CURRICULUM VITAE

Name: T.Y. (Ta-Yuan) Chang

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Date of Birth: April 8, 1945

Education:

B.S. in Chemistry, National Taiwan University, Taiwan, 1967

Ph.D. in Biochemistry (with Mary Ellen Jones), University of North Carolina, Chapel Hill, North Carolina, 1968-1973

Postdoctoral Fellow (with Roy Vagelos), Dept of Biological Chemistry, Washington University School of Medicine, St. Louis, Missouri, 1973-1975

Postdoctoral Fellow (with Roy Vagelos), Merck, Sharp & Dohme Research Laboratories, Rahway, New Jersey, 1975-1976

Professional Experience:

2008-present	Professor, Dept of Biochemistry and Cell Biology, Geisel School of Medicine at Dartmouth
2000-2008	Professor and Chair, Dept of Biochemistry, Dartmouth Medical School
1988-2000	Professor, Dept of Biochemistry, Dartmouth Medical School
1982-1988	Associate Professor, Dept of Biochemistry, Dartmouth Medical School
1976-1982	Assistant Professor, Dept of Biochemistry, Dartmouth Medical School

Membership:

American Society of Biological Chemists and Molecular Biologists, 1981-present

American Society of Cell Biologists, 1999-present

American Association for the Advancement of Science, 2007-present

American Heart Association, 2000-present

Extramural Activities:

Member of Editorial Board, Journal of Lipid Research (2018-present)

Member of Editorial Board, Journal of Biological Chemistry (1995-2000; 2001-2006; 2009-2014)

Member of Editorial Board, Acta Biochimica et Biophysica Sinica (2005-present)

Visiting Professor, Kumamoto University Medical School, Kumamoto, Japan (1995-1997; 1999-2000)

Member, American Heart Association National Review Committee on Lipids and Lipoproteins (1998-2002; Co-Chair, 2001).

Member, NIH Integrative Nutrition & Metabolic Processes Study Section (2005-2009)

Consultantships:

Parke-Davis Pharmaceuticals, Ann-Arbor, MI (1992-1994)

Pierre-Fabre Pharmaceutical Laboratories, Castres, France (1998-2000)

Chugai Pharmaceuticals, Gotemba, Japan (1998-2001)

National Health Research Institutes, Biopharmaceutical Division, Taiwan (2002-2016)

Honors:

NIH Research Career Development Award (1982-1987)

NIH MERIT Award (1994-2004)

Elected AAAS Fellow (2011)

Current Research Support:

1. NIH RO1 AG037609 Chang, TY (PI) Chang, Catherine (co-I)
Cholesterol and Sphingolipid Metabolism in Alzheimer Disease
08/15/2015-04/30/2020
The goal of this project is to mechanistically link cholesterol metabolism with neuropathology in Alzheimer Disease.
2. NIH R21 AG056281 Chang, TY (PI); Hasan, MT (co-I)
08/01/2017-07/31/2019
Rescuing the ApoE4 Genotype by Activating Sterol Biosynthesis in the CNS
The goal of this project is to test the hypothesis that increasing cholesterol synthesis in the CNS can ameliorate ApoE4 mediated malfunctions in the brain.

Highlight of TYC's Scientific Accomplishment:

At Dartmouth, my laboratory isolated and characterized four classes of Chinese hamster ovary (CHO) cell mutants in cellular cholesterol metabolism (1978-1994). Each of these mutants led to a new gene: Two of these mutants were used as cloning vehicles in the Brown and Goldstein laboratory to identify the S*cap* gene (1996) and the S*2p* gene (1997), which mediate the sterol regulatory element binding protein (SREBP) dependent transcriptional control of many genes in lipid metabolism. The third mutant was used in the Pentchev laboratory at NIH to help identify the Niemann-Pick type C1 (N*pc1*) gene (1997), which plays a key role in intracellular cholesterol transport. The single most significant scientific accomplishment of my laboratory is that, in 1993, we used the fourth CHO cell mutant as the cloning vehicle to identify the *Acat1* gene. ACAT1 is a membrane bound enzyme located at the endoplasmic reticulum; it plays a key role in cellular cholesterol homeostasis; however, the molecular identity of ACAT had remained elusive for many years. For identifying the Acat1 gene, I received a MERIT Award from NIH. My laboratory has continued to work on ACAT related research to the present. We purified the recombinant ACAT1 to homogeneity and demonstrated that unlike many other enzymes in lipid metabolism, ACAT1 is not transcriptionally regulated by SREBP, but is regulated through substrate driven allosteric control. We also showed that ACAT1 is a homotetrameric enzyme with nine membrane-spanning domains (1993-2005). More recently, my laboratory demonstrated that ACAT1 is a novel target for neurodegenerative diseases including Alzheimer's disease (2010-present). NIH has supported my research since 1977 without interruption. The identification of the *Acat1* gene also paved the way for molecular studies of other membrane bound acyltransferase (MBOAT) family members, which include enzymes involved in neutral lipid biosynthesis (ACAT2, DGAT1), in membrane phospholipid remodeling (LPLATs), and in acylation of the peptide hormone ghrelin (GOAT), which stimulates appetite in the brain.

Recent Invited Lectures at National/International Meetings (2006-2018)

1. Keystone Symposium on Lipid Rafts (2006)

2. Argentina National Biochemistry Society Meeting (as keynote speaker) (2007)

3. Taiwan National Health Research Institute Distinguished Lecturer Series (2008)

4. International Congress of Biochemistry & Molecular Biology (2009)

5. Gordon Research Conference on Lipoprotein Metabolism (2010)

6. International Symposium on Macrophages, Japan (2010)

7. International Symposium on Lipid Biology (also as session chair), China (2010)

8. Japanese National Biochemical Society Meeting (2011)

9. Cold Spring Harbor Asia Meeting in Metabolism and Obesity (2013)

10. FASEB Meeting in Lipid Droplets (also as session chair) (2014)

11. The 2015 Alzheimer's Disease Congress, London, UK (2015)

12. Drug Discovery and Therapy World Congress (also as session co-chair), Boston (2015)

13. Neurological Disorders Summit (also as organization committee member), San Francisco (2015)

14. Meeting the Challenge of Healthy Aging, EuroSciCon, London (2017)

15. One of two organizers for JLR thematic series on "ApoE and Lipid Homeostasis in Alzheimer's Disease (2017)

16. Neuropharmacology Congress, Los Angeles. (Keynote speaker) (2018)

17. 12th International Conference on Alzheimer's Disease & Dementia, Valencia, Spain. (Keynote speaker) (2018)

Publication List

I. Original Publications in Peer-Reviewed Journals:

1. Chang, T. Y., and M. E. Jones. 1974. Aspartate transcarbamylase from Streptoco.C.us faecalis. Purification, properties, and nature of an allosteric activator site. *Biochemistry* 13: 629-638.
2. Chang, T. Y., and M. E. Jones. 1974. Aspartate transcarbamylase from Streptococcus faecalis. Steady-state kinetic analysis. *Biochemistry* 13: 638-645.
3. Chang, T. Y., and M. E. Jones. 1974. Aspartate transcarbamylase from Streptococcus faecalis. Reverse reaction and binding studies. *Biochemistry* 13: 646-653.
4. Chang, T. Y., and P. R. Vagelos. 1976. Isolation and characterization of an unsaturated fatty acid-requiring mutant of cultured mammalian cells. *Proceedings of the National Academy of Sciences of the United States of America* 73: 24-28.
5. Chang, T. Y., C. Telakowski, W. V. Heuvel, A. W. Alberts, and P. R. Vagelos. 1977. Isolation and partial characterization of a cholesterol-requiring mutant of Chinese hamster ovary cells. *Proceedings of the National Academy of Sciences of the United States of America* 74: 832-836.
6. Nelson, J.A., M.R. Czarny, T.A. Spencer, J.S.,Limanek, K.R. McCrae, , and T.Y. Chang. 1978. A Novel Inhibitor of Steroid Biosynthesis. *J. Am. Chem. Soc.* 100, 4900 (1978)
7. Limanek, J. S., J. Chin, and T. Y. Chang. 1978. Mammalian cell mutant requiring cholesterol and unsaturated fatty acid for growth. *Proceedings of the National Academy of Sciences of the United States of America* 75: 5452-5456.
8. Chang, T. Y., E. S. Schiavoni, Jr., K. R. McCrae, J. A. Nelson, and T. A. Spencer. 1979. Inhibition of cholesterol biosynthesis in Chinese hamster ovary cells by 4,4,10 beta-trimethyl-trans-decal-3 beta-ol. A specific 2,3-oxidosqualene cyclase inhibitor. *The Journal of biological chemistry* 254: 11258-11263.
9. Chang, T. Y., and J. S. Limanek. 1980. Regulation of cytosolic acetoacetyl coenzyme A thiolase, 3-hydroxy-3-methylglutaryl coenzyme A synthase, 3-hydroxy-3-methylglutaryl coenzyme A reductase, and mevalonate kinase by low density lipoprotein and by 25-hydroxycholesterol in Chinese hamster ovary cells. *The Journal of biological chemistry* 255: 7787-7795.
10. Chang, T. Y., J. S. Limanek, and C. C. Y. Chang. 1981. Evidence indicating that inactivation of 3-hydroxy-3-methylglutaryl coenzyme A reductase by low density lipoprotein or by 25-hydroxycholesterol requires mediator protein(s) with rapid turnover rate. *The Journal of biological chemistry* 256: 6174-6180.
11. Chin, J., and T. Y. Chang. 1981. Evidence for coordinate expression of 3-hydroxy-3-methylglutaryl coenzyme A reductase ad low density lipoprotein binding activity. *The Journal of biological chemistry* 256: 6304-6310.
12. Chang, T. Y., J. S. Limanek, and C. C. Y. Chang. 1981. A simple and efficient procedure for the rapid homogenization of cultured animal cells grown in monolayer. *Anal. Biochem.* 116: 298-302.

13. Berry, D. J., and T. Y. Chang. 1982. Further characterization of a Chinese hamster ovary cell mutant defective in lanosterol demethylation. *Biochemistry* 21: 573-580.
14. Doolittle, G. M., and T. Y. Chang. 1982. Solubilization, partial purification, and reconstitution in phosphatidylcholine-cholesterol liposomes of acyl-CoA:cholesterol acyltransferase. *Biochemistry* 21: 674-679.
15. Chin, J., and T. Y. Chang. 1982. Further characterization of a Chinese hamster ovary cell mutant requiring cholesterol and unsaturated fatty acid for growth. *Biochemistry* 21: 3196-3202.
16. Chang, T. Y., and C. C. Y. Chang. 1982. Revertants of Chinese hamster ovary cell mutant resistant to suppression by analog of cholesterol-isolation and partial characterization. *Biochemistry* 21: 5316-5323.
17. Doolittle, G. M., and T. Y. Chang. 1982. Acyl-CoA:cholesterol acyltransferase in Chinese hamster ovary cells. Enzyme activity determined after reconstitution in phospholipid/cholesterol liposomes. *Biochimica et biophysica acta* 713: 529-537.
18. Chang, C. C.Y., G. M. Doolittle, and T. Y. Chang. 1986. Cycloheximide sensitivity in regulation of acyl coenzyme A:cholesterol acyltransferase activity in Chinese hamster ovary cells. 1. Effect of exogenous sterols. *Biochemistry* 25: 1693-1699.
19. Chang, C. C.Y., and T. Y. Chang. 1986. Cycloheximide sensitivity in regulation of acyl coenzyme A:cholesterol acyltransferase activity in Chinese hamster ovary cells. 2. Effect of sterol endogenously synthesized. *Biochemistry* 25: 1700-1706.
20. Ventimiglia, J. B., M. C. Levesque, and T. Y. Chang. 1986. Preparation and characterization of unilamellar vesicles from cholate-phospholipid micelle treated with cholestyramine. *Analytical biochemistry* 157: 323-330.
21. Cadigan, K. M., J. G. Heider, and T. Y. Chang. 1988. Isolation and characterization of Chinese hamster ovary cell mutants deficient in acyl-coenzyme A:cholesterol acyltransferase activity. *The Journal of biological chemistry* 263: 274-282.
22. Cadigan, K. M., and T. Y. Chang. 1988. A simple method for reconstitution of CHO cell and human fibroblast acyl coenzyme A: cholesterol acyltransferase activity into liposomes. *Journal of lipid research* 29: 1683-1692.
23. Cadigan, K. M., C. C. Y. Chang, and T. Y. Chang. 1989. Isolation of Chinese hamster ovary cell lines expressing human acyl-coenzyme A/cholesterol acyltransferase activity. *The Journal of cell biology* 108: 2201-2210.
24. Shi, S. P., C. C. Y. Chang, G. W. Gould, and T. Y. Chang. 1989. Comparison of phosphatidylethanolamine and phosphatidylcholine vesicles produced by treating cholate-phospholipid micelles with cholestyramine. *Biochimica et biophysica acta* 982: 187-195.
25. Cadigan, K. M., D. M. Spillane, and T. Y. Chang. 1990. Isolation and characterization of Chinese hamster ovary cell mutants defective in intracellular low density lipoprotein-cholesterol trafficking. *The Journal of cell biology* 110: 295-308.
26. Hasan, M. T., R. Subbaroyan, and T. Y. Chang. 1991. High-efficiency stable gene transfection using chloroquine-treated Chinese hamster ovary cells. *Somatic cell and molecular genetics* 17: 513-517.
27. Chang, C. C. Y., H. Y. Huh, K. M. Cadigan, and T. Y. Chang. 1993. Molecular cloning and functional expression of human acyl-coenzyme A:cholesterol acyltransferase

cDNA in mutant Chinese hamster ovary cells. *The Journal of biological chemistry* 268: 20747-20755.
28. Hasan, M. T., C. C. Y. Chang, and T. Y. Chang. 1994. Somatic cell genetic and biochemical characterization of cell lines resulting from human genomic DNA transfections of Chinese hamster ovary cell mutants defective in sterol-dependent activation of sterol synthesis and LDL receptor expression. *Somatic cell and molecular genetics* 20: 183-194.
29. Chang, C. C. Y. , W. W. Noll, N. Nutile-McMenemy, E. A. Lindsay, A. Baldini, W. Chang, and T. Y. Chang. 1994. Localization of acyl coenzyme A:cholesterol acyltransferase gene to human chromosome 1q25. *Somatic cell and molecular genetics* 20: 71-74.
30. Hasan, M. T., and T. Y. Chang. 1994. Somatic cell genetic analysis of two classes of CHO cell mutants expressing opposite phenotypes in sterol-dependent regulation of cholesterol metabolism. *Somatic cell and molecular genetics* 20: 481-491.
31. Spillane, D. M., J. W. Reagan, Jr., N. J. Kennedy, D. L. Schneider, and T. Y. Chang. 1995. Translocation of both lysosomal LDL-derived cholesterol and plasma membrane cholesterol to the endoplasmic reticulum for esterification may require common cellular factors involved in cholesterol egress from the acidic compartments (lysosomes/endosomes). *Biochimica et biophysica acta* 1254: 283-294.
32. Cheng, D., C. C. Y. Chang, X. Qu, and T. Y. Chang. 1995. Activation of acyl-coenzyme A:cholesterol acyltransferase by cholesterol or by oxysterol in a cell-free system. *The Journal of biological chemistry* 270: 685-695.
33. Uelmen, P. J., K. Oka, M. Sullivan, C. C. Y. Chang, T. Y. Chang, and L. Chan. 1995. Tissue-specific expression and cholesterol regulation of acylcoenzyme A:cholesterol acyltransferase (ACAT) in mice. Molecular cloning of mouse ACAT cDNA, chromosomal localization, and regulation of ACAT in vivo and in vitro. *The Journal of biological chemistry* 270: 26192-26201.
34. Chang, C. C. Y., J. Chen, M. A. Thomas, D. Cheng, V. A. Del Priore, R. S. Newton, M. E. Pape, and T. Y. Chang. 1995. Regulation and immunolocalization of acyl-coenzyme A: cholesterol acyltransferase in mammalian cells as studied with specific antibodies. *The Journal of biological chemistry* 270: 29532-29540.
35. Matsuda, H., H. Hakamata, A. Miyazaki, M. Sakai, C. C. Y. Chang, T. Y. Chang, S. Kobori, M. Shichiri, and S. Horiuchi. 1996. Activation of acyl-coenzyme A:cholesterol acyltransferase activity by cholesterol is not due to altered mRNA levels in HepG2 cells. *Biochimica et biophysica acta* 1301: 76-84.
36. Carstea, E. D., J. A. Morris, K. G. Coleman, S. K. Loftus, D. Zhang, C. Cummings, J. Gu, M. A. Rosenfeld, W. J. Pavan, D. B. Krizman, J. Nagle, M. H. Polymeropoulos, S. L. Sturley, Y. A. Ioannou, M. E. Higgins, M. Comly, A. Cooney, A. Brown, C. R. Kaneski, E. J. Blanchette-Mackie, N. K. Dwyer, E. B. Neufeld, T. Y. Chang, L. Liscum, J. F. Strauss, 3rd, K. Ohno, M. Zeigler, R. Carmi, J. Sokol, D. Markie, R. R. O'Neill, O. P. van Diggelen, M. Elleder, M. C. Patterson, R. O. Brady, M. T. Vanier, P. G. Pentchev, and D. A. Tagle. 1997. Niemann-Pick C1 disease gene: homology to mediators of cholesterol homeostasis. *Science*. 277: 228-231.
37. Rawson, R. B., N. G. Zelenski, D. Nijhawan, J. Ye, J. Sakai, M. T. Hasan, T. Y. Chang, M. S. Brown, and J. L. Goldstein. 1997. Complementation cloning of S2P, a gene

encoding a putative metalloprotease required for intramembrane cleavage of SREBPs. *Molecular cell* 1: 47-57.
38. Khelef, N., X. Buton, N. Beatini, H. Wang, V. Meiner, T. Y. Chang, R. V. J. Farese, F. R. Maxfield, and I. Tabas. 1998. Immunolocalization of acyl-coenzyme A:cholesterol O-acyltransferase in macrophages. *The Journal of biological chemistry* 273: 11218-11224.
39. Lee, O., C. C. Y. Chang, W. Lee, and T. Y. Chang. 1998. Immunodepletion experiments suggest that acyl-coenzyme A:cholesterol acyltransferase-1 (ACAT-1) protein plays a major catalytic role in adult human liver, adrenal gland, macrophages, and kidney, but not in intestines. *Journal of lipid research* 39: 1722-1727.
40. Miyazaki, A., N. Sakashita, O. Lee, K. Takahashi, S. Horiuchi, H. Hakamata, P. M. Morganelli, C. C. Y. Chang, and T. Y. Chang. 1998. Expression of ACAT-1 protein in human atherosclerotic lesions and cultured human monocytes-macrophages. *Arteriosclerosis, thrombosis, and vascular biology* 18: 1568-1574.
41. Chang, C. C. Y., C. Y. G. Lee, E. T. Chang, J. C. Cruz, M. C. Levesque, and T. Y. Chang. 1998. Recombinant human acyl-CoA:cholesterol acyltransferase 1 (ACAT1) purified to essential homogeneity utilizes cholesterol in mixed micelles or vesicles in a highly cooperative manner. *The Journal of biological chemistry* 273: 35132-35141.
42. Tomita, T., T. Y. Chang, T. Kodama, and T. Iwatsubo. 1998. BetaAPP gamma-secretase and SREBP site 2 protease are two different enzymes. *Neuroreport* 9: 911-913.
43. Li, B. L., X. L. Li, Z. J. Duan, O. Lee, S. Lin, Z. M. Ma, C. C. Y. Chang, X. Y. Yang, J. P. Park, T. K. Mohandas, W. Noll, L. Chan, and T. Y. Chang. 1999. Human acyl-CoA:cholesterol acyltransferase-1 (ACAT-1) gene organization and evidence that the 4.3-kilobase ACAT-1 mRNA is produced from two different chromosomes. *The Journal of biological chemistry* 274: 11060-11071.
44. Lin, S., D. Cheng, M. S. Liu, J. Chen, and T. Y. Chang. 1999. Human acyl-CoA:cholesterol acyltransferase-1 in the endoplasmic reticulum contains seven transmembrane domains. *The Journal of biological chemistry* 274: 23276-23285.
45. Yu, C., J. Chen, S. Lin, J. Liu, C. C. Y. Chang, and T. Y. Chang. 1999. Human acyl-CoA:cholesterol acyltransferase-1 is a homotetrameric enzyme in intact cells and in vitro. *The Journal of biological chemistry* 274: 36139-36145.
46. Sakashita, N., A. Miyazaki, M. Takeya, S. Horiuchi, C. C. Y. Chang, T. Y. Chang, and K. Takahashi. 2000. Localization of human acyl-coenzyme A: cholesterol acyltransferase-1 (ACAT-1) in macrophages and in various tissues. *The American journal of pathology* 156: 227-236.
47. Cruz, J. C., S. Sugii, C. Yu, and T. Y. Chang. 2000. Role of Niemann-Pick type C1 protein in intracellular trafficking of low density lipoprotein-derived cholesterol. *The Journal of biological chemistry* 275: 4013-4021.
48. Henderson, L. P., L. Lin, A. Prasad, C. A. Paul, T. Y. Chang, and R. A. Maue. 2000. Embryonic striatal neurons from niemann-pick type C mice exhibit defects in cholesterol metabolism and neurotrophin responsiveness. *The Journal of biological chemistry* 275: 20179-20187.
49. Chang, C. C. Y., N. Sakashita, K. Ornvold, O. Lee, E. T. Chang, R. Dong, S. Lin, C. Y. Lee, S. C. Strom, R. Kashyap, J. J. Fung, R. V. Farese, Jr., J. F. Patoiseau, A. Delhon, and T. Y. Chang. 2000. Immunological quantitation and localization of ACAT-1

and ACAT-2 in human liver and small intestine. *The Journal of biological chemistry* 275: 28083-28092.
50. Cruz, J. C., and T. Y. Chang. 2000. Fate of endogenously synthesized cholesterol in Niemann-Pick type C1 cells. *The Journal of biological chemistry* 275: 41309-41316.
51. Maung, K., A. Miyazaki, H. Nomiyama, C. C. Y. Chang, T. Y. Chang, and S. Horiuchi. 2001. Induction of acyl-coenzyme A:cholesterol acyltransferase-1 by 1,25-dihydroxyvitamin D(3) or 9-cis-retinoic acid in undifferentiated THP-1 cells. *Journal of lipid research* 42: 181-187.
52. Yamazaki, T., T. Y. Chang, C. Haass, and Y. Ihara. 2001. Accumulation and aggregation of amyloid beta-protein in late endosomes of Niemann-pick type C cells. *The Journal of biological chemistry* 276: 4454-4460.
53. Yang, J. B., Z. J. Duan, W. Yao, O. Lee, L. Yang, X. Y. Yang, X. Sun, C. C. Y. Chang, T. Y. Chang, and B. L. Li. 2001. Synergistic transcriptional activation of human Acyl-coenzyme A: cholesterol acyltransterase-1 gene by interferon-gamma and all-trans-retinoic acid THP-1 cells. *The Journal of biological chemistry* 276: 20989-20998.
54. Song, B. L., W. Qi, X. Y. Yang, C. C. Y. Chang, J. Q. Zhu, T. Y. Chang, and B. L. Li. 2001. Organization of human ACAT-2 gene and its cell-type-specific promoter activity. *Biochemical and biophysical research communications* 282: 580-588.
55. Puglielli, L., G. Konopka, E. Pack-Chung, L. A. Ingano, O. Berezovska, B. T. Hyman, T. Y. Chang, R. E. Tanzi, and D. M. Kovacs. 2001. Acyl-coenzyme A: cholesterol acyltransferase modulates the generation of the amyloid beta-peptide. *Nature cell biology* 3: 905-912.
56. Lu, X., S. Lin, C. C. Y. Chang, and T. Y. Chang. 2002. Mutant acyl-coenzyme A:cholesterol acyltransferase 1 devoid of cysteine residues remains catalytically active. *The Journal of biological chemistry* 277: 711-718.
57. Yu, C., Y. Zhang, X. Lu, J. Chen, C. C. Y. Chang, and T. Y. Chang. 2002. Role of the N-terminal hydrophilic domain of acyl-coenzyme A:cholesterol acyltransferase 1 on the enzyme's quaternary structure and catalytic efficiency. *Biochemistry* 41: 3762-3769.
58. Cruz, J. C., M. Thomas, E. Wong, N. Ohgami, S. Sugii, T. Curphey, C. C. Y. Chang, and T. Y. Chang. 2002. Synthesis and biochemical properties of a new photoactivatable cholesterol analog 7,7-azocholestanol and its linoleate ester in Chinese hamster ovary cell lines. *Journal of lipid research* 43: 1341-1347.
59. Buszczak, M., X. Lu, W. A. Segraves, T. Y. Chang, and L. Cooley. 2002. Mutations in the midway gene disrupt a Drosophila acyl coenzyme A: diacylglycerol acyltransferase. *Genetics* 160: 1511-1518.
60. Khan, N., J. Shen, T. Y. Chang, C. C. Y. Chang, P. C. Fung, O. Grinberg, E. Demidenko, and H. Swartz. 2003. Plasma membrane cholesterol: a possible barrier to intracellular oxygen in normal and mutant CHO cells defective in cholesterol metabolism. *Biochemistry* 42: 23-29.
61. Zhang, Y., C. Yu, J. Liu, T. A. Spencer, C. C. Y. Chang, and T. Y. Chang. 2003. Cholesterol is superior to 7-ketocholesterol or 7 alpha-hydroxycholesterol as an allosteric activator for acyl-coenzyme A:cholesterol acyltransferase 1. *The Journal of biological chemistry* 278: 11642-11647.
62. Sugii, S., P. C. Reid, N. Ohgami, Y. Shimada, R. A. Maue, H. Ninomiya, Y. Ohno-Iwashita, and T. Y. Chang. 2003. Biotinylated theta-toxin derivative as a probe to

examine intracellular cholesterol-rich domains in normal and Niemann-Pick type C1 cells. *Journal of lipid research* 44: 1033-1041.
63. Reid, P. C., S. Sugii, and T. Y. Chang. 2003. Trafficking defects in endogenously synthesized cholesterol in fibroblasts, macrophages, hepatocytes, and glial cells from Niemann-Pick type C1 mice. *Journal of lipid research* 44: 1010-1019.
64. Lin, S., X. Lu, C. C. Y. Chang, and T. Y. Chang. 2003. Human acyl-coenzyme A:cholesterol acyltransferase expressed in chinese hamster ovary cells: membrane topology and active site location. *Molecular biology of the cell* 14: 2447-2460.
65. Sugii, S., P. C. Reid, N. Ohgami, H. Du, and T. Y. Chang. 2003. Distinct endosomal compartments in early trafficking of low density lipoprotein-derived cholesterol. *The Journal of biological chemistry* 278: 27180-27189.
66. Sakashita, N., A. Miyazaki, C. C. Y. Chang, T. Y. Chang, E. Kiyota, M. Satoh, Y. Komohara, P. M. Morganelli, S. Horiuchi, and M. Takeya. 2003. Acyl-coenzyme A:cholesterol acyltransferase 2 (ACAT2) is induced in monocyte-derived macrophages: in vivo and in vitro studies. *Laboratory investigation* 83: 1569-1581.
67. Wiegand, V., T. Y. Chang, J. F. Strauss, 3rd, F. Fahrenholz, and G. Gimpl. 2003. Transport of plasma membrane-derived cholesterol and the function of Niemann-Pick C1 Protein. *Faseb J* 17: 782-784.
68. Sawamura, N., J. S. Gong, T. Y. Chang, K. Yanagisawa, and M. Michikawa. 2003. Promotion of tau phosphorylation by MAP kinase Erk1/2 is accompanied by reduced cholesterol level in detergent-insoluble membrane fraction in Niemann-Pick C1-deficient cells. *Journal of neurochemistry* 84: 1086-1096.
69. Yang, L., J. Chen, C. C. Y. Chang, X. Y. Yang, Z. Z. Wang, T. Y. Chang, and B. L. Li. 2004. A stable upstream stem-loop structure enhances selection of the first 5'-ORF-AUG as a main start codon for translation initiation of human ACAT1 mRNA. *Acta biochimica et biophysica Sinica* 36: 259-268.
70. Reid, P. C., N. Sakashita, S. Sugii, Y. Ohno-Iwashita, Y. Shimada, W. F. Hickey, and T. Y. Chang. 2004. A novel cholesterol stain reveals early neuronal cholesterol accumulation in the Niemann-Pick type C1 mouse brain. *Journal of lipid research* 45: 582-591.
71. Yamauchi, Y., C. C. Y. Chang, M. Hayashi, S. Abe-Dohmae, P. C. Reid, T. Y. Chang, and S. Yokoyama. 2004. Intracellular cholesterol mobilization involved in the ABCA1/apolipoprotein-mediated assembly of high density lipoprotein in fibroblasts. *Journal of lipid research* 45: 1943-1951.
72. Ohgami, N., D. C. Ko, M. Thomas, M. P. Scott, C. C. Y. Chang, and T. Y. Chang. 2004. Binding between the Niemann-Pick C1 protein and a photoactivatable cholesterol analog requires a functional sterol-sensing domain. *Proceedings of the National Academy of Sciences of the United States of America* 101: 12473-12478.
73. Yang, L., O. Lee, J. Chen, C. C. Y. Chang, P. Zhou, Z. Z. Wang, H. H. Ma, H. F. Sha, J. X. Feng, Y. Wang, X. Y. Yang, L. Wang, R. Dong, K. Ornvold, B. L. Li, and T. Y. Chang. 2004. Human acyl-coenzyme A:cholesterol acyltransferase 1 (acat1) sequences located in two different chromosomes (7 and 1) are required to produce a novel ACAT1 isoenzyme with additional sequence at the N terminus. *The Journal of biological chemistry* 279: 46253-46262.
74. Yang, L., J. B. Yang, J. Chen, G. Y. Yu, P. Zhou, L. Lei, Z. Z. Wang, C. C. Y. Chang, X. Y. Yang, T. Y. Chang, and B. L. Li. 2004. Enhancement of human ACAT1

gene expression to promote the macrophage-derived foam cell formation by dexamethasone. *Cell research* 14: 315-323.
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II. Invited Reviews in Books, Review Series, and Journals:

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III. Books (as Editor):

1. *Intracellular Cholesterol Trafficking* (Ed. by T.Y. Chang and D. Freeman). Kluwer Academic Press. (1998)

IV. Patents:

Inventor of nine patents issued to Dartmouth College:

1. U.S. Patent # 5,484,727 (Issued 01/16/96)
2. U.S. Patent # 5,834,283 (Issued 11/10/98)
3. U.S. Patent # 5,968,749 (Issued 10/19/99)
4. U.S. Patent # 6,602,710 (Issued 08/05/03)
5. U.S. Patent # 8,673,587 (Issued 03/18/04)
6. U.S. Patent # 8,466,121 (Issued 06/18/13)
7. U.S. Patent # 8,802,646 (Issued 08/12/14)
8. U.S. Patent # 9,206425 (Issued 12/08/15)
9. U.S. Patent # 9,388414 (Issued 07/12/2016)
10. Active Patent Application: DC0546US NP (Filing date May 11th, 2016; tentatively approved September, 2017)