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Accademic Studies

١٩٨٣-١٩٨٧: Study of Biology at the University of Bayreuth, Germany
١٩٨٨: Diploma Thesis at the Institute of Microbiology, University of Bayreuth

Professional Career

١٩٨٩-١٩٩٣:	PhD Thesis at the Institute of Biochemistry University of Bayreuth, Germany; Degree: Dr.*rer.nat*.
١٩٩٣-١٩٩٧:	Postdoc at Max-Planck Institute of Molecular Physiology, Department of Structural Biology, Dortmund, Germany
١٩٩٨-١٩٩٩:	Dr. Mildred Scheel Postdoctoral Fellow at Netherlands Cancer Institute, Section Cell Biology, Amsterdam, Netherlands
٢٠٠٠-٢٠٠٦:	Head of the research group of Structural Biochemistry at Max-Planck Institute of Molecular Physiology, Dortmund, Germany
٢٠٠٣:	Habilitation and Venia legendi in Biochemistry at the Chemical Faculty of the Ruhr University, Bochum
٢٠٠٧:	Group leader, Institute of Biochemistry and Molecular Biology II, Heinrich-Heine University, Düsseldorf, Germany
٢٠٠٨-٢٠١٠:	Deputy Director, Institute of Biochemistry and Molecular Biology II, Heinrich-Heine University, Düsseldorf, Germany
٢٠٠٨:	Venia legendi in Biochemistry at the Mathematics and Natural Science Faculty of the Heinrich-Heine University, Düsseldorf, Germany
٢٠١٥:	Associate Professor, Heinrich-Heine University of Düsseldorf, Germany

Accademic Distinctions

١٩٩٣-١٩٩٥:	Max-Planck research scholarship
١٩٩٧:	Wyeth-Lederle Price for Biomedicine
١٩٩٨-١٩٩٩:	Dr. Mildred Scheel scholarship
٢٠٠٢-٢٠٠٤:	European Union Marie Curie fellowship
٢٠٠٧-٢٠٠٩:	VW foundation grants
٢٠٠٩-٢٠١١:	Federal Ministry of Education and Research grants
٢٠١٠-٢٠١٢:	European network on noonan syndrome and related disorders grants
٢٠١١-٢٠١٥:	Collaborative Research Centre 974 grants
٢٠١٦-٢٠١٨:	Federal Ministry of Education and Research grants
٢٠١٦-٢٠١٨:	European network on noonan syndrome and related disorders grants 2016-
٢٠١٩:	Collaborative Research Centre 974 grants

Publications (121 items)

Ahmadian, M., and D.E. Bergstrom. 1998. A simple and regioselective synthesis of 13C-methyl-labeled thymidine. *Nucleosides & nucleotides*. 17:1183-1190.

Ahmadian, M., D.A. Klewer, and D.E. Bergstrom. 2001. Palladium-mediated C5 substitution of pyrimidine nucleosides. *Current protocols in nucleic acid chemistry*. Chapter 1:Unit 1.1.

Ahmadian, M., P. Zhang, and D.E. Bergstrom. 1998. A comparative study of the thermal stability of oligodeoxyribonucleotides containing 5-substituted 2'-deoxyuridines. *Nucleic acids research*. 26:3127-3135.

Ahmadian, M.R. 2002. Prospects for anti-ras drugs. *British journal of haematology*. 116:511-518.

Ahmadian, M.R., U. Hoffmann, R.S. Goody, and A. Wittinghofer. 1997a. Individual rate constants for the interaction of Ras proteins with GTPase-activating proteins determined by fluorescence spectroscopy. *Biochemistry*. 36:4535-4541.

Ahmadian, M.R., C. Kiel, P. Stege, and K. Scheffzek. 2003. Structural fingerprints of the Ras-GTPase activating proteins neurofibromin and p120GAP. *Journal of molecular biology*. 329:699-710.

Ahmadian, M.R., R. Kreutzer, B. Blechschmidt, and M. Sprinzl. 1995. Site-directed mutagenesis of Thermus thermophilus EF-Tu: the substitution of threonine-62 by serine or alanine. *FEBS letters*. 377:253-257.

Ahmadian, M.R., R. Kreutzer, and M. Sprinzl. 1991. Overproduction of the Thermus thermophilus elongation factor Tu in Escherichia coli. *Biochimie*. 73:1037-1043.

Ahmadian, M.R., R. Mittal, A. Hall, and A. Wittinghofer. 1997b. Aluminum fluoride associates with the small guanine nucleotide binding proteins. *FEBS letters*. 408:315-318.

Ahmadian, M.R., P. Stege, K. Scheffzek, and A. Wittinghofer. 1997c. Confirmation of the arginine-finger hypothesis for the GAP-stimulated GTP-hydrolysis reaction of Ras. *Nature structural biology*. 4:686-689.

Ahmadian, M.R., L. Wiesmuller, A. Lautwein, F.R. Bischoff, and A. Wittinghofer. 1996. Structural differences in the minimal catalytic domains of the GTPase-activating proteins p120GAP and neurofibromin. *The Journal of biological chemistry*. 271:16409-16415.

Ahmadian, M.R., A. Wittinghofer, and C. Herrmann. 2002a. Fluorescence methods in the study of small GTP-binding proteins. *Methods in molecular biology (Clifton, N.J.)*. 189:45-63.

Ahmadian, M.R., A. Wittinghofer, and G. Schmidt. 2002b. The actin filament architecture: tightly regulated by the cells, manipulated by pathogens. International Titisee Conference on the actin cytoskeleton: from signalling to bacterial pathogenesis. *EMBO reports*. 3:214-218.

Ahmadian, M.R., T. Zor, D. Vogt, W. Kabsch, Z. Selinger, A. Wittinghofer, and K. Scheffzek. 1999. Guanosine triphosphatase stimulation of oncogenic Ras mutants. *Proceedings of the National Academy of Sciences of the United States of America*. 96:7065-7070.

Allin, C., M.R. Ahmadian, A. Wittinghofer, and K. Gerwert. 2001. Monitoring the GAP catalyzed H-Ras GTPase reaction at atomic resolution in real time. *Proceedings of the National Academy of Sciences of the United States of America*. 98:7754-7759.

Altmuller, F., C. Lissewski, D. Bertola, E. Flex, Z. Stark, S. Spranger, G. Baynam, M. Buscarilli, S. Dyack, J. Gillis, H.G. Yntema, F. Pantaleoni, R.L. van Loon, S. MacKay, K. Mina, I. Schanze, T.Y. Tan, M. Walsh, S.M. White, M.R. Niewisch, S. Garcia-Minaur, D. Plaza, M.R. Ahmadian, H. Cave, M. Tartaglia, and M. Zenker. 2017a. Genotype and phenotype spectrum of NRAS germline variants. *European journal of human genetics : EJHG*. 25:823-831.

Altmuller, F., S. Pothula, A. Annamneedi, S. Nakhaei-Rad, C. Montenegro-Venegas, E. Pina-Fernandez, C. Marini, M. Santos, D. Schanze, D. Montag, M.R. Ahmadian, O. Stork, M. Zenker, and A. Fejtova. 2017b. Aberrant neuronal activity-induced signaling and gene expression in a mouse model of RASopathy. *PLoS genetics*. 13:e1006684.

Altmuller, F., S. Pothula, A. Annamneedi, S. Nakhaei-Rad, C. Montenegro-Venegas, E. Pina-Fernandez, C. Marini, M. Santos, D. Schanze, D. Montag, M.R. Ahmadian, O. Stork, M. Zenker, and A. Fejtova. 2017c. Correction: Aberrant neuronal activity-induced signaling and gene expression in a mouse model of RASopathy. *PLoS genetics*. 13:e1006843.

Amin, E., B.N. Dubey, S.C. Zhang, L. Gremer, R. Dvorsky, J.M. Moll, M.S. Taha, L. Nagel-Steger, R.P. Piekorz, A.V. Somlyo, and M.R. Ahmadian. 2013. Rho-kinase: regulation, (dys)function, and inhibition. *Biological chemistry*. 394:1399-1410.

Amin, E., M. Jaiswal, U. Derewenda, K. Reis, K. Nouri, K.T. Koessmeier, P. Aspenstrom, A.V. Somlyo, R. Dvorsky, and M.R. Ahmadian. 2016. Deciphering the Molecular and Functional Basis of RHOGAP Family Proteins: A SYSTEMATIC APPROACH TOWARD SELECTIVE INACTIVATION OF RHO FAMILY PROTEINS. *The Journal of biological chemistry*. 291:20353-20371.

Badeli, H.R., S.A. Sajedi, A. Tangestaninejad, M.R. Ahmadian, and K. Alipour Kanafi. 2007. Multicystic dysplastic kidney in association with congenital ichthyosiform erythroderma. *Iranian journal of kidney diseases*. 1:102-104.

Baran, P., S. Hansen, G.H. Waetzig, M. Akbarzadeh, L. Lamertz, H.J. Huber, M.R. Ahmadian, J.M. Moll, and J. Scheller. 2018. The balance of interleukin (IL)-6, IL-6.soluble IL-6 receptor (sIL-6R), and IL-6.sIL-6R.sgp130 complexes allows simultaneous classic and trans-signaling. The Journal of *biological chemistry*. 293:6762-6775.

Becker, M.S., P.M. Muller, J. Bajorat, A. Schroeder, M. Giaisi, E. Amin, M.R. Ahmadian, O. Rocks, R. Kohler, P.H. Krammer, and M. Li-Weber. 2016. The anticancer phytochemical rocaglamide inhibits Rho GTPase activity and cancer cell migration. *Oncotarget*. 7:51908-51921.

Blazevits, O., Y.G. Mideksa, M. Solman, A. Ligabue, N. Ariotti, H. Nakhaeizadeh, E.K. Fansa, A.C. Papageorgiou, A. Wittinghofer, M.R. Ahmadian, and D. Abankwa. 2016. Galectin-1 dimers can scaffold Raf-effectors to increase H-ras nanoclustering. *Scientific reports*. 6:24165.

Blochl, A., L. Blumenstein, and M.R. Ahmadian. 2004. Inactivation and activation of Ras by the neurotrophin receptor p75. *The European journal of neuroscience*. 20:2321-2335.

Blumenstein, L., and M.R. Ahmadian. 2004. Models of the cooperative mechanism for Rho effector recognition: implications for RhoA-mediated effector activation. *The Journal of biological chemistry*. 279:53419-53426.

Boppudi, S., N. Bogershausen, H.B. Hove, E.F. Percin, D. Aslan, R. Dvorsky, G. Kayhan, Y. Li, C. Cursiefen, I. Tantcheva-Poor, P.B. Toft, O. Bartsch, C. Lissewski, I. Wieland, S. Jakubiczka, B. Wollnik, M.R. Ahmadian, L.M. Heindl, and M. Zenker. 2016. Specific mosaic KRAS mutations affecting codon 146 cause oculoectodermal syndrome and encephalocraniocutaneous lipomatosis. Clinical *genetics*. 90:334-342.

Brinkmann, T., O. Daumke, U. Herbrand, D. Kuhlmann, P. Stege, M.R. Ahmadian, and A. Wittinghofer. 2002. Rap-specific GTPase activating protein follows an alternative mechanism. The Journal of *biological chemistry*. 277:12525-12531.

Capri, Y., E. Flex, O.H.F. Krumbach, G. Carpentieri, S. Cecchetti, C. Lissewski, S. Rezaei Adariani, D. Schanze, J. Brinkmann, J. Piard, F. Pantaleoni, F.R. Lepri, E.S. Goh, K. Chong, E. Stieglitz, J. Meyer, A. Kuechler, N.C. Bramswig, S. Sacharow, M. Strullu, Y. Vial, C. Vignal, G. Kensah, G. Cuturilo, N.S. Kazemein Jasemi, R. Dvorsky, K.G. Monaghan, L.M. Vincent, H. Cave, A. Verloes, M.R. Ahmadian, M. Tartaglia, and M. Zenker. 2019. Activating Mutations of RRAS2 Are a Rare Cause of Noonan Syndrome. *American journal of human genetics*. 104:1223-1232.

Caye, A., M. Strullu, F. Guidez, B. Cassinat, S. Gazal, O. Fenneteau, E. Lainey, K. Nouri, S. Nakhaei-Rad, R. Dvorsky, J. Lachenaud, S. Pereira, J. Vivent, E. Verger, D. Vidaud, C. Galambrun, C. Picard, A. Petit, A. Contet, M. Poiree, N. Sirvent, F. Mechinaud, D. Adjaoud, C. Paillard, B. Nelken, Y. Reguerre, Y. Bertrand, D. Haussinger, J.H. Dalle, M.R. Ahmadian, A. Baruchel, C. Chomienne, and H. Cave. 2015. Juvenile myelomonocytic leukemia displays mutations in components of the RAS pathway and the PRC2 network. *Nature genetics*. 47:1334-1340.

Cirstea, I.C., L. Gremer, R. Dvorsky, S.C. Zhang, R.P. Piekorz, M. Zenker, and M.R. Ahmadian. 2013. Diverging gain-of-function mechanisms of two novel KRAS mutations associated with Noonan and cardio-facio-cutaneous syndromes. *Human molecular genetics*. 22:262-270.

Cirstea, I.C., K. Kutsche, R. Dvorsky, L. Gremer, C. Carta, D. Horn, A.E. Roberts, F. Lepri, T. Merbitz-Zahradnik, R. Konig, C.P. Kratz, F. Pantaleoni, M.L. Dentici, V.A. Joshi, R.S. Kucherlapati, L. Mazzanti, S. Mundlos, M.A. Patton, M.C. Silengo, C. Rossi, G. Zampino, C. Digilio, L. Stuppia, E. Seemanova, L.A. Pennacchio, B.D. Gelb, B. Dallapiccola, A. Wittinghofer, M.R. Ahmadian, M. Tartaglia, and M. Zenker. 2010. A restricted spectrum of NRAS mutations causes Noonan syndrome. *Nature genetics*. 42:27-29.

Demunter, A., M.R. Ahmadian, L. Libbrecht, M. Stas, M. Baens, K. Scheffzek, H. Degreef, C. De Wolf-Peeters, and J.J. van Den Oord. 2001. A novel N-ras mutation in malignant melanoma is associated with excellent prognosis. *Cancer research*. 61:4916-4922.

Dutting, S., J. Heidenreich, D. Cherpokova, E. Amin, S.C. Zhang, M.R. Ahmadian, C. Brakebusch, and B. Nieswandt. 2015. Critical off-target effects of the widely used Rac1 inhibitors NSC23766 and EHT1864 in mouse platelets. *Journal of thrombosis and haemostasis : JTH*. 13:827-838.

Dvorsky, R., and M.R. Ahmadian. 2004. Always look on the bright site of Rho: structural implications for a conserved intermolecular interface. *EMBO reports*. 5:1130-1136.

Dvorsky, R., L. Blumenstein, I.R. Vetter, and M.R. Ahmadian. 2004. Structural insights into the interaction of ROCKI with the switch regions of RhoA. *The Journal of biological chemistry*. 279:7098-7104.

Eberth, A., and M.R. Ahmadian. 2009. In vitro GEF and GAP assays. *Current protocols in cell biology*. Chapter 14:Unit 14.19.

Eberth, A., R. Dvorsky, C.F. Becker, A. Beste, R.S. Goody, and M.R. Ahmadian. 2005. Monitoring the real-time kinetics of the hydrolysis reaction of guanine nucleotide-binding proteins. *Biological chemistry*. 386:1105-1114.

Eberth, A., R. Lundmark, L. Gremer, R. Dvorsky, K.T. Koessmeier, H.T. McMahon, and M.R. Ahmadian. 2009. A BAR domain-mediated autoinhibitory mechanism for RhoGAPs of the GRAF family. The *Biochemical journal*. 417:371-377.

Fansa, E.K., R. Dvorsky, S.C. Zhang, D. Fiegen, and M.R. Ahmadian. 2013. Interaction characteristics of Plexin-B1 with Rho family proteins. *Biochemical and biophysical research communications*. 434:785-790.

Fauchereau, F., U. Herbrand, P. Chafey, A. Eberth, A. Koulakoff, M.C. Vinet, M.R. Ahmadian, J. Chelly, and P. Billuart. 2003. The RhoGAP activity of OPHN1, a new F-actin-binding protein, is negatively controlled by its amino-terminal domain. *Molecular and cellular neurosciences*. 23:574-586.

Fazel Modares, N., R. Polz, F. Haghighi, L. Lamertz, K. Behnke, Y. Zhuang, C. Kordes, D. Haussinger, U.R. Sorg, K. Pfeffer, D.M. Floss, J.M. Moll, R.P. Piekorz, M.R. Ahmadian, P.A. Lang, and J. Scheller. 2019. IL-6 Trans-signaling Controls Liver Regeneration After Partial Hepatectomy. Hepatology *(Baltimore, Md.)*. 70:2075-2091.

Fiegen, D., L. Blumenstein, P. Stege, I.R. Vetter, and M.R. Ahmadian. 2002. Crystal structure of Rnd3/RhoE: functional implications. *FEBS letters*. 525:100-104.

Fiegen, D., L.C. Haeusler, L. Blumenstein, U. Herbrand, R. Dvorsky, I.R. Vetter, and M.R. Ahmadian. 2004. Alternative splicing of Rac1 generates Rac1b, a self-activating GTPase. *The Journal of biological chemistry*. 279:4743-4749.

Flex, E., M. Jaiswal, F. Pantaleoni, S. Martinelli, M. Strullu, E.K. Fansa, A. Caye, A. De Luca, F. Lepri, R. Dvorsky, L. Pannone, S. Paolacci, S.C. Zhang, V. Fodale, G. Bocchinfuso, C. Rossi, E.M. Burkitt-Wright, A. Farrotti, E. Stellacci, S. Cecchetti, R. Ferese, L. Bottero, S. Castro, O. Fenneteau, B. Brethon, M. Sanchez, A.E. Roberts, H.G. Yntema, I. Van Der Burgt, P. Cianci, M.L. Bondeson, M. Cristina Digilio, G. Zampino, B. Kerr, Y. Aoki, M.L. Loh, A. Palleschi, E. Di Schiavi, A. Care, A. Selicorni, B. Dallapiccola, I.C. Cirstea, L. Stella, M. Zenker, B.D. Gelb, H. Cave, M.R. Ahmadian, and M. Tartaglia. 2014. Activating mutations in RRAS underlie a phenotype within the RASopathy spectrum and contribute to leukaemogenesis. *Human molecular genetics*. 23:4315-4327.

Frasa, M.A., K.T. Koessmeier, M.R. Ahmadian, and V.M. Braga. 2012. Illuminating the functional and structural repertoire of human TBC/RABGAPs. *Nature reviews. Molecular cell biology*. 13:67-73.

Frasa, M.A., F.C. Maximiano, K. Smolarczyk, R.E. Francis, M.E. Betson, E. Lozano, J. Goldenring, M.C. Seabra, A. Rak, M.R. Ahmadian, and V.M. Braga. 2010. Armus is a Rac1 effector that inactivates Rab7 and regulates E-cadherin degradation. *Current biology : CB*. 20:198-208.

Gail, R., B. Costisella, M.R. Ahmadian, and A. Wittinghofer. 2001. Ras-mediated cleavage of a GTP analogue by a novel mechanism. *Chembiochem : a European journal of chemical biology*. 2:570-575.

Gasper, R., C. Thomas, M.R. Ahmadian, and A. Wittinghofer. 2008. The role of the conserved switch II glutamate in guanine nucleotide exchange factor-mediated nucleotide exchange of GTP-binding proteins. *Journal of molecular biology*. 379:51-63.

Gotthardt, K., and M.R. Ahmadian. 2007. Asef is a Cdc42-specific guanine nucleotide exchange factor. *Biological chemistry*. 388:67-71.

Gremer, L., A. De Luca, T. Merbitz-Zahradnik, B. Dallapiccola, S. Morlot, M. Tartaglia, K. Kutsche, M.R. Ahmadian, and G. Rosenberger. 2010. Duplication of Glu37 in the switch I region of HRAS impairs effector/GAP binding and underlies Costello syndrome by promoting enhanced growth factor-dependent MAPK and AKT activation. *Human molecular genetics*. 19:790-802.

Gremer, L., B. Gilsbach, M.R. Ahmadian, and A. Wittinghofer. 2008. Fluoride complexes of oncogenic Ras mutants to study the Ras-RasGap interaction. *Biological chemistry*. 389:1163-1171.

Gremer, L., T. Merbitz-Zahradnik, R. Dvorsky, I.C. Cirstea, C.P. Kratz, M. Zenker, A. Wittinghofer, and M.R. Ahmadian. 2011. Germline KRAS mutations cause aberrant biochemical and physical properties leading to developmental disorders. *Human mutation*. 32:33-43.

Guo, Z., M.R. Ahmadian, and R.S. Goody. 2005. Guanine nucleotide exchange factors operate by a simple allosteric competitive mechanism. *Biochemistry*. 44:15423-15429.

Haeusler, L.C., L. Blumenstein, P. Stege, R. Dvorsky, and M.R. Ahmadian. 2003. Comparative functional analysis of the Rac GTPases. *FEBS letters*. 555:556-560.

Haeusler, L.C., L. Hemsath, D. Fiegen, L. Blumenstein, U. Herbrand, P. Stege, R. Dvorsky, and M.R. Ahmadian. 2006. Purification and biochemical properties of Rac1, 2, 3 and the splice variant Rac1b. *Methods in enzymology*. 406:1-11.

Haghighi, F., J. Dahlmann, S. Nakhaei-Rad, A. Lang, I. Kutschka, M. Zenker, G. Kensah, R.P. Piekorz, and M.R. Ahmadian. 2018. bFGF-mediated pluripotency maintenance in human induced pluripotent

stem cells is associated with NRAS-MAPK signaling. *Cell communication and signaling : CCS*. 16:96.

Hain, A., M. Kramer, R.M. Linka, S. Nakhaei-Rad, M.R. Ahmadian, D. Haussinger, A. Borkhardt, and C. Munk. 2018. IL-2 Inducible Kinase ITK is Critical for HIV-1 Infection of Jurkat T-cells. *Scientific reports*. 8:3217.

Hemsath, L., and M.R. Ahmadian. 2005. Fluorescence approaches for monitoring interactions of Rho GTPases with nucleotides, regulators, and effectors. *Methods (San Diego, Calif.)*. 37:173-182.

Hemsath, L., R. Dvorsky, D. Fiegen, M.F. Carlier, and M.R. Ahmadian. 2005. An electrostatic steering mechanism of Cdc42 recognition by Wiskott-Aldrich syndrome proteins. *Molecular cell*. 20:313-324.

Herbrand, U., and M.R. Ahmadian. 2006. p190-RhoGAP as an integral component of the Tiam1/Rac1-induced downregulation of Rho. *Biological chemistry*. 387:311-317.

Herrmann, C., M.R. Ahmadian, F. Hofmann, and I. Just. 1998. Functional consequences of monoglucosylation of Ha-Ras at effector domain amino acid threonine 35. *The Journal of biological chemistry*. 273:16134-16139.

Jaiswal, M., B.N. Dubey, K.T. Koessmeier, L. Gremer, and M.R. Ahmadian. 2012. Biochemical assays to characterize Rho GTPases. *Methods in molecular biology (Clifton, N.J.)*. 827:37-58.

Jaiswal, M., R. Dvorsky, and M.R. Ahmadian. 2013a. Deciphering the molecular and functional basis of Dbl family proteins: a novel systematic approach toward classification of selective activation of the Rho family proteins. *The Journal of biological chemistry*. 288:4486-4500.

Jaiswal, M., R. Dvorsky, E. Amin, S.L. Risse, E.K. Fansa, S.C. Zhang, M.S. Taha, A.R. Gauhar, S. Nakhaei-Rad, C. Kordes, K.T. Koessmeier, I.C. Cirstea, M.A. Olayioye, D. Haussinger, and M.R. Ahmadian. 2014. Functional cross-talk between ras and rho pathways: a Ras-specific GTPase-activating protein (p120RasGAP) competitively inhibits the RhoGAP activity of deleted in liver cancer (DLC) tumor suppressor by masking the catalytic arginine finger. *The Journal of biological chemistry*. 289:6839-6849.

Jaiswal, M., E.K. Fansa, R. Dvorsky, and M.R. Ahmadian. 2013b. New insight into the molecular switch mechanism of human Rho family proteins: shifting a paradigm. *Biological chemistry*. 394:89-95.

Jaiswal, M., L. Gremer, R. Dvorsky, L.C. Haeusler, I.C. Cirstea, K. Uhlenbrock, and M.R. Ahmadian. 2011. Mechanistic insights into specificity, activity, and regulatory elements of the regulator of G-protein signaling (RGS)-containing Rho-specific guanine nucleotide exchange factors (GEFs) p115, PDZ-RhoGEF (PRG), and leukemia-associated RhoGEF (LARG). *The Journal of biological chemistry*. 286:18202-18212.

Karaguni, I.M., P. Herter, P. Debruyne, S. Chtarbova, A. Kasprzynski, U. Herbrand, M.R. Ahmadian, K.H. Glusenkamp, G. Winde, M. Mareel, T. Moroy, and O. Muller. 2002. The new sulindac derivative IND 12 reverses Ras-induced cell transformation. *Cancer research*. 62:1718-1723.

Kheirandish, P., S.A. Seyedalinaghi, M. Hosseini, M.R. Jahani, H. Shirzad, M. Foroughi, M.R. Ahmadian, H. Jabbari, M. Mohraz, and W. McFarland. 2010. Prevalence and correlates of HIV infection among male injection drug users in detention in Tehran, Iran. *Journal of acquired immune deficiency syndromes (1999)*. 53:273-275.

Klockow, B., M.R. Ahmadian, C. Block, and A. Wittinghofer. 2000. Oncogenic insertional mutations in the P-loop of Ras are overactive in MAP kinase signaling. *Oncogene*. 19:5367-5376.

Klose, A., M.R. Ahmadian, M. Schuelke, K. Scheffzek, S. Hoffmeyer, A. Gewies, F. Schmitz, D. Kaufmann, H. Peters, A. Wittinghofer, and P. Nurnberg. 1998. Selective disactivation of neurofibromin GAP activity in neurofibromatosis type 1. *Human molecular genetics*. 7:1261-1268.

Kraft, M., I.C. Cirstea, A.K. Voss, T. Thomas, I. Goehring, B.N. Sheikh, L. Gordon, H. Scott, G.K. Smyth, M.R. Ahmadian, U. Trautmann, M. Zenker, M. Tartaglia, A. Ekici, A. Reis, H.G. Dorr, A. Rauch, and C.T. Thiel. 2011. Disruption of the histone acetyltransferase MYST4 leads to a Noonan syndrome-like phenotype and hyperactivated MAPK signaling in humans and mice. *The Journal of clinical investigation*. 121:3479-3491.

Kurig, B., A. Shymanets, T. Bohnacker, Prajwal, C. Brock, M.R. Ahmadian, M. Schaefer, A. Gohla, C. Harteneck, M.P. Wymann, E. Jeanclos, and B. Nurnberg. 2009. Ras is an indispensable coregulator of the class IB phosphoinositide 3-kinase p87/p110gamma. *Proceedings of the National Academy of Sciences of the United States of America*. 106:20312-20317.

Lam, M.T., S. Coppola, O.H.F. Krumbach, G. Prencipe, A. Insalaco, C. Cifaldi, I. Brigida, E. Zara, S. Scala, S. Di Cesare, S. Martinelli, M. Di Rocco, A. Pascarella, M. Niceta, F. Pantaleoni, A. Ciolfi, P. Netter, A.F. Carisey, M. Diehl, M. Akbarzadeh, F. Conti, P. Merli, A. Pastore, S. Levi Mortera, S. Camerini,

L. Farina, M. Buchholzer, L. Pannone, T.N. Cao, Z.H. Coban-Akdemir, S.N. Jhangiani, D.M. Muzny, R.A. Gibbs, L. Basso-Ricci, M. Chiriaco, R. Dvorsky, L. Putignani, R. Carsetti, P. Janning, A. Stray-Pedersen, H.C. Erichsen, A. Horne, Y.T. Bryceson, L. Torralba-Raga, K. Ramme, V. Rosti, C. Bracaglia, V. Messia, P. Palma, A. Finocchi, F. Locatelli, I.K. Chinn, J.R. Lupski, E.M. Mace, C. Cancrini, A. Aiuti, M.R. Ahmadian, J.S. Orange, F. De Benedetti, and M. Tartaglia. 2019. A novel disorder involving dyshematopoiesis, inflammation, and HLH due to aberrant CDC42 function. *The Journal of experimental medicine*. 216:2778-2799.

Linka, R.M., S.L. Risse, K. Bienemann, M. Werner, Y. Linka, F. Krux, C. Synaeve, R. Deenen, S. Ginzel, R. Dvorsky, M. Gombert, A. Halenius, R. Hartig, M. Helminen, A. Fischer, P. Stepensky, K. Vettenranta, K. Kohrer, M.R. Ahmadian, H.J. Laws, B. Fleckenstein, H. Jumaa, S. Latour, B. Schraven, and A. Borkhardt. 2012. Loss-of-function mutations within the IL-2 inducible kinase ITK in patients with EBV-associated lymphoproliferative diseases. *Leukemia*. 26:963-971.

Lowry, D.F., M.R. Ahmadian, A.G. Redfield, and M. Sprinzl. 1992. NMR study of the phosphate-binding loops of Thermus thermophilus elongation factor Tu. *Biochemistry*. 31:2977-2982.

Martinelli, S., O.H.F. Krumbach, F. Pantaleoni, S. Coppola, E. Amin, L. Pannone, K. Nouri, L. Farina, R. Dvorsky, F. Lepri, M. Buchholzer, R. Konopatzki, L. Walsh, K. Payne, M.E. Pierpont, S.S. Vergano, K.G. Langley, D. Larsen, K.D. Farwell, S. Tang, C. Mroske, I. Gallotta, E. Di Schiavi, M. Della Monica, L. Lugli, C. Rossi, M. Seri, G. Cocchi, L. Henderson, B. Baskin, M. Alders, R. Mendoza-Londono, L. Dupuis, D.A. Nickerson, J.X. Chong, N. Meeks, K. Brown, T. Causey, M.T. Cho, S. Demuth, M.C. Digilio, B.D. Gelb, M.J. Bamshad, M. Zenker, M.R. Ahmadian, R.C. Hennekam, M. Tartaglia, and G.M. Mirzaa. 2018. Functional Dysregulation of CDC42 Causes Diverse Developmental Phenotypes. *American journal of human genetics*. 102:309-320.

Mayer, S., R. Kumar, M. Jaiswal, T. Soykan, M.R. Ahmadian, N. Brose, H. Betz, J.S. Rhee, and T. Papadopoulos. 2013. Collybistin activation by GTP-TC10 enhances postsynaptic gephyrin clustering and hippocampal GABAergic neurotransmission. *Proceedings of the National Academy of Sciences of the United States of America*. 110:20795-20800.

Mittal, R., M.R. Ahmadian, R.S. Goody, and A. Wittinghofer. 1996. Formation of a transition-state analog of the Ras GTPase reaction by Ras-GDP, tetrafluoroaluminate, and GTPase-activating proteins. *Science (New York, N.Y.)*. 273:115-117.

Motta, M., L. Sagi-Dain, O.H.F. Krumbach, A. Hahn, A. Peleg, A. German, C. Lissewski, S. Coppola, F. Pantaleoni, L. Kocherscheid, F. Altmuller, D. Schanze, T. Logeswaran, S. Chahrokh-Zadeh, A. Munzig, S. Nakhaei-Rad, H. Cave, M.R. Ahmadian, M. Tartaglia, and M. Zenker. 2019. Activating MRAS mutations cause Noonan syndrome associated with hypertrophic cardiomyopathy. *Human molecular genetics*.

Nakhaei-Rad, S., F. Haghighi, P. Nouri, S. Rezaei Adariani, J. Lissy, N.S. Kazemein Jasemi, R. Dvorsky, and M.R. Ahmadian. 2018. Structural fingerprints, interactions, and signaling networks of RAS family proteins beyond RAS isoforms. *Critical reviews in biochemistry and molecular biology*. 53:130-156.

Nakhaei-Rad, S., H. Nakhaeizadeh, S. Gotze, C. Kordes, I. Sawitza, M.J. Hoffmann, M. Franke, W.A. Schulz, J. Scheller, R.P. Piekorz, D. Haussinger, and M.R. Ahmadian. 2016. The Role of Embryonic Stem Cell-expressed RAS (ERAS) in the Maintenance of Quiescent Hepatic Stellate Cells. *The Journal of biological chemistry*. 291:8399-8413.

Nakhaei-Rad, S., H. Nakhaeizadeh, C. Kordes, I.C. Cirstea, M. Schmick, R. Dvorsky, P.I. Bastiaens, D. Haussinger, and M.R. Ahmadian. 2015. The Function of Embryonic Stem Cell-expressed RAS (E-RAS), a Unique RAS Family Member, Correlates with Its Additional Motifs and Its Structural Properties. *The Journal of biological chemistry*. 290:15892-15903.

Nakhaeizadeh, H., E. Amin, S. Nakhaei-Rad, R. Dvorsky, and M.R. Ahmadian. 2016. The RAS-Effector Interface: Isoform-Specific Differences in the Effector Binding Regions. *PloS one*. 11:e0167145.

Nock, S., N. Grillenbeck, M.R. Ahmadian, S. Ribeiro, R. Kreutzer, and M. Sprinzl. 1995. Properties of isolated domains of the elongation factor Tu from Thermus thermophilus HB8. *European journal of biochemistry*. 234:132-139.

Nouri, K., E.K. Fansa, E. Amin, R. Dvorsky, L. Gremer, D. Willbold, L. Schmitt, D.J. Timson, and M.R. Ahmadian. 2016. IQGAP1 Interaction with RHO Family Proteins Revisited: KINETIC AND EQUILIBRIUM EVIDENCE FOR MULTIPLE DISTINCT BINDING SITES. *The Journal of biological chemistry*. 291:26364-26376.

Nouri, K., J.M. Moll, L.G. Milroy, A. Hain, R. Dvorsky, E. Amin, M. Lenders, L. Nagel-Steger, S. Howe, S.H. Smits, H. Hengel, L. Schmitt, C. Munk, L. Brunsveld, and M.R. Ahmadian. 2015. Biophysical

Characterization of Nucleophosmin Interactions with Human Immunodeficiency Virus Rev and Herpes Simplex Virus US11. *PloS one*. 10:e0143634.

Nouri, K., D.J. Timson, and M.R. Ahmadian. 2017. New model for the interaction of IQGAP1 with CDC42 and RAC1. *Small GTPases*:1-7.

Oliveira, M.J., J. Van Damme, T. Lauwaet, V. De Corte, G. De Bruyne, G. Verschraegen, M. Vaneechoutte, M. Goethals, M.R. Ahmadian, O. Muller, J. Vandekerckhove, M. Mareel, and A. Leroy. 2003. Beta-casein-derived peptides, produced by bacteria, stimulate cancer cell invasion and motility. *The EMBO journal*. 22:6161-6173.

Olsen, H., F. ter Veld, U. Herbrand, M.R. Ahmadian, R.K. Kinne, and F. Wehner. 2007. Differential regulation of cell volume and shape in confluent rat hepatocytes under hypertonic stress. *Cellular physiology and biochemistry : international journal of experimental cellular physiology, biochemistry, and pharmacology*. 19:259-268.

Pantaleoni, F., D. Lev, I.C. Cirstea, M. Motta, F.R. Lepri, L. Bottero, S. Cecchetti, I. Linger, S. Paolacci, E. Flex, A. Novelli, A. Care, M.R. Ahmadian, E. Stellacci, and M. Tartaglia. 2017. Aberrant HRAS transcript processing underlies a distinctive phenotype within the RASopathy clinical spectrum. *Human mutation*. 38:798-804.

Pena, V., M. Hothorn, A. Eberth, N. Kaschau, A. Parret, L. Gremer, F. Bonneau, M.R. Ahmadian, and K. Scheffzek. 2008. The C2 domain of SynGAP is essential for stimulation of the Rap GTPase reaction. *EMBO reports*. 9:350-355.

Reid, T., A. Bathoorn, M.R. Ahmadian, and J.G. Collard. 1999. Identification and characterization of hPEM-2, a guanine nucleotide exchange factor specific for Cdc42. *The Journal of biological chemistry*. 274:33587-33593.

Rezaei Adariani, S., M. Buchholzer, M. Akbarzadeh, S. Nakhaei-Rad, R. Dvorsky, and M.R. Ahmadian. 2018. Structural snapshots of RAF kinase interactions. Biochemical Society transactions. 46:1393-1406.

Risse, S.L., B. Vaz, M.F. Burton, P. Aspenstrom, R.P. Piekorz, L. Brunsveld, and M.R. Ahmadian. 2013. SH3-mediated targeting of Wrch1/RhoU by multiple adaptor proteins. *Biological chemistry*. 394:421-432.

Roglin, L., M.R. Ahmadian, and O. Seitz. 2007. DNA-controlled reversible switching of peptide conformation and bioactivity. *Angewandte Chemie (International ed. in English)*. 46:2704-2707.

Rose, R., M. Weyand, M. Lammers, T. Ishizaki, M.R. Ahmadian, and A. Wittinghofer. 2005. Structural and mechanistic insights into the interaction between Rho and mammalian Dia. *Nature*. 435:513-518.

Saliani, M., R. Jalal, and M.R. Ahmadian. 2019. From basic researches to new achievements in therapeutic strategies of KRAS-driven cancers. *Cancer biology & medicine*. 16:435-461.

Scheffzek, K., and M.R. Ahmadian. 2005. GTPase activating proteins: structural and functional insights 18 years after discovery. Cellular and molecular life sciences : CMLS. 62:3014-3038.

Scheffzek, K., M.R. Ahmadian, W. Kabsch, L. Wiesmuller, A. Lautwein, F. Schmitz, and A. Wittinghofer. 1997. The Ras-RasGAP complex: structural basis for GTPase activation and its loss in oncogenic Ras mutants. *Science (New York, N.Y.)*. 277:333-338.

Scheffzek, K., M.R. Ahmadian, L. Wiesmuller, W. Kabsch, P. Stege, F. Schmitz, and A. Wittinghofer. 1998a. Structural analysis of the GAP-related domain from neurofibromin and its implications. *The EMBO journal*. 17:4313-4327.

S

c

Scheffzek, K., A. Lautwein, W. Kabsch, M.R. Ahmadian, and A. Wittinghofer. 1996. Crystal structure of the GTPase-activating domain of human p120GAP and implications for the interaction with Ras. *Nature*. 384:591-596.

Schmidt, S., F. Essmann, I.C. Cirstea, F. Kuck, H.C. Thakur, M. Singh, A. Kletke, R.U. Janicke, C. Wiek, H. Hanenberg, M.R. Ahmadian, K. Schulze-Osthoff, B. Nurnberg, and R.P. Piekorz. 2010a. The centrosome and mitotic spindle apparatus in cancer and senescence. *Cell cycle (Georgetown, Tex.)*. 9:4469-4473.

Schmidt, S., L. Schneider, F. Essmann, I.C. Cirstea, F. Kuck, A. Kletke, R.U. Janicke, C. Wiek, H. Hanenberg, M.R. Ahmadian, K. Schulze-Osthoff, B. Nurnberg, and R.P. Piekorz. 2010b. The centrosomal protein TACC3 controls paclitaxel sensitivity by modulating a premature senescence program. *Oncogene*. 29:6184-6192.

,

M

Scholz, R.P., J.O. Gustafsson, P. Hoffmann, M. Jaiswal, M.R. Ahmadian, S.A. Eisler, P. Erlmann, S. Schmid, A. Hausser, and M.A. Olayioye. 2011. The tumor suppressor protein DLC1 is regulated by PKD-mediated GAP domain phosphorylation. *Experimental cell research*. 317:496-503.

Shymanets, A., M.R. Ahmadian, K.T. Kossmeier, R. Wetzker, C. Harteneck, and B. Nurnberg. 2012. The p101 subunit of PI3Kgamma restores activation by Gbeta mutants deficient in stimulating p110gamma. *The Biochemical journal*. 441:851-858.

Shymanets, A., M.R. Ahmadian, and B. Nurnberg. 2009. Gbetagamma-copurified lipid kinase impurity from Sf9 cells. *Protein and peptide letters*. 16:1053-1056.

Stark, Z., G. Gillessen-Kaesbach, M.M. Ryan, I.C. Cirstea, L. Gremer, M.R. Ahmadian, R. Savarirayan, and M. Zenker. 2012. Two novel germline KRAS mutations: expanding the molecular and clinical phenotype. *Clinical genetics*. 81:590-594.

Taha, M.S., K. Nouri, L.G. Milroy, J.M. Moll, C. Herrmann, L. Brunsveld, R.P. Piekorz, and M.R. Ahmadian. 2014. Subcellular fractionation and localization studies reveal a direct interaction of the fragile X mental retardation protein (FMRP) with nucleolin. *PloS one*. 9:e91465.

Thakur, H.C., M. Singh, L. Nagel-Steger, J. Kremer, D. Prumbaum, E.K. Fansa, H. Ezzahoini, K. Nouri, L. Gremer, A. Abts, L. Schmitt, S. Raunser, M.R. Ahmadian, and R.P. Piekorz. 2014. The centrosomal adaptor TACC3 and the microtubule polymerase chTOG interact via defined C-terminal subdomains in an Aurora-A kinase-independent manner. *The Journal of biological chemistry*. 289:74-88.

Thakur, H.C., M. Singh, L. Nagel-Steger, D. Prumbaum, E.K. Fansa, L. Gremer, H. Ezzahoini, A. Abts, L. Schmitt, S. Raunser, M.R. Ahmadian, and R.P. Piekorz. 2013. Role of centrosomal adaptor proteins of the TACC family in the regulation of microtubule dynamics during mitotic cell division. *Biological chemistry*. 394:1411-1423.

Tiede, I., G. Fritz, S. Strand, D. Poppe, R. Dvorsky, D. Strand, H.A. Lehr, S. Wirtz, C. Becker, R. Atreya, J. Mudter, K. Hildner, B. Bartsch, M. Holtmann, R. Blumberg, H. Walczak, H. Iven, P.R. Galle, M.R. Ahmadian, and M.F. Neurath. 2003. CD28-dependent Rac1 activation is the molecular target of azathioprine in primary human CD4+ T lymphocytes. *The Journal of clinical investigation*. 111:1133-1145.

Uhlenbrock, K., A. Eberth, U. Herbrand, N. Daryab, P. Stege, F. Meier, P. Friedl, J.G. Collard, and M.R. Ahmadian. 2004. The RacGEF Tiam1 inhibits migration and invasion of metastatic melanoma via a novel adhesive mechanism. *Journal of cell science*. 117:4863-4871.

van der Burgt, I., W. Kupsky, S. Stassou, A. Nadroo, C. Barroso, A. Diem, C.P. Kratz, R. Dvorsky, M.R. Ahmadian, and M. Zenker. 2007. Myopathy caused by HRAS germline mutations: implications for disturbed myogenic differentiation in the presence of constitutive HRas activation. *Journal of medical genetics*. 44:459-462.

van Horck, F.P., M.R. Ahmadian, L.C. Haeusler, W.H. Moolenaar, and O. Kranenburg. 2001. Characterization of p190RhoGEF, a RhoA-specific guanine nucleotide exchange factor that interacts with microtubules. *The Journal of biological chemistry*. 276:4948-4956.

Wittinghofer, A., K. Scheffzek, and M.R. Ahmadian. 1997. The interaction of Ras with GTPase-activating proteins. *FEBS letters*. 410:63-67.

Wurtele, M., E. Wolf, K.J. Pederson, G. Buchwald, M.R. Ahmadian, J.T. Barbieri, and A. Wittinghofer. 2001. How the Pseudomonas aeruginosa ExoS toxin downregulates Rac. Nature structural *biology*. 8:23-26.

Zhang, S.C., L. Gremer, H. Heise, P. Janning, A. Shymanets, I.C. Cirstea, E. Krause, B. Nurnberg, and M.R. Ahmadian. 2014. Liposome reconstitution and modulation of recombinant prenylated human Rac1 by GEFs, GDI1 and Pak1. *PloS one*. 9:e102425.

Zhuang, Y., H.C. Xu, P.V. Shinde, J. Warfsmann, J. Vasilevska, B. Sundaram, K. Behnke, J. Huang, J.I. Hoell, A. Borkhardt, K. Pfeffer, M.S. Taha, D. Herebian, E. Mayatepek, D. Brenner, M.R. Ahmadian, V. Keitel, D. Wieczorek, D. Haussinger, A.A. Pandyra, K.S. Lang, and P.A. Lang. 2020. Fragile X mental retardation protein protects against tumour necrosis factor-mediated cell death and liver injury. *Gut*. 69:133-145.

Ziegler, V., C. Henninger, I. Simiantonakis, M. Buchholzer, M.R. Ahmadian, W. Budach, and G. Fritz. 2017. Rho inhibition by lovastatin affects apoptosis and DSB repair of primary human lung cells in vitro and lung tissue in vivo following fractionated irradiation. *Cell death & disease*. 8:e2978.