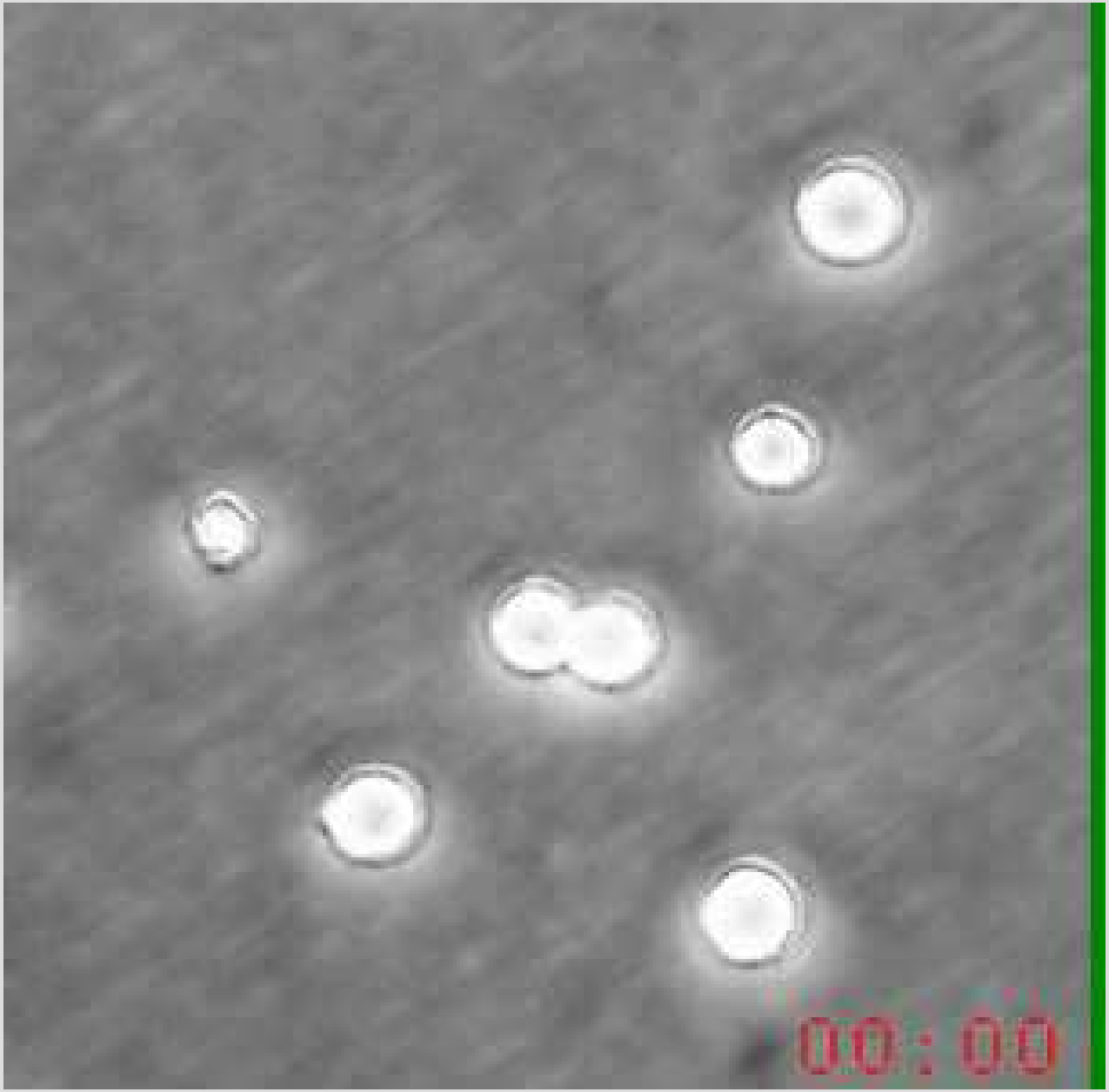


A vándorlás lehetséges irányai



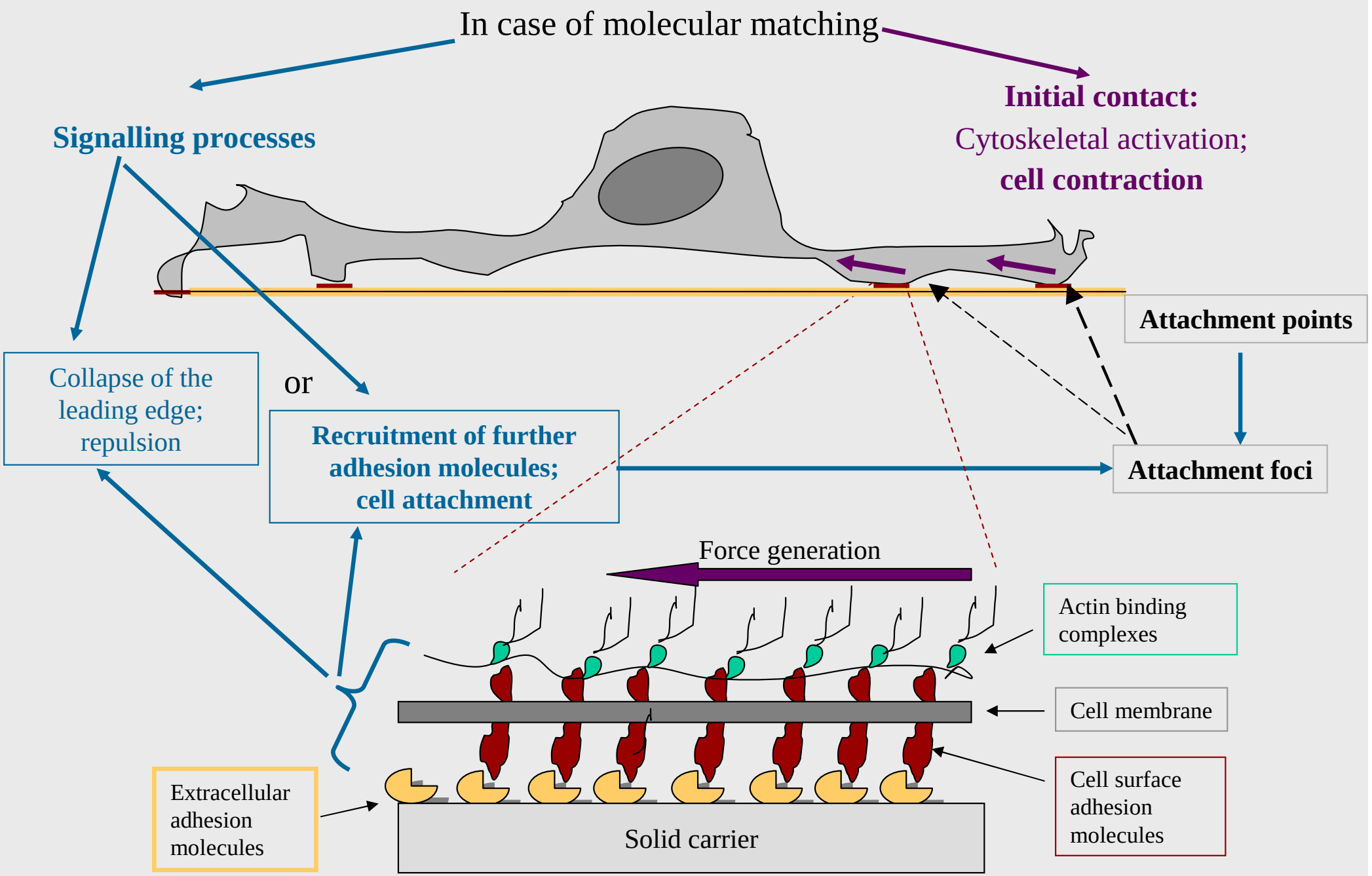
Differenciális adhézió: a sejt arra „vándorol”, amerre a letapadási pontok denzitása / aviditása nagyobb;
Ha nincs adhéziós gradiens: izometrikusan „kiterül”

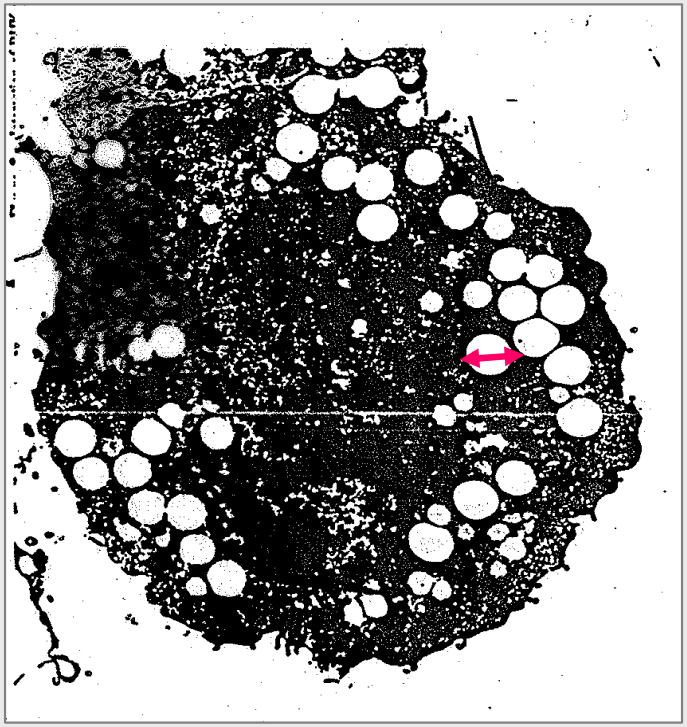


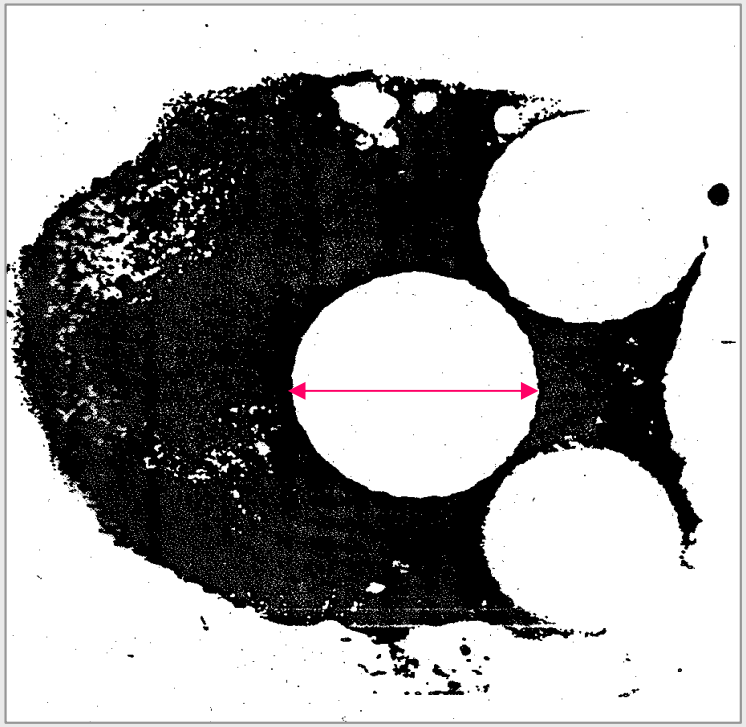


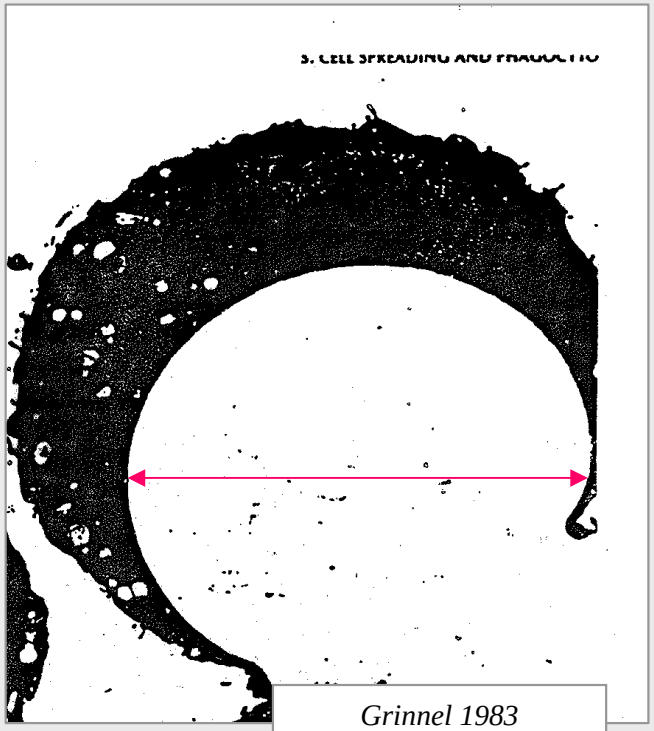
Környei Zsuzsanna (MTA KOKI), felvétele

Molecular interactions between cell surface molecules and components of the environment









Grinnel 1983

d= 1 μm

d= 5 μm

d= 10 μm

Phagocytosis ⟶ Spreading

Cell adhesion

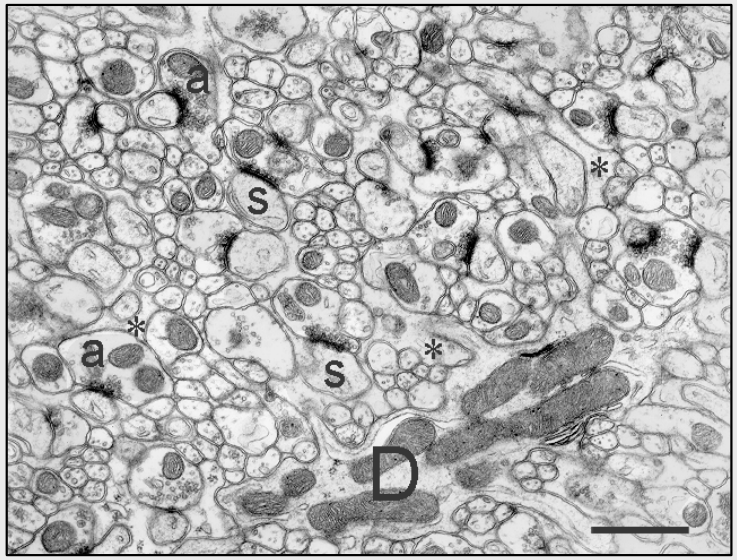
Cell to cell-surface

Ligand-receptor pairs

Cadherin -	Cadherin
CAM -	CAM (Ig-Superfamily)
Integrin –	Fibronectin, CAM,
Selectins -	Carbohydrate chains

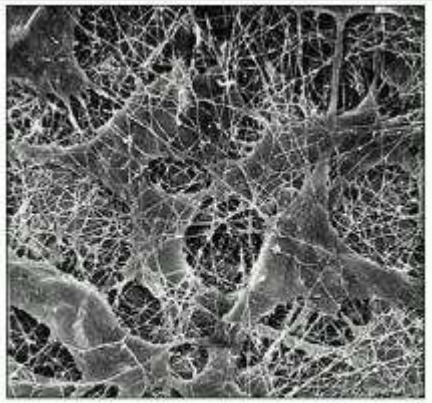
Adhesion regularory ligand-receptor pairs

Slit –	Robo
Ephrin –	Ephrin receptor
Semaphorins -	Neuropilins



Neuropil in the adult forebrain

Germinative zone in the developing forebrain
(* brain ventricle)



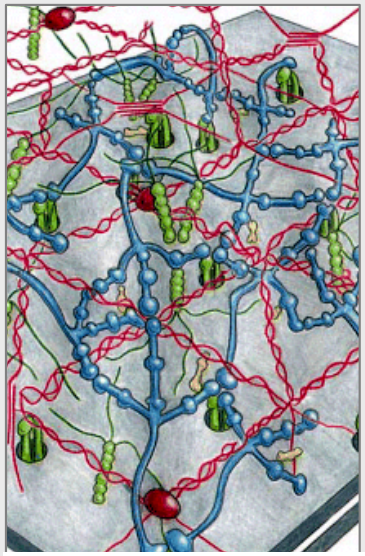
Nishida et al., 1988

Cell to extracellular matrix

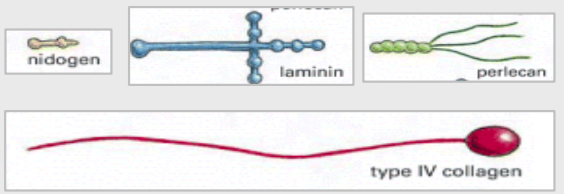
Ligand-receptor pairs

Integrins –	Fibronectin, Laminin, Collagen Fibrin, Willebrand factor, etc
Laminin Rs -	Laminins
Lectins -	Carbohydrate chains

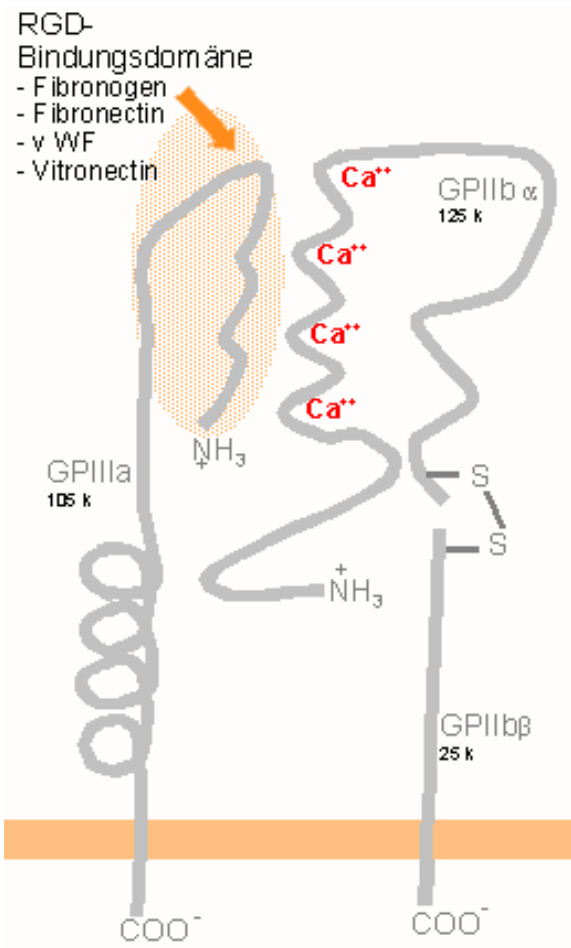
basement membrane



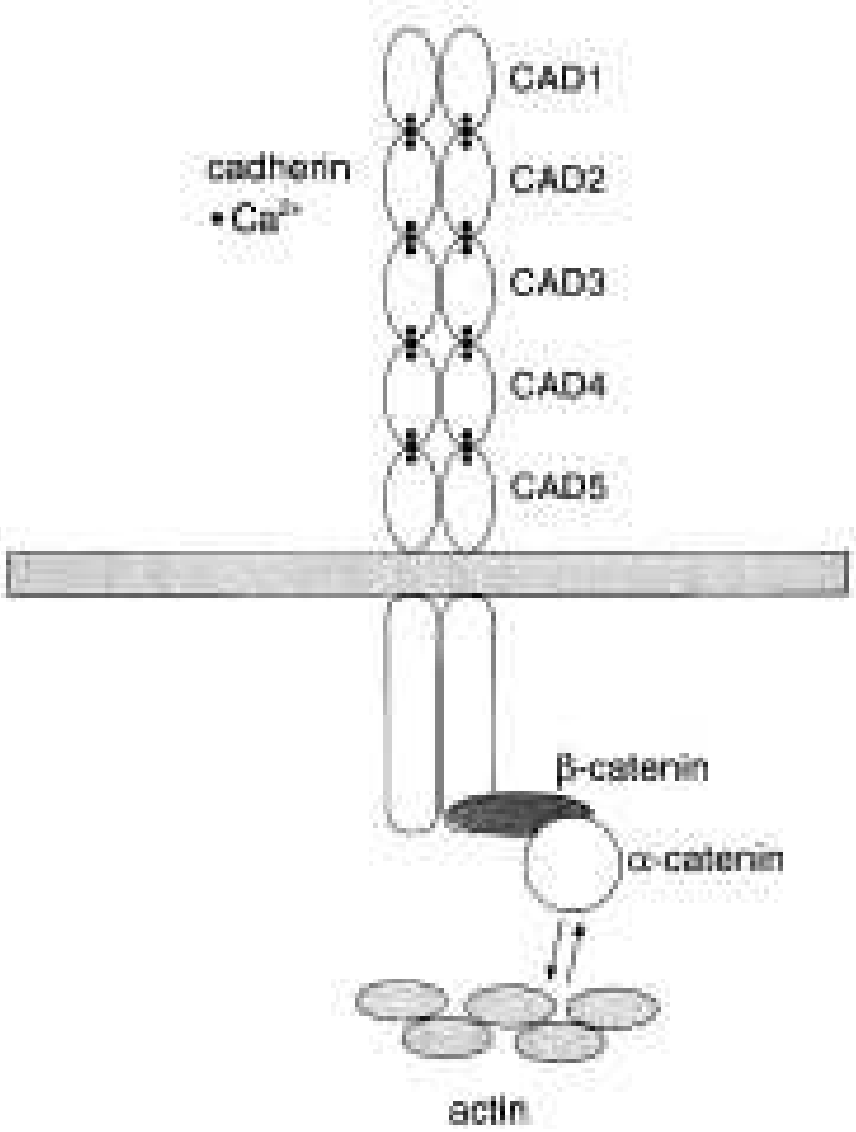
Colognato and Yurchenco 2000.

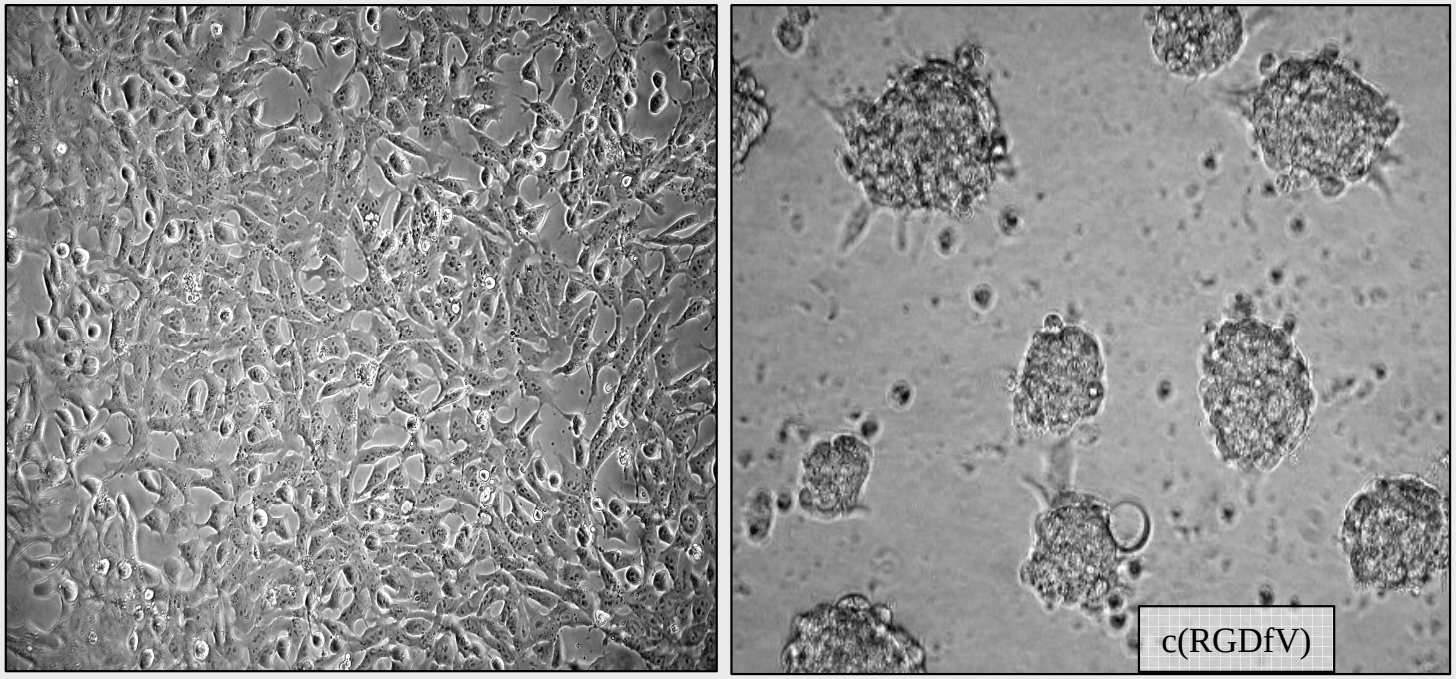


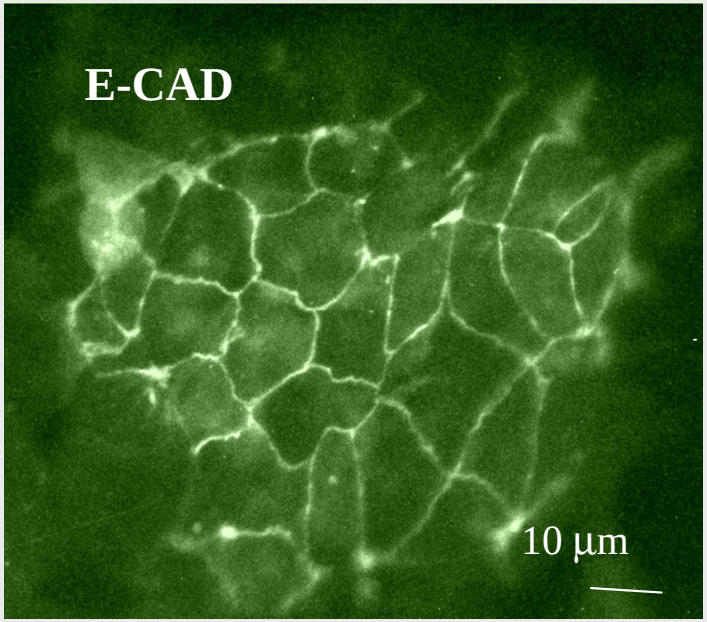
Name	Synonyms	Distribution	Ligands
$\alpha_1\beta_1$		Many	Collagens, laminins.[5]
$\alpha_2\beta_1$		Many	Collagens, laminins[5]
$\alpha_4\beta_1$	VLA-4[5]	Hematopoietic cells	Fibronectin, VCAM-1[5]
$\alpha_5\beta_1$	fibronectin receptor	widespread	fibronectin[5] and proteinases
$\alpha_6\beta_1$	laminin receptor	widespread	matrix macromolecules laminins
$\alpha_L\beta_2$	LFA-1[5]	T-lymphocytes	ICAM-1, ICAM-2[5]
$\alpha_M\beta_2$	Mac-1, CR3[5]	Neutrophils and monocytes	Serum proteins, ICAM-1[5]
$\alpha_{IIb}\beta_3$		Platelets[5]	fibrinogen, fibronectin[5]
$\alpha_V\beta_3$	vitronectin receptor[6]	activated endothelial cells, melanoma, glioblastoma	vitronectin [6], fibronectin, fibrinogen, osteopontin, Cyr61
$\alpha_V\beta_5$		widespread, esp. fibroblasts, epithelial cells	vitronectin and adenovirus
$\alpha_V\beta_6$		proliferating epithelia, esp. lung and liver	fibronectin; TGFβ1+3
$A_6\beta_4$		Epithelial cells[5]	Laminin[5]

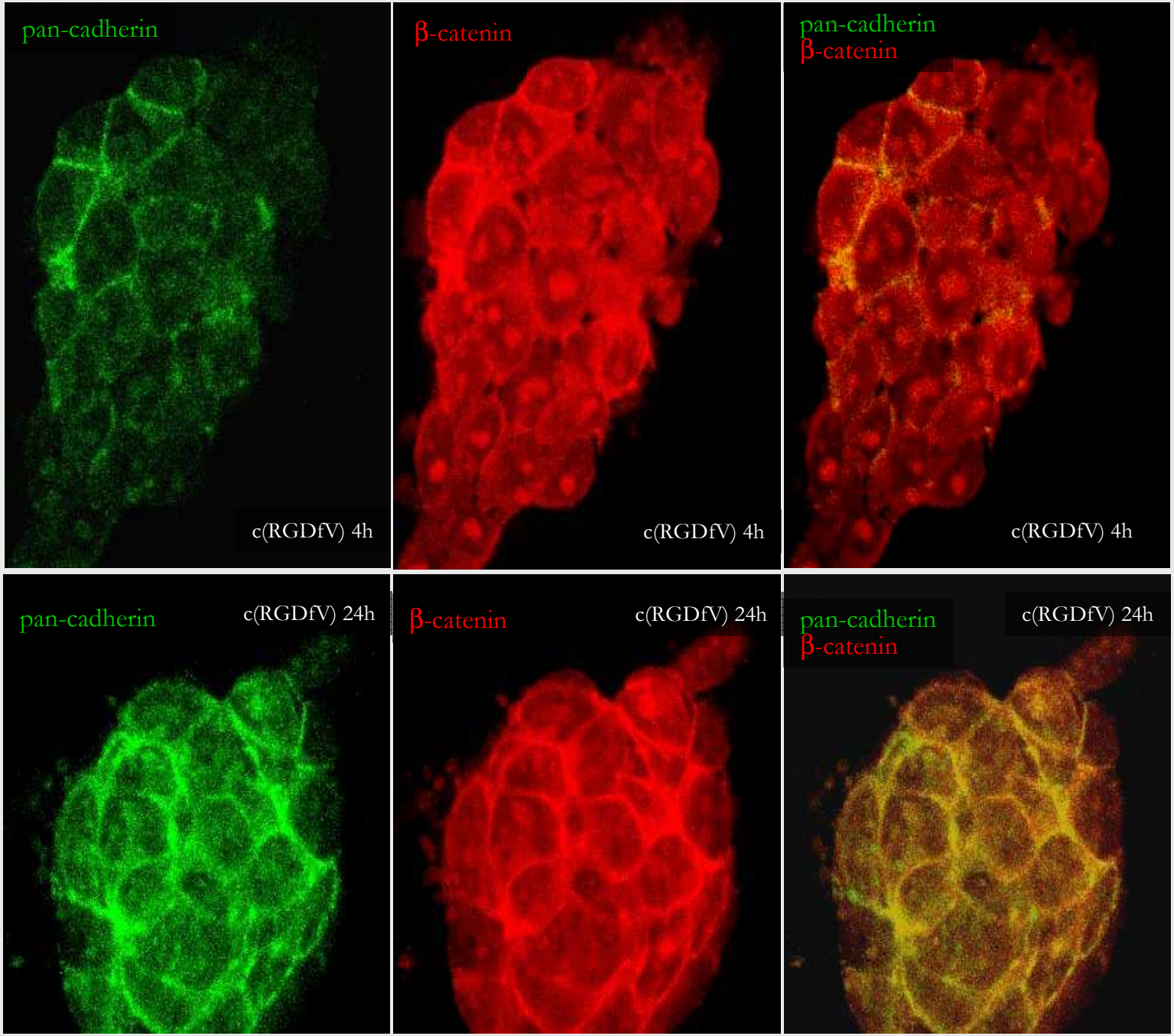


CDH1 - E-cadherin (epithelial)
CDH2 - N-cadherin (neural)
CDH12 - cadherin 12, type 2 (N-cadherin 2)
CDH3 - P-cadherin (placental)
CDH4 - R-cadherin (retinal)
CDH5 - VE-cadherin (vascular endothelial)
CDH6 - K-cadherin (kidney)
CDH7 - cadherin 7, type 2
CDH8 - cadherin 8, type 2
CDH9 - cadherin 9, type 2 (T1-cadherin)
CDH10 - cadherin 10, type 2 (T2-cadherin)
CDH11 - OB-cadherin (osteoblast)
CDH13 - T-cadherin - H-cadherin (heart)
CDH15 - M-cadherin (myotubule)
CDH16 - KSP-cadherin
CDH17 - LI cadherin (liver-intestine)
CDH18 - cadherin 18, type 2
CDH19 - cadherin 19, type 2
CDH20 - cadherin 20, type 2
CDH23 - cadherin 23, (neurosensory epithelium)




c(RGDfV)


E-CAD
10 µm


pan-cadherin
c(RGDfV) 4h
β-catenin
c(RGDfV) 4h
pan-cadherin
β-catenin
c(RGDfV) 4h
pan-cadherin
c(RGDfV) 24h
β-catenin
c(RGDfV) 24h
pan-cadherin
β-catenin
c(RGDfV) 24h

Ig Szupercsaládba (IgSF)tartozó sejtadhéziós molekulák

CD2

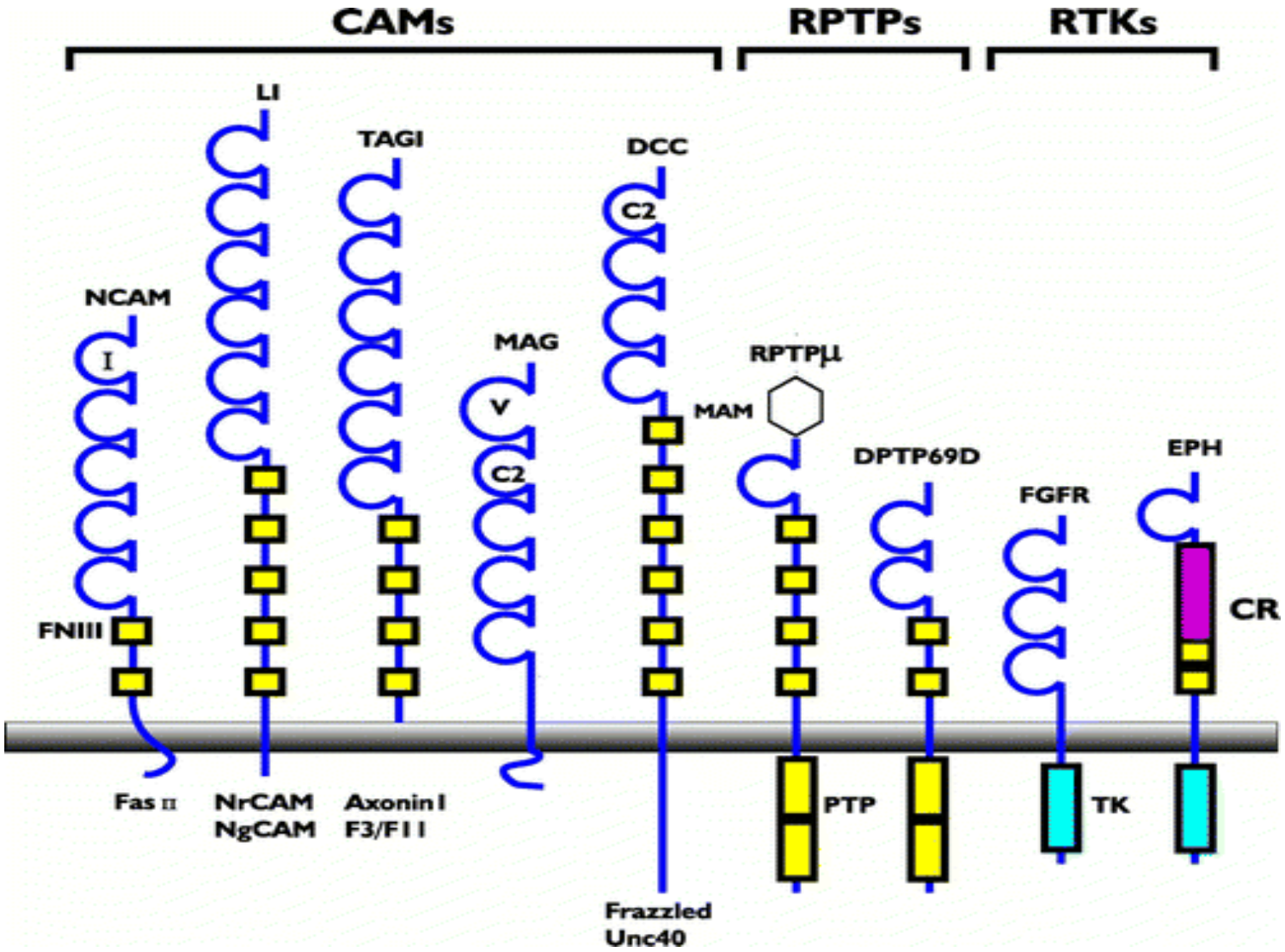
CD48

The SIGLEC family (e.g. CD22, CD83)

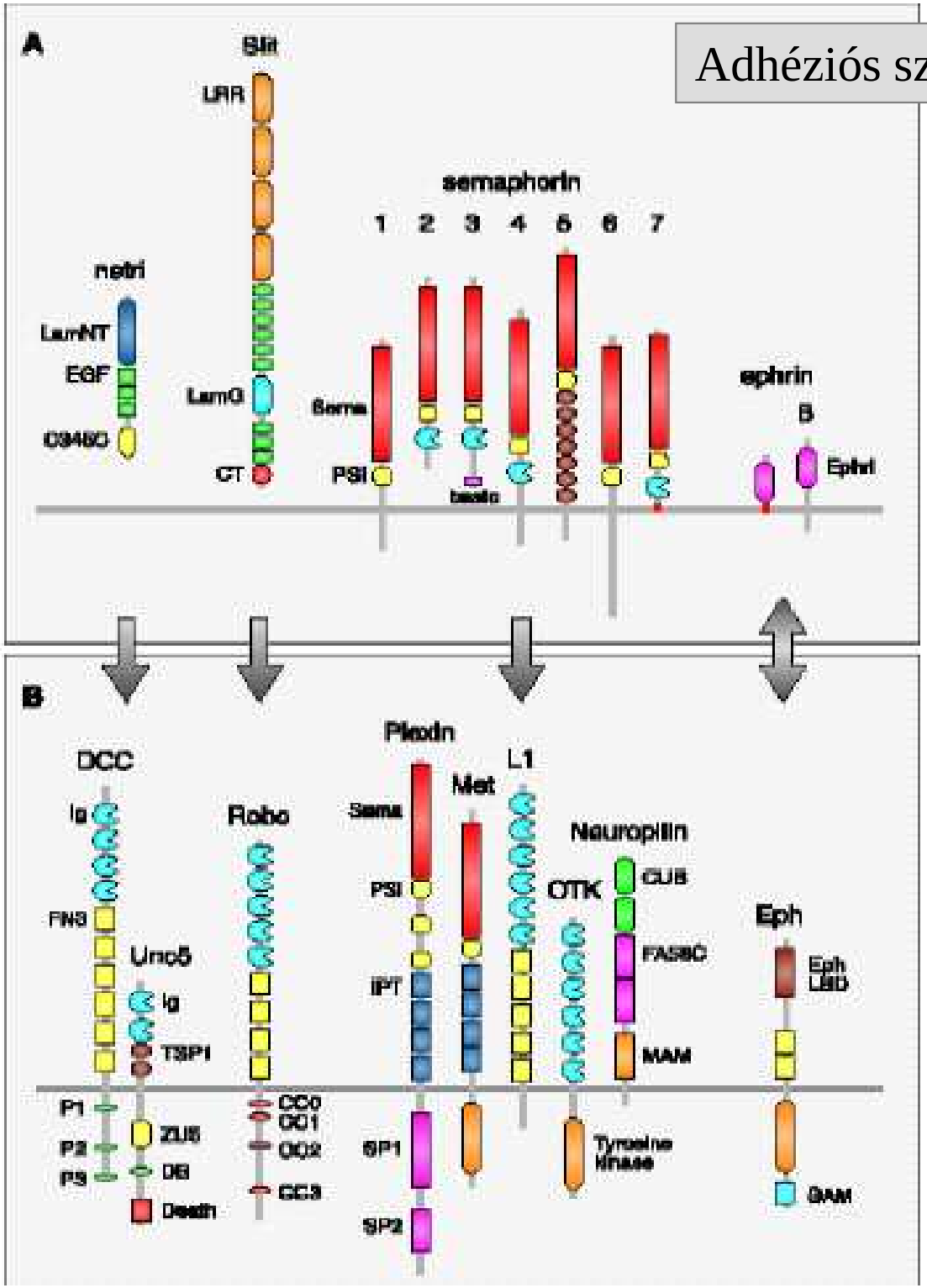
Intercellular adhesion molecules (ICAMs)

Vascular cell adhesion molecules (e.g. VCAM-1)

Neural Cell Adhesion Molecule (NCAM)



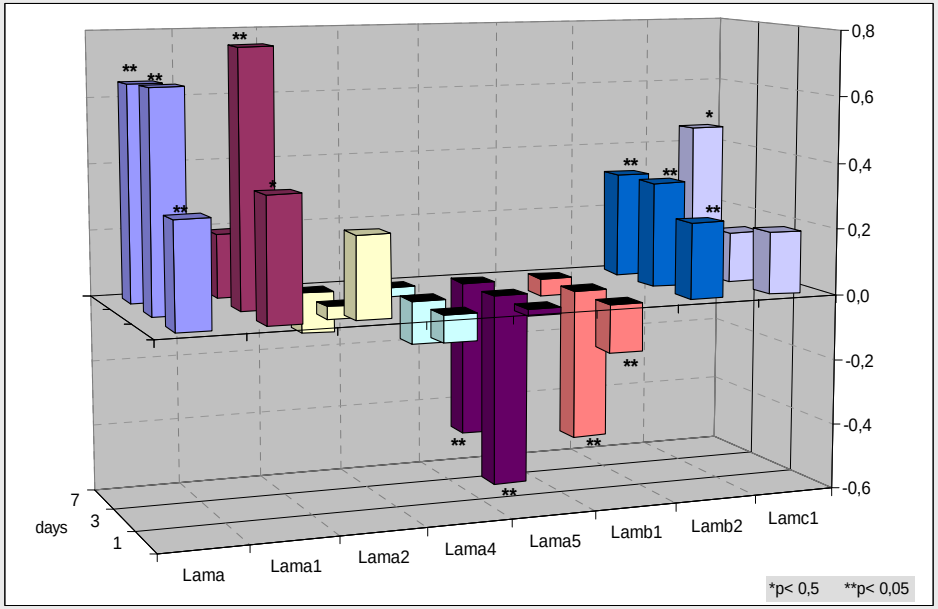
Adhéziós szignál (guidance) molekulák



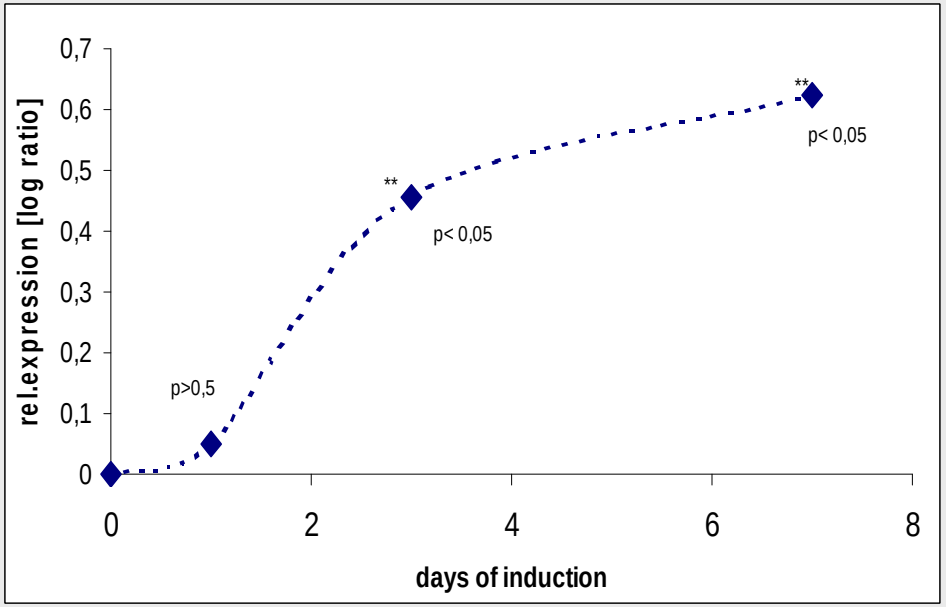
Receptor	Ligand	Letapadási jel
DCC/Unc5	Netrin	repulzív/attraktív Wadsworth, Hedgecock 1996
Robo	Slit	repulzív Wong et al., 2002
Neuropilin	Semaphorin	repulzív/attraktív Chen et al., 1998
Eph (Trk receptors)	Ephrin	repulzív/attraktív Himanen, Nikolov 2003
NogoR	MAG,Omgp , Nogo66	repulzív McGee, Strittmatter, 2003

SEMA I, II, VIII: gerinctelen; receptor: plexinek
SEMA III-VII : gerinces; receptor: neuropilin 1 és 2

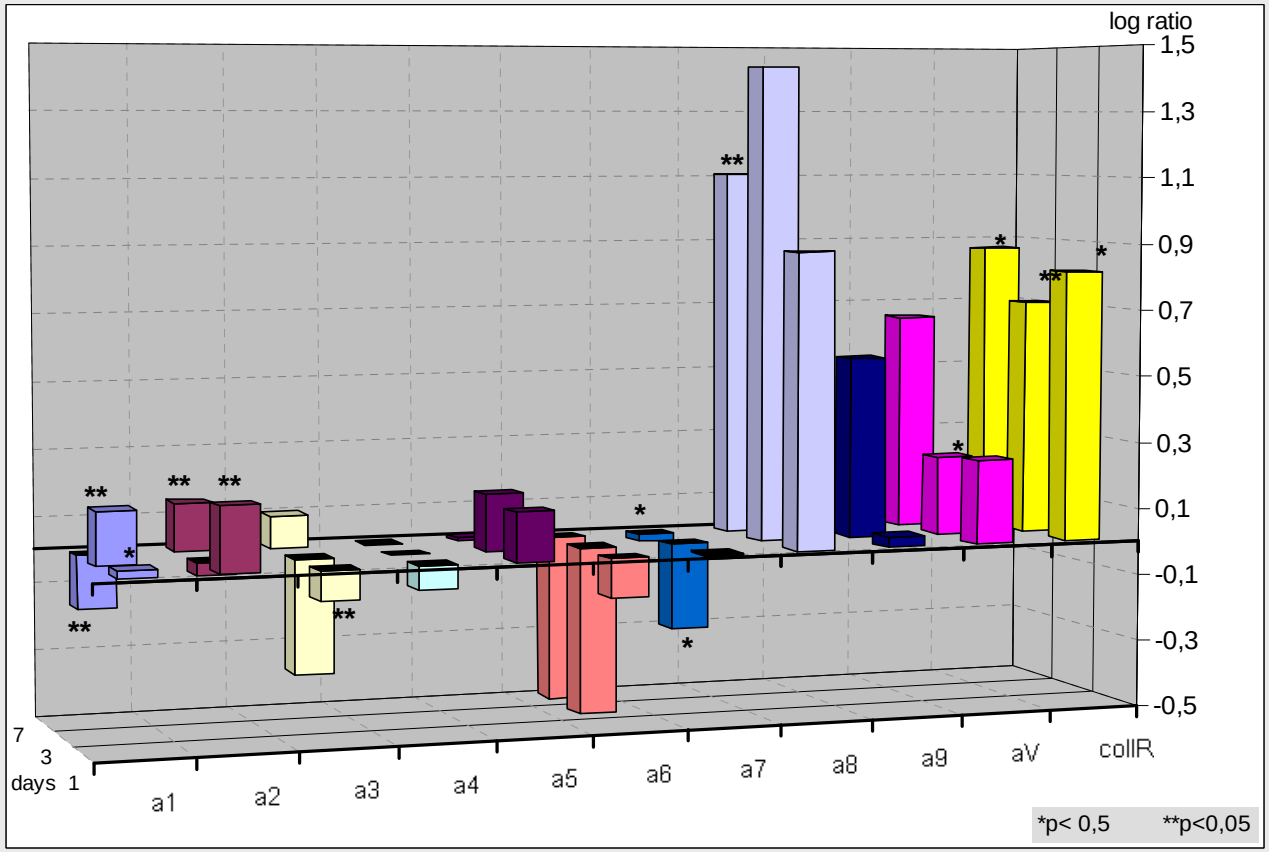
Expression of various laminin α-chains



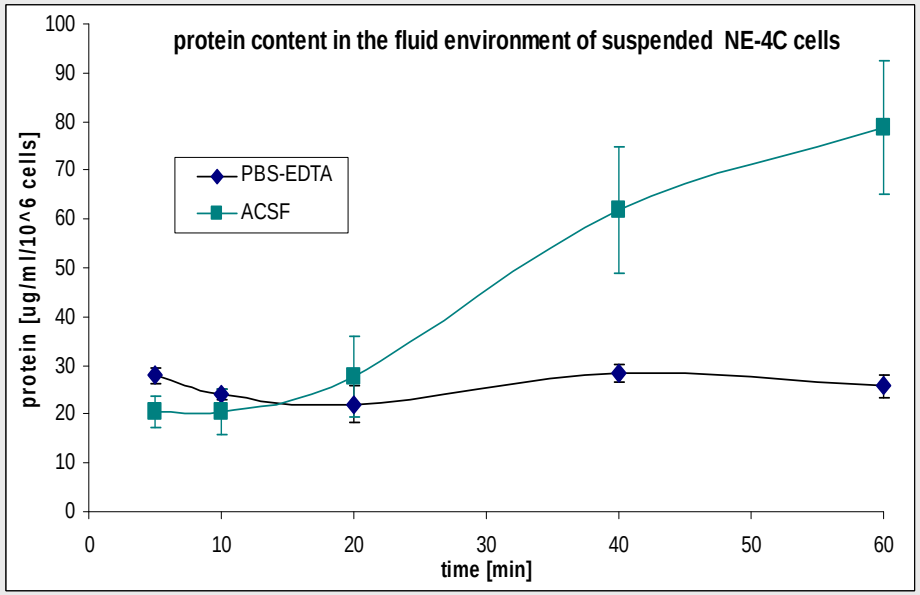
Expression of fibronectin

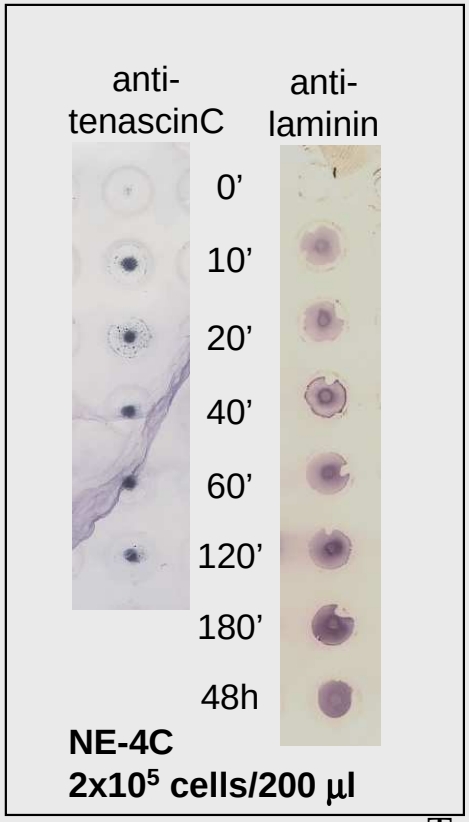


Expression of integrin α-chains

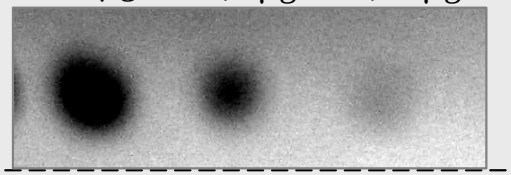


Protein secretion by cells



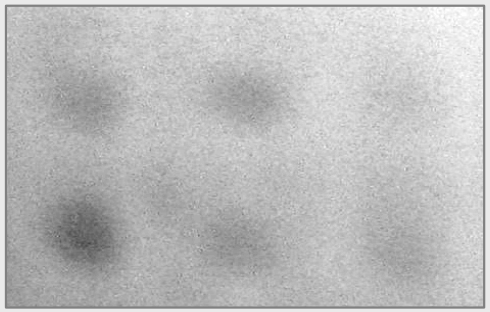


Traditional cell-blotting



BSA

Living cells in fluid contact with the blot-membrane



NE-4C 10^5 cells

MDCK 10^5 cells

Extracellular matrix molecules
Adhesion molecules
Growth factors
Hormones
etc