

## 5. REFERENCES

AbdAlla, S., H. Lother, A. el Massiery and U. Quitterer (2001). "Increased AT(1) receptor heterodimers in preeclampsia mediate enhanced angiotensin II responsiveness." Nat Med 7(9): 1003-9.

AbdAlla, S., H. Lother and U. Quitterer (2000). "AT1-receptor heterodimers show enhanced G-protein activation and altered receptor sequestration." Nature 407(6800): 94-8.

AbdAlla, S., E. Zaki, H. Lother and U. Quitterer (1999). "Involvement of the amino terminus of the B(2) receptor in agonist-induced receptor dimerization." J Biol Chem 274(37): 26079-84.

Abe, J., H. Suzuki, M. Notoya, T. Yamamoto and S. Hirose (1999). "Ig-hepta, a novel member of the G protein-coupled hepta-helical receptor (GPCR) family that has immunoglobulin-like repeats in a long N-terminal extracellular domain and defines a new subfamily of GPCRs." J Biol Chem 274(28): 19957-64.

Alberts, B. (2002). "Molecular biology of the cell 4th ed." New York: Garland science.

Angelova, K., D. Puett and P. Narayan (1997). "Identification of endothelin receptor subtypes in sheep choroid plexus." Endocrine 7(3): 287-93.

Angers, S., A. Salahpour and M. Bouvier (2001). "Biochemical and biophysical demonstration of GPCR oligomerization in mammalian cells." Life Sci 68(19-20): 2243-50.

Angers, S., A. Salahpour, E. Joly, S. Hilair, D. Chelsky, M. Dennis and M. Bouvier (2000). "Detection of beta 2-adrenergic receptor dimerization in living cells using bioluminescence resonance energy transfer (BRET)." Proc Natl Acad Sci U S A 97(7): 3684-9.

Arai, H., S. Hori, I. Aramori, H. Ohkubo and S. Nakanishi (1990). "Cloning and expression of a cDNA encoding an endothelin receptor." Nature 348(6303): 730-2.

Ayoub, M. A., C. Couturier, E. Lucas-Meunier, S. Angers, P. Fossier, M. Bouvier and R. Jockers (2002). "Monitoring of ligand-independent dimerization and ligand-induced conformational changes of melatonin receptors in living cells by bioluminescence resonance energy transfer." J Biol Chem 277(24): 21522-8.

## 5. References

---

- Bai, M., S. Trivedi and E. M. Brown (1998). "Dimerization of the extracellular calcium-sensing receptor (CaR) on the cell surface of CaR-transfected HEK293 cells." J Biol Chem **273**(36): 23605-10.
- Bai, M., S. Trivedi, O. Kifor, S. J. Quinn and E. M. Brown (1999). "Intermolecular interactions between dimeric calcium-sensing receptor monomers are important for its normal function." Proc Natl Acad Sci U S A **96**(6): 2834-9.
- Baldwin, J. M. (1993). "The probable arrangement of the helices in G protein-coupled receptors." Embo J **12**(4): 1693-703.
- Benkirane, M., D. Y. Jin, R. F. Chun, R. A. Koup and K. T. Jeang (1997). "Mechanism of transdominant inhibition of CCR5-mediated HIV-1 infection by ccr5delta32." J Biol Chem **272**(49): 30603-6.
- Berglund, M. M., D. A. Schober, M. A. Esterman and D. R. Gehlert (2003). "Neuropeptide Y Y4 receptor homodimers dissociate upon agonist stimulation." J Pharmacol Exp Ther **307**(3): 1120-6.
- Blanpain, C., J. M. Vanderwinden, J. Cihak, V. Wittamer, E. Le Poul, H. Issafraas, M. Stangassinger, G. Vassart, S. Marullo, D. Schlendorff, M. Parmentier and M. Mack (2002). "Multiple active states and oligomerization of CCR5 revealed by functional properties of monoclonal antibodies." Mol Biol Cell **13**(2): 723-37.
- Blomstrand, F., C. Giaume, E. Hansson and L. Ronnback (1999). "Distinct pharmacological properties of ET-1 and ET-3 on astroglial gap junctions and Ca(2+) signaling." Am J Physiol **277**(4 Pt 1): C616-27.
- Bockaert, J. and J. P. Pin (1999). "Molecular tinkering of G protein-coupled receptors: an evolutionary success." Embo J **18**(7): 1723-9.
- Bremnes, T., J. D. Paasche, A. Mehlum, C. Sandberg, B. Bremnes and H. Attramadal (2000). "Regulation and intracellular trafficking pathways of the endothelin receptors." J Biol Chem **275**(23): 17596-604.
- Brock, C., M. Schaefer, H. P. Reusch, C. Czupalla, M. Michalke, K. Spicher, G. Schultz and B. Nurnberg (2003). "Roles of G beta gamma in membrane recruitment and activation of p110 gamma/p101 phosphoinositide 3-kinase gamma." J Cell Biol **160**(1): 89-99.
- Carrithers, M. D. and M. R. Lerner (1996). "Synthesis and characterization of bivalent peptide ligands targeted to G-protein-coupled receptors." Chem Biol **3**(7): 537-42.

## 5. References

---

- Cheng, Z. J., K. G. Harikumar, E. L. Holicky and L. J. Miller (2003). "Heterodimerization of type A and B cholecystokinin receptors enhance signaling and promote cell growth." *J Biol Chem* **278**(52): 52972-9.
- Cheng, Z. J. and L. J. Miller (2001). "Agonist-dependent dissociation of oligomeric complexes of G protein-coupled cholecystokinin receptors demonstrated in living cells using bioluminescence resonance energy transfer." *J Biol Chem* **276**(51): 48040-7.
- Conn, P. M., D. C. Rogers and R. McNeil (1982). "Potency enhancement of a GnRH agonist: GnRH-receptor microaggregation stimulates gonadotropin release." *Endocrinology* **111**(1): 335-7.
- Cornea, A. and P. M. Conn (2002). "Measurement of changes in fluorescence resonance energy transfer between gonadotropin-releasing hormone receptors in response to agonists." *Methods* **27**(4): 333-9.
- Cornea, A., J. A. Janovick, G. Maya-Nunez and P. M. Conn (2001). "Gonadotropin-releasing hormone receptor microaggregation. Rate monitored by fluorescence resonance energy transfer." *J Biol Chem* **276**(3): 2153-8.
- Couve, A., A. K. Filippov, C. N. Connolly, B. Bettler, D. A. Brown and S. J. Moss (1998). "Intracellular retention of recombinant GABAB receptors." *J Biol Chem* **273**(41): 26361-7.
- Cramer, H., K. Schmenger, K. Heinrich, A. Horstmeyer, H. Boning, A. Breit, A. Piiper, K. Lundstrom, W. Muller-Esterl and C. Schroeder (2001). "Coupling of endothelin receptors to the ERK/MAP kinase pathway. Roles of palmitoylation and G(alpha)q." *Eur J Biochem* **268**(20): 5449-59.
- Cvejic, S. and L. A. Devi (1997). "Dimerization of the delta opioid receptor: implication for a role in receptor internalization." *J Biol Chem* **272**(43): 26959-64.
- Damke, H., T. Baba, D. E. Warnock and S. L. Schmid (1994). "Induction of mutant dynamin specifically blocks endocytic coated vesicle formation." *J Cell Biol* **127**(4): 915-34.
- Davies, A., B. E. Gowen, A. M. Krebs, G. F. Schertler and H. R. Saibil (2001). "Three-dimensional structure of an invertebrate rhodopsin and basis for ordered alignment in the photoreceptor membrane." *J Mol Biol* **314**(3): 455-63.
- Devreotes, P. N. (1994). "G protein-linked signaling pathways control the developmental program of Dictyostelium." *Neuron* **12**(2): 235-41.

## 5. References

---

- Dohlman, H. G., J. Thorner, M. G. Caron and R. J. Lefkowitz (1991). "Model systems for the study of seven-transmembrane-segment receptors." *Annu Rev Biochem* **60**: 653-88.
- Dupuis, J., C. A. Goresky and A. Fournier (1996). "Pulmonary clearance of circulating endothelin-1 in dogs in vivo: exclusive role of ETB receptors." *J Appl Physiol* **81**(4): 1510-5.
- Eguchi, S., Y. Hirata, T. Imai and F. Marumo (1993). "Endothelin receptor subtypes are coupled to adenylyl cyclase via different guanyl nucleotide-binding proteins in vasculature." *Endocrinology* **132**(2): 524-9.
- Ehrenreich, H. (1999). "The astrocytic endothelin system: toward solving a mystery focus on "distinct pharmacological properties of ET-1 and ET-3 on astroglial gap junctions and Ca(2+) signaling"." *Am J Physiol* **277**(4 Pt 1): C614-5.
- Elmhurst, J. L., Z. Xie, B. F. O'Dowd and S. R. George (2000). "The splice variant D3nf reduces ligand binding to the D3 dopamine receptor: evidence for heterooligomerization." *Brain Res Mol Brain Res* **80**(1): 63-74.
- Faro, R., D. M. Grassi-Kassise, I. Boin, P. G. Withrington, T. J. Opogenorth, J. G. Ferraz, E. Antunes and G. de Nucci (1998). "Characterization of endothelin receptors in isolated, perfused human spleen." *J Cardiovasc Pharmacol* **31 Suppl 1**: S551-3.
- Ferre, S., M. Karcz-Kubicha, B. T. Hope, P. Popoli, J. Burgueno, M. A. Gutierrez, V. Casado, K. Fuxe, S. R. Goldberg, C. Lluis, R. Franco and F. Ciruela (2002). "Synergistic interaction between adenosine A2A and glutamate mGlu5 receptors: implications for striatal neuronal function." *Proc Natl Acad Sci U S A* **99**(18): 11940-5.
- Freedman, N. J., A. S. Ament, M. Oppermann, R. H. Stoffel, S. T. Exum and R. J. Lefkowitz (1997). "Phosphorylation and desensitization of human endothelin A and B receptors. Evidence for G protein-coupled receptor kinase specificity." *J Biol Chem* **272**(28): 17734-43.
- Fukushima, Y., T. Asano, T. Saitoh, M. Anai, M. Funaki, T. Ogihara, H. Katagiri, N. Matsuhashi, Y. Yazaki and K. Sugano (1997). "Oligomer formation of histamine H2 receptors expressed in Sf9 and COS7 cells." *FEBS Lett* **409**(2): 283-6.

## 5. References

---

- Gama, L., S. G. Wilt and G. E. Breitwieser (2001). "Heterodimerization of calcium sensing receptors with metabotropic glutamate receptors in neurons." *J Biol Chem* **276**(42): 39053-9.
- George, S. R., T. Fan, Z. Xie, R. Tse, V. Tam, G. Varghese and B. F. O'Dowd (2000). "Oligomerization of mu- and delta-opioid receptors. Generation of novel functional properties." *J Biol Chem* **275**(34): 26128-35.
- George, S. R., B. F. O'Dowd and S. P. Lee (2002). "G-protein-coupled receptor oligomerization and its potential for drug discovery." *Nat Rev Drug Discov* **1**(10): 808-20.
- Gines, S., J. Hillion, M. Torvinen, S. Le Crom, V. Casado, E. I. Canela, S. Rondin, J. Y. Lew, S. Watson, M. Zoli, L. F. Agnati, P. Verniera, C. Lluis, S. Ferre, K. Fuxe and R. Franco (2000). "Dopamine D1 and adenosine A1 receptors form functionally interacting heteromeric complexes." *Proc Natl Acad Sci U S A* **97**(15): 8606-11.
- Gomes, I., B. A. Jordan, A. Gupta, N. Trapaidze, V. Nagy and L. A. Devi (2000). "Heterodimerization of mu and delta opioid receptors: A role in opiate synergy." *J Neurosci* **20**(22): RC110.
- Grant, M., B. Collier and U. Kumar (2004). "Agonist-dependent dissociation of human somatostatin receptor 2 dimers: a role in receptor trafficking." *J Biol Chem* **279**(35): 36179-83.
- Grantcharova, E., J. Furkert, H. P. Reusch, H. W. Krell, G. Papsdorf, M. Beyermann, R. Schulein, W. Rosenthal and A. Oksche (2002). "The extracellular N terminus of the endothelin B (ETB) receptor is cleaved by a metalloprotease in an agonist-dependent process." *J Biol Chem* **277**(46): 43933-41.
- Guo, W., L. Shi and J. A. Javitch (2003). "The fourth transmembrane segment forms the interface of the dopamine D2 receptor homodimer." *J Biol Chem* **278**(7): 4385-8.
- Hanyaloglu, A. C., R. M. Seeber, T. A. Kohout, R. J. Lefkowitz and K. A. Eidne (2002). "Homo- and hetero-oligomerization of thyrotropin-releasing hormone (TRH) receptor subtypes. Differential regulation of beta-arrestins 1 and 2." *J Biol Chem* **277**(52): 50422-30.
- Harada, N., A. Himeno, K. Shigematsu, K. Sumikawa and M. Niwa (2002). "Endothelin-1 binding to endothelin receptors in the rat anterior pituitary gland: possible formation of an ETA-ETB receptor heterodimer." *Cell Mol Neurobiol* **22**(2): 207-26.

## 5. References

---

- Hasselblatt, M., H. Kamrowski-Kruck, N. Jensen, L. Schilling, H. Kratzin, A. L. Siren and H. Ehrenreich (1998). "ETA and ETB receptor antagonists synergistically increase extracellular endothelin-1 levels in primary rat astrocyte cultures." *Brain Res* **785**(2): 253-61.
- Hebert, T. E., T. P. Loisel, L. Adam, N. Ethier, S. S. Onge and M. Bouvier (1998). "Functional rescue of a constitutively desensitized beta2AR through receptor dimerization." *Biochem J* **330** (Pt 1): 287-93.
- Hebert, T. E., S. Moffett, J. P. Morello, T. P. Loisel, D. G. Bichet, C. Barret and M. Bouvier (1996). "A peptide derived from a beta2-adrenergic receptor transmembrane domain inhibits both receptor dimerization and activation." *J Biol Chem* **271**(27): 16384-92.
- Hillion, J., M. Canals, M. Torvinen, V. Casado, R. Scott, A. Terasmaa, A. Hansson, S. Watson, M. E. Olah, J. Mallol, E. I. Canela, M. Zoli, L. F. Agnati, C. F. Ibanez, C. Lluis, R. Franco, S. Ferre and K. Fuxe (2002). "Coaggregation, cointernalization, and codesensitization of adenosine A2A receptors and dopamine D2 receptors." *J Biol Chem* **277**(20): 18091-7.
- Himeno, A., K. Shigematsu, T. Taguchi and M. Niwa (1998). "Endothelin-1 binding to endothelin receptors in the rat anterior pituitary gland: interaction in the recognition of endothelin-1 between ETA and ETB receptors." *Cell Mol Neurobiol* **18**(4): 447-52.
- Horvat, R. D., D. A. Roess, S. E. Nelson, B. G. Barisas and C. M. Clay (2001). "Binding of agonist but not antagonist leads to fluorescence resonance energy transfer between intrinsically fluorescent gonadotropin-releasing hormone receptors." *Mol Endocrinol* **15**(5): 695-703.
- Indrapichate, K., D. Meehan, T. A. Lane, S. Y. Chu, C. V. Rao, D. Johnson, T. T. Chen and J. Wimalasena (1992). "Biological actions of monoclonal luteinizing hormone/human chorionic gonadotropin receptor antibodies." *Biol Reprod* **46**(2): 265-78.
- Inoue, A., M. Yanagisawa, S. Kimura, Y. Kasuya, T. Miyauchi, K. Goto and T. Masaki (1989). "The human endothelin family: three structurally and pharmacologically distinct isopeptides predicted by three separate genes." *Proc Natl Acad Sci U S A* **86**(8): 2863-7.
- Issafra, H., S. Angers, S. Bulenger, C. Blanpain, M. Parmentier, C. Labbe-Jullie, M. Bouvier and S. Marullo (2002). "Constitutive agonist-independent CCR5 oligomerization and antibody-mediated clustering occurring at physiological levels of receptors." *J Biol Chem* **277**(38): 34666-73.

## 5. References

---

- Iwasa, S., J. Fan, T. Shimokama, M. Nagata and T. Watanabe (1999). "Increased immunoreactivity of endothelin-1 and endothelin B receptor in human atherosclerotic lesions. A possible role in atherogenesis." Atherosclerosis **146**(1): 93-100.
- Jensen, A. A., J. L. Hansen, S. P. Sheikh and H. Brauner-Osborne (2002). "Probing intermolecular protein-protein interactions in the calcium-sensing receptor homodimer using bioluminescence resonance energy transfer (BRET)." Eur J Biochem **269**(20): 5076-87.
- Jones, K. A., B. Borowsky, J. A. Tamm, D. A. Craig, M. M. Durkin, M. Dai, W. J. Yao, M. Johnson, C. Gunwaldsen, L. Y. Huang, C. Tang, Q. Shen, J. A. Salon, K. Morse, T. Laz, K. E. Smith, D. Nagarathnam, S. A. Noble, T. A. Branchek and C. Gerald (1998). "GABA(B) receptors function as a heteromeric assembly of the subunits GABA(B)R1 and GABA(B)R2." Nature **396**(6712): 674-9.
- Jordan, B. A. and L. A. Devi (1999). "G-protein-coupled receptor heterodimerization modulates receptor function." Nature **399**(6737): 697-700.
- Jordan, B. A., N. Trapaidze, I. Gomes, R. Nivarthi and L. A. Devi (2001). "Oligomerization of opioid receptors with beta 2-adrenergic receptors: a role in trafficking and mitogen-activated protein kinase activation." Proc Natl Acad Sci U S A **98**(1): 343-8.
- Karpa, K. D., R. Lin, N. Kabbani and R. Levenson (2000). "The dopamine D3 receptor interacts with itself and the truncated D3 splice variant d3nf: D3-D3nf interaction causes mislocalization of D3 receptors." Mol Pharmacol **58**(4): 677-83.
- Kaupmann, K., B. Malitschek, V. Schuler, J. Heid, W. Froestl, P. Beck, J. Mosbacher, S. Bischoff, A. Kulik, R. Shigemoto, A. Karschin and B. Bettler (1998). "GABA(B)-receptor subtypes assemble into functional heteromeric complexes." Nature **396**(6712): 683-7.
- Kitsukawa, Y., Z. F. Gu, P. Hildebrand and R. T. Jensen (1994). "Gastric smooth muscle cells possess two classes of endothelin receptors but only one alters contraction." Am J Physiol **266**(4 Pt 1): G713-21.
- Kroeger, K. M., A. C. Hanyaloglu, R. M. Seeber, L. E. Miles and K. A. Eidne (2001). "Constitutive and agonist-dependent homo-oligomerization of the thyrotropin-releasing hormone receptor. Detection in living cells using bioluminescence resonance energy transfer." J Biol Chem **276**(16): 12736-43.

## 5. References

---

- Kuner, R., G. Kohr, S. Grunewald, G. Eisenhardt, A. Bach and H. C. Kornau (1999). "Role of heteromer formation in GABAB receptor function." Science **283**(5398): 74-7.
- Kunishima, N., Y. Shimada, Y. Tsuji, T. Sato, M. Yamamoto, T. Kumasaka, S. Nakanishi, H. Jingami and K. Morikawa (2000). "Structural basis of glutamate recognition by a dimeric metabotropic glutamate receptor." Nature **407**(6807): 971-7.
- Latif, R., P. Graves and T. F. Davies (2002). "Ligand-dependent inhibition of oligomerization at the human thyrotropin receptor." J Biol Chem **277**(47): 45059-67.
- Lavoie, C., J. F. Mercier, A. Salahpour, D. Umapathy, A. Breit, L. R. Villeneuve, W. Z. Zhu, R. P. Xiao, E. G. Lakatta, M. Bouvier and T. E. Hebert (2002). "Beta 1/beta 2-adrenergic receptor heterodimerization regulates beta 2-adrenergic receptor internalization and ERK signaling efficacy." J Biol Chem **277**(38): 35402-10.
- Lee, S. P., B. F. O'Dowd, G. Y. Ng, G. Varghese, H. Akil, A. Mansour, T. Nguyen and S. R. George (2000). "Inhibition of cell surface expression by mutant receptors demonstrates that D2 dopamine receptors exist as oligomers in the cell." Mol Pharmacol **58**(1): 120-8.
- Lenz, J. C., H. P. Reusch, N. Albrecht, G. Schultz and M. Schaefer (2002). "Ca<sup>2+</sup>-controlled competitive diacylglycerol binding of protein kinase C isoenzymes in living cells." J Cell Biol **159**(2): 291-302.
- Li, X., L. Staszewski, H. Xu, K. Durick, M. Zoller and E. Adler (2002). "Human receptors for sweet and umami taste." Proc Natl Acad Sci U S A **99**(7): 4692-6.
- Liang, Y., D. Fotiadis, S. Filipek, D. A. Saperstein, K. Palczewski and A. Engel (2003). "Organization of the G protein-coupled receptors rhodopsin and opsin in native membranes." J Biol Chem **278**(24): 21655-62.
- Maggio, R., P. Barbier, A. Colelli, F. Salvadori, G. Demontis and G. U. Corsini (1999). "G protein-linked receptors: pharmacological evidence for the formation of heterodimers." J Pharmacol Exp Ther **291**(1): 251-7.
- Margeta-Mitrovic, M., Y. N. Jan and L. Y. Jan (2000). "A trafficking checkpoint controls GABA(B) receptor heterodimerization." Neuron **27**(1): 97-106.

## 5. References

---

- McLatchie, L. M., N. J. Fraser, M. J. Main, A. Wise, J. Brown, N. Thompson, R. Solari, M. G. Lee and S. M. Foord (1998). "RAMPs regulate the transport and ligand specificity of the calcitonin-receptor-like receptor." *Nature* **393**(6683): 333-9.
- McVey, M., D. Ramsay, E. Kellett, S. Rees, S. Wilson, A. J. Pope and G. Milligan (2001). "Monitoring receptor oligomerization using time-resolved fluorescence resonance energy transfer and bioluminescence resonance energy transfer. The human delta -opioid receptor displays constitutive oligomerization at the cell surface, which is not regulated by receptor occupancy." *J Biol Chem* **276**(17): 14092-9.
- Mellado, M., J. M. Rodriguez-Frade, A. J. Vila-Coro, A. M. de Ana and A. C. Martinez (1999). "Chemokine control of HIV-1 infection." *Nature* **400**(6746): 723-4.
- Mellado, M., J. M. Rodriguez-Frade, A. J. Vila-Coro, S. Fernandez, A. Martin de Ana, D. R. Jones, J. L. Toran and A. C. Martinez (2001). "Chemokine receptor homo- or heterodimerization activates distinct signaling pathways." *Embo J* **20**(10): 2497-507.
- Mercier, J. F., A. Salahpour, S. Angers, A. Breit and M. Bouvier (2002). "Quantitative assessment of beta 1- and beta 2-adrenergic receptor homo- and heterodimerization by bioluminescence resonance energy transfer." *J Biol Chem* **277**(47): 44925-31.
- Monnot, C., C. Bihoreau, S. Conchon, K. M. Curnow, P. Corvol and E. Clauser (1996). "Polar residues in the transmembrane domains of the type 1 angiotensin II receptor are required for binding and coupling. Reconstitution of the binding site by co-expression of two deficient mutants." *J Biol Chem* **271**(3): 1507-13.
- Nelson, G., J. Chandrashekhar, M. A. Hoon, L. Feng, G. Zhao, N. J. Ryba and C. S. Zuker (2002). "An amino-acid taste receptor." *Nature* **416**(6877): 199-202.
- Nelson, G., M. A. Hoon, J. Chandrashekhar, Y. Zhang, N. J. Ryba and C. S. Zuker (2001). "Mammalian sweet taste receptors." *Cell* **106**(3): 381-90.
- New, D. C. and J. T. Wong (1998). "The evidence for G-protein-coupled receptors and heterotrimeric G proteins in protozoa and ancestral metazoa." *Biol Signals Recept* **7**(2): 98-108.
- Ng GY, O. D. B., Lee SP, Chung HT, Brann MR, Seeman P, George SR. (1996). "Dopamine D2 receptor dimers and receptor-blocking peptides." *Biochem Biophys Res Commun*. 1996 Oct 3;227(1):200-4.

## 5. References

---

Nimchinsky, E. A., P. R. Hof, W. G. Janssen, J. H. Morrison and C. Schmauss (1997). "Expression of dopamine D3 receptor dimers and tetramers in brain and in transfected cells." J Biol Chem **272**(46): 29229-37.

Ogawa, Y., K. Nakao, H. Arai, O. Nakagawa, K. Hosoda, S. Suga, S. Nakanishi and H. Imura (1991). "Molecular cloning of a non-isopeptide-selective human endothelin receptor." Biochem Biophys Res Commun **178**(1): 248-55.

Okamoto, Y., H. Ninomiya, S. Miwa and T. Masaki (2000). "Cholesterol oxidation switches the internalization pathway of endothelin receptor type A from caveolae to clathrin-coated pits in Chinese hamster ovary cells." J Biol Chem **275**(9): 6439-46.

Oksche, A., G. Boese, A. Horstmeyer, J. Ferkert, M. Beyermann, M. Bienert and W. Rosenthal (2000). Late endosomal/lysosomal targeting and lack of recycling of the ligand-occupied endothelin B receptor. Molecular Pharmacology **57**: 1104-13.

Oksche, A., G. Boese, A. Horstmeyer, J. Ferkert, M. Beyermann, M. Bienert and W. Rosenthal (2000). "Late endosomal/lysosomal targeting and lack of recycling of the ligand-occupied endothelin B receptor." Mol Pharmacol **57**(6): 1104-13.

Oliveira, L., A. C. Paiva, C. Sander and G. Vriend (1994). "A common step for signal transduction in G protein-coupled receptors." Trends Pharmacol Sci **15**(6): 170-2.

Overton, M. C. and K. J. Blumer (2000). "G-protein-coupled receptors function as oligomers in vivo." Curr Biol **10**(6): 341-4.

Palczewski, K., T. Kumashita, T. Hori, C. Behnke, H. Motoshima, B. Fox, I. Trong, D. Teller, T. Okada, R. Stenkamp, M. Yamamoto and M. Miyano (2000). "Crystal Structure of Rhodopsin: A G Protein-Coupled Receptor." Science **289**: 739-745.

Pfeiffer, M., T. Koch, H. Schroder, M. Klutzny, S. Kirscht, H. J. Kreienkamp, V. Hollt and S. Schulz (2001). "Homo- and heterodimerization of somatostatin receptor subtypes. Inactivation of sst(3) receptor function by heterodimerization with sst(2A)." J Biol Chem **276**(17): 14027-36.

Pfeiffer, M., T. Koch, H. Schroder, M. Laugsch, V. Hollt and S. Schulz (2002). "Heterodimerization of somatostatin and opioid receptors cross-modulates phosphorylation, internalization, and desensitization." J Biol Chem **277**(22): 19762-72.

## 5. References

---

Plakidou-Dymock, S., D. Dymock and R. Hooley (1998). "A higher plant seven-transmembrane receptor that influences sensitivity to cytokinins." Curr Biol **8**(6): 315-24.

Ramsay, D., E. Kellett, M. McVey, S. Rees and G. Milligan (2002). "Homo- and hetero-oligomeric interactions between G-protein-coupled receptors in living cells monitored by two variants of bioluminescence resonance energy transfer (BRET): hetero-oligomers between receptor subtypes form more efficiently than between less closely related sequences." Biochem J **365**(Pt 2): 429-40.

Robbins, M. J., F. Ciruela, A. Rhodes and R. A. McIlhinney (1999). "Characterization of the dimerization of metabotropic glutamate receptors using an N-terminal truncation of mGluR1alpha." J Neurochem **72**(6): 2539-47.

Rocheville, M., D. C. Lange, U. Kumar, S. C. Patel, R. C. Patel and Y. C. Patel (2000). "Receptors for dopamine and somatostatin: formation of hetero-oligomers with enhanced functional activity." Science **288**(5463): 154-7.

Rocheville, M., D. C. Lange, U. Kumar, R. Sasi, R. C. Patel and Y. C. Patel (2000). "Subtypes of the somatostatin receptor assemble as functional homo- and heterodimers." J Biol Chem **275**(11): 7862-9.

Rodriguez-Frade, J. M., A. J. Vila-Coro, A. M. de Ana, J. P. Albar, A. C. Martinez and M. Mellado (1999). "The chemokine monocyte chemoattractant protein-1 induces functional responses through dimerization of its receptor CCR2." Proc Natl Acad Sci U S A **96**(7): 3628-33.

Roess, D. A., R. D. Horvat, H. Munnely and B. G. Barisas (2000). "Luteinizing hormone receptors are self-associated in the plasma membrane." Endocrinology **141**(12): 4518-23.

Romano, C., W. L. Yang and K. L. O'Malley (1996). "Metabotropic glutamate receptor 5 is a disulfide-linked dimer." J Biol Chem **271**(45): 28612-6.

Saito, Y., T. Mizuno, M. Itakura, Y. Suzuki, T. Ito, H. Hagiwara and S. Hirose (1991). "Primary structure of bovine endothelin ETB receptor and identification of signal peptidase and metal proteinase cleavage sites." J Biol Chem **266**(34): 23433-7.

Sakamoto, A., M. Yanagisawa, T. Sawamura, T. Enoki, T. Ohtani, T. Sakurai, K. Nakao, T. Toyo-oka and T. Masaki (1993). "Distinct subdomains of human endothelin receptors determine their selectivity to endothelinA-selective antagonist and endothelinB-selective agonists." J Biol Chem **268**(12): 8547-53.

## 5. References

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- Sakurai, T., M. Yanagisawa and T. Masaki (1992). "Molecular characterization of endothelin receptors." Trends Pharmacol Sci **13**(3): 103-8.
- Sakurai, T., M. Yanagisawa, Y. Takuwa, H. Miyazaki, S. Kimura, K. Goto and T. Masaki (1990). "Cloning of a cDNA encoding a non-isopeptide-selective subtype of the endothelin receptor." Nature **348**(6303): 732-5.
- Salahpour, A., S. Angers and M. Bouvier (2000). "Functional significance of oligomerization of G-protein-coupled receptors." Trends Endocrinol Metab **11**(5): 163-8.
- Sasaki, Y., S. Hori, K. Oda, T. Okada and M. Takimoto (1998). "Both ET(A) and ET(B) receptors are involved in mitogen-activated protein kinase activation and DNA synthesis of astrocytes: study using ET(B) receptor-deficient rats (aganglionosis rats)." Eur J Neurosci **10**(9): 2984-93.
- Scarselli, M., F. Novi, E. Schallmach, R. Lin, A. Baragli, A. Colzi, N. Griffon, G. U. Corsini, P. Sokoloff, R. Levenson, Z. Vogel and R. Maggio (2001). "D2/D3 dopamine receptor heterodimers exhibit unique functional properties." J Biol Chem **276**(32): 30308-14.
- Seko, T., M. Ito, Y. Kureishi, R. Okamoto, N. Moriki, K. Onishi, N. Isaka, D. J. Hartshorne and T. Nakano (2003). "Activation of RhoA and inhibition of myosin phosphatase as important components in hypertension in vascular smooth muscle." Circ Res **92**(4): 411-8.
- Seo, B., B. S. Oemar, R. Siebenmann, L. von Segesser and T. F. Luscher (1994). "Both ETA and ETB receptors mediate contraction to endothelin-1 in human blood vessels." Circulation **89**(3): 1203-8.
- Terrillon, S., T. Durroux, B. Mouillac, A. Breit, M. A. Ayoub, M. Taulan, R. Jockers, C. Barberis and M. Bouvier (2003). "Oxytocin and vasopressin V1a and V2 receptors form constitutive homo- and heterodimers during biosynthesis." Mol Endocrinol **17**(4): 677-91.
- Tsuji, Y., Y. Shimada, T. Takeshita, N. Kajimura, S. Nomura, N. Sekiyama, J. Otomo, J. Usukura, S. Nakanishi and H. Jingami (2000). "Cryptic dimer interface and domain organization of the extracellular region of metabotropic glutamate receptor subtype 1." J Biol Chem **275**(36): 28144-51.
- Van Brocklyn, J. R., B. Behbahani and N. H. Lee (2002). "Homodimerization and heterodimerization of S1P/EDG sphingosine-1-phosphate receptors." Biochim Biophys Acta **1582**(1-3): 89-93.

Venter, J. C., M. D. Adams, E. W. Myers, P. W. Li, R. J. Mural, G. G. Sutton, H. O. Smith, M. Yandell, C. A. Evans, R. A. Holt, J. D. Gocayne, P. Amanatides, R. M. Ballew, D. H. Huson, J. R. Wortman, Q. Zhang, C. D. Kodira, X. H. Zheng, L. Chen, M. Skupski, G. Subramanian, P. D. Thomas, J. Zhang, G. L. Gabor Miklos, C. Nelson, S. Broder, A. G. Clark, J. Nadeau, V. A. McKusick, N. Zinder, A. J. Levine, R. J. Roberts, M. Simon, C. Slayman, M. Hunkapiller, R. Bolanos, A. Delcher, I. Dew, D. Fasulo, M. Flanigan, L. Florea, A. Halpern, S. Hannenhalli, S. Kravitz, S. Levy, C. Mobarry, K. Reinert, K. Remington, J. Abu-Threideh, E. Beasley, K. Biddick, V. Bonazzi, R. Brandon, M. Cargill, I. Chandramouliswaran, R. Charlab, K. Chaturvedi, Z. Deng, V. Di Francesco, P. Dunn, K. Eilbeck, C. Evangelista, A. E. Gabrielian, W. Gan, W. Ge, F. Gong, Z. Gu, P. Guan, T. J. Heiman, M. E. Higgins, R. R. Ji, Z. Ke, K. A. Ketchum, Z. Lai, Y. Lei, Z. Li, J. Li, Y. Liang, X. Lin, F. Lu, G. V. Merkulov, N. Milshina, H. M. Moore, A. K. Naik, V. A. Narayan, B. Neelam, D. Nusskern, D. B. Rusch, S. Salzberg, W. Shao, B. Shue, J. Sun, Z. Wang, A. Wang, X. Wang, J. Wang, M. Wei, R. Wides, C. Xiao, C. Yan, A. Yao, J. Ye, M. Zhan, W. Zhang, H. Zhang, Q. Zhao, L. Zheng, F. Zhong, W. Zhong, S. Zhu, S. Zhao, D. Gilbert, S. Baumhueter, G. Spier, C. Carter, A. Cravchik, T. Woodage, F. Ali, H. An, A. Awe, D. Baldwin, H. Baden, M. Barnstead, I. Barrow, K. Beeson, D. Busam, A. Carver, A. Center, M. L. Cheng, L. Curry, S. Danaher, L. Davenport, R. Desilets, S. Dietz, K. Dodson, L. Doucet, S. Ferriera, N. Garg, A. Gluecksmann, B. Hart, J. Haynes, C. Haynes, C. Heiner, S. Hladun, D. Hostin, J. Houck, T. Howland, C. Ibegwam, J. Johnson, F. Kalush, L. Kline, S. Koduru, A. Love, F. Mann, D. May, S. McCawley, T. McIntosh, I. McMullen, M. Moy, L. Moy, B. Murphy, K. Nelson, C. Pfannkoch, E. Pratts, V. Puri, H. Qureshi, M. Reardon, R. Rodriguez, Y. H. Rogers, D. Romblad, B. Ruhfel, R. Scott, C. Sitter, M. Smallwood, E. Stewart, R. Strong, E. Suh, R. Thomas, N. N. Tint, S. Tse, C. Vech, G. Wang, J. Wetter, S. Williams, M. Williams, S. Windsor, E. Winn-Deen, K. Wolfe, J. Zaveri, K. Zaveri, J. F. Abril, R. Guigo, M. J. Campbell, K. V. Sjolander, B. Karlak, A. Kejariwal, H. Mi, B. Lazareva, T. Hatton, A. Narechania, K. Diemer, A. Muruganujan, N. Guo, S. Sato, V. Bafna, S. Istrail, R. Lippert, R. Schwartz, B. Walenz, S. Yooseph, D. Allen, A. Basu, J. Baxendale, L. Blick, M. Caminha, J. Carnes-Stine, P. Caulk, Y. H. Chiang, M. Coyne, C. Dahlke, A. Mays, M. Dombroski, M. Donnelly, D. Ely, S. Esparham, C. Fosler, H. Gire, S. Glanowski, K. Glasser, A. Glodek, M. Gorokhov, K. Graham, B. Gropman, M. Harris, J. Heil, S. Henderson, J. Hoover, D. Jennings, C. Jordan, J. Jordan, J. Kasha, L. Kagan, C. Kraft, A. Levitsky, M. Lewis, X. Liu, J. Lopez, D. Ma, W. Majoros, J. McDaniel, S. Murphy, M. Newman, T. Nguyen, N. Nguyen, M. Nodell, S. Pan, J. Peck, M. Peterson, W. Rowe, R. Sanders, J. Scott, M. Simpson, T. Smith, A. Sprague, T. Stockwell, R. Turner, E. Venter, M. Wang, M. Wen, D. Wu, M. Wu, A. Xia, A. Zandieh and X. Zhu (2001). "The sequence of the human genome." *Science* **291**(5507): 1304-51.

Vernier, P., B. Cardinaud, O. Valdenaire, H. Philippe and J. D. Vincent (1995). "An evolutionary view of drug-receptor interaction: the bioamine receptor family." *Trends Pharmacol Sci* **16**(11): 375-81.

## 5. References

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- Vila-Coro, A. J., M. Mellado, A. Martin de Ana, P. Lucas, G. del Real, A. C. Martinez and J. M. Rodriguez-Frade (2000). "HIV-1 infection through the CCR5 receptor is blocked by receptor dimerization." Proc Natl Acad Sci U S A **97**(7): 3388-93.
- Vila-Coro, A. J., J. M. Rodriguez-Frade, A. Martin De Ana, M. C. Moreno-Ortiz, A. C. Martinez and M. Mellado (1999). "The chemokine SDF-1alpha triggers CXCR4 receptor dimerization and activates the JAK/STAT pathway." Faseb J **13**(13): 1699-710.
- White, J. H., A. Wise, M. J. Main, A. Green, N. J. Fraser, G. H. Disney, A. A. Barnes, P. Emson, S. M. Foord and F. H. Marshall (1998). "Heterodimerization is required for the formation of a functional GABA(B) receptor." Nature **396**(6712): 679-82.
- Xie, Z., S. P. Lee, B. F. O'Dowd and S. R. George (1999). "Serotonin 5-HT1B and 5-HT1D receptors form homodimers when expressed alone and heterodimers when co-expressed." FEBS Lett **456**(1): 63-7.
- Yanagisawa, M., H. Kurihara, S. Kimura, Y. Tomobe, M. Kobayashi, Y. Mitsui, Y. Yazaki, K. Goto and T. Masaki (1988). "A novel potent vasoconstrictor peptide produced by vascular endothelial cells." Nature **332**(6163): 411-5.
- Yoshioka, K., O. Saitoh and H. Nakata (2001). "Heteromeric association creates a P2Y-like adenosine receptor." Proc Natl Acad Sci U S A **98**(13): 7617-22.
- Yoshioka, K., O. Saitoh and H. Nakata (2002). "Agonist-promoted heteromeric oligomerization between adenosine A(1) and P2Y(1) receptors in living cells." FEBS Lett **523**(1-3): 147-51.
- Zawarynski, P., T. Tallerico, P. Seeman, S. P. Lee, B. F. O'Dowd and S. R. George (1998). "Dopamine D2 receptor dimers in human and rat brain." FEBS Lett **441**(3): 383-6.
- Zeng, F. Y. and J. Wess (1999). "Identification and molecular characterization of m3 muscarinic receptor dimers." J Biol Chem **274**(27): 19487-97.
- Zhu, X. and J. Wess (1998). "Truncated V2 vasopressin receptors as negative regulators of wild-type V2 receptor function." Biochemistry **37**(45): 15773-84.