**BIOGRAPHICAL SKETCH**

NAME: Sojin An

eRA COMMONS USER NAME: Sojin An

POSITION TITLE: Research Lab Specialist Intermediate, Department of Biological Chemistry, University of Michigan

EDUCATION/TRAINING

|  |  |  |  |
| --- | --- | --- | --- |
| INSTITUTION AND LOCATION | DEGREE | Completion Date | FIELD OF STUDY |
| Department of Nutritional science, Ewha Woman’s university, Seoul, South Korea  Department of Nutritional science, Ewha Woman’s university, Seoul, South Korea  Department of Biochemistry, Yonsei University, Seoul, South Korea | Bachelor of Science (B.S.)  Master of Science (M.S.)  Doctor of Philosophy (Ph.D.) | 02/1999  02/2001  02/2007 | Nutritional science  Nutritional science  Biochemistry |

1. **Personal Statement**

I am a highly motivated and experienced Protein Structural Biologist / Biochemist with over ten years of research experience. My research interests have revolved around the development of innovative drugs against cancers and metabolic diseases and exploring their underlying mechanism through a biochemical and structural biology approach. I am currently have a full time position in the Department of Biological Chemistry as a Research Lab Specialist Intermediate at the University of Michigan. During my Ph.D training, my research focused on characterizing two types of human Acyl-CoA:cholesterol acyltransferase (ACAT) isoforms, ACAT-1 and ACAT-2 as a target of atherosclerosis and metabolic disease. I developed and screens to find ACAT isoform-specific inhibitors, and validated compounds in cell systems and the animal models to find drug candidates as a part of a medicinal chemistry research team. After I earned my Ph.D, I moved to the field of x-ray crystallography hoping to gain a structural biology skill set to aid my skills in drug development. I was able to solve x-ray crystal structures of 10 proteins related to epigenetic inheritance, centromere biology and metabolic disease. This work led to 1 international research award, and 8 publications in international peer reviewed journals. Specifically, I investigated the catalytic mechanism of histone methyltransferase Ash1L proposing auto-inhibitory regulation (J Bio Chem. 2011), the mechanism of CENP-A recruitment to the centromere by the fission yeast Mis18 complex (J Mol Biol. 2015, Structure. 2018), and the nuclear translocation mechanism of histone H3 and H4 in both human and yeast models (ELife. 2017, J Mol Biol. 2018). I also uncovered how human sestrin2, an important target of metabolic disease, has two distinct functions: reactive oxygen species reduction and inhibition of the mechanistic target of mTORC1. This work was appreciated by being published in *Nature Communications 2015*. I have recently begun training in negative staining and cryo-electron microscopy (Cryo-EM). I am currently working on the structural study of several nucleosome bound complexes using Cryo-EM techniques such as the FACT (facilitates chromatin transcription) complex and the LSD1-histone-demethylation complex. For the first project, I was able to directly purify the endogenous FACT complex, an oncogenic histone chaperone, bound to nucleosome from S. pombe using TAP-tag purification. We expect the structure of the FACT complex in association with nucleosomes will pave the way for the development of small molecules which can be used as a broad spectrum cancer therapeutic agent to supplement existing treatment approaches. For the second project, I successfully reconstituted both of canonical and neuronal form of LSD1 complex bound to nucleosome. Through this study we will determine how the neuron-specific LSD1 complex recognizes nucleosomes in a distinct manner compared to canonical form and regulate neuronal specific gene transcription.

1. **Positions and Honors**

Postdoctoral Fellow / Research Lab Specialist Intermediate 2013 – current

University of Michigan Medical School, Ann Arbor, MI:

Advisor: Dr. Uhn-Soo Cho ([uhnsoo@med.umich.edu](http://uhnsoo@med.umich.edu))

“Protein Structural Study on Epigenetics, Centromere Biology and Metabolic Disease”

* Investigated the mechanism of CENP-A recruitment to centromere by fission yeast Mis18 complex   
   (related PDB ID : 4XYH, 4XYI, 5WJC)
* Uncovered how human sestrin2 has a two distinct functions, Reactive oxygen species (ROS) reduction   
   and inhibition of the mechanistic target of rapamycin complex-1 (mTORC1) (related PDB ID : 5CUF)
* Researched nuclear translocation mechanism of histone H3 and H4 by Kap123, yeast homologue of   
   human importin4 (related PDB ID : 5VCH, 5VE8, 5W0V)
* Studied the molecular insight of the mechanism of hemoglobin catalyzed H2S oxidation.   
   (related PDB ID : 5UCU, 5XBK)
* Recently working on the structural study of the FACT (facilitates chromatin transcription) complex and   
   the LSD1-histone-demethylation complex bound to Nucleosome using Cryo-EM techniques
* Maintained and managed laboratory and instructed laboratory techniques to undergraduate and   
   graduate students.

Postdoctoral Research fellow 2009 – 2013

Department of Biological Sciences, Korea Advanced Institute of Science and Technology, Daejeon,

South Korea:

Advisor: Dr. Ji-Joon Song (<songj@kaist.ac.kr>)

“Protein Structural Study on Epigenetics”

* Investigated the catalytic mechanism of histone methyltransferase Ash1L proposing auto-inhibitory regulation. (related PDB ID : [3OPE](http://www.rcsb.org/pdb/explore/explore.do?structureId=3OPE))
* Researched the mechanism of non-coding RNA, Xist recognition by EZH2 histone methyltransferase through NMR
* Researched nuclear translocation mechanism of Asf1/histone H3:H4 by human importin 4 (related PDB ID : [5XAH](http://www.rcsb.org/structure/5XAH), [5XBK](http://www.rcsb.org/structure/5XBK))
* Instructed laboratory techniques to graduate students, technicians and other personnel.

Research assistant fellow 2002 - 2009

National Research Lab. of Lipid Metabolism & Atherosclerosis, Korea Research Institute of Bioscience   
 and Biotechnology (KRIBB), Daejeon, South Korea:

Advisor: Dr. Tae-Sook Jeong ([tsjeong@kribb.re.kr)](mailto:tsjeong@kribb.re.kr))

“Medicinal chemistry to develop anti-atherosclerotic lead compounds from natural resources”

* Developed Acyl-CoA:cholesterol acyltransferase (ACAT) isotype specific inhibitors as anti-atherosclerotic agent through enzyme characterization, activity guided natural resources fractionation and lead oriented chemical synthesis.
* Investigated molecular mechanism(s) and developed pharmacological therapy in metabolic disease using various in vivo and in vitro systems.

1. **Awards and recognition**

* Scholarship Award, Keystone Symposia Scholarship from Keystone Symposia, USA 2011
* Research Award, Korean Biophysical Society, South Korea 2011
* Brain Korea 21 Postdoctoral Fellowship, Korea Ministry of Education, Science and Technology, South Korea, 2009-2012
* Basic Research Award, Korean Society of Lipidology and Atherosclerosis, South Korea 2008

1. **Selected publication**

Peer-Reviewed and Research Articles (\*Authors equally contributed)

1. **An S**, Koldewey P, Chik J, Bardwell J, Subramanian L, Cho US: Eic1, a component of the

oligomeric Mis18 holo-complex, converts Mis16 from a histone H4 chaperone to a CENP-ACnp1

assembly factor. Structure. 26(7):960-971. (2018)

2. Yoon J, Kim S, **An S**, Leitner A, Jung T, Aebersold R, Herbert H, Cho US, Song JJ: Integrative

structural investigation on the architecture of human Importin4\_histone H3/H4\_Asf1a complex and

its histone H3 tail binding. J Mol Biol. 430, 822-841. (2018)

3. **An S**\*, Yoon J\*, Kim H, Song JJ, Cho US: Structure-based nuclear import mechanism of histones

H3 and H4 mediated by Kap123. ELife. 6, e30244. (2017)

4. Kim H\*, **An S**\*, Ro SH\*, Teixeira F, Jin Park G, Kim C, Cho CS, Kim JS, Jakob U, Hee Lee J, Cho

US: Janus-faced Sestrin2 controls ROS and mTOR signaling through two seperate functional

domains. Nat Communications. 6, 10025-10036. (2015)

5. **An S**, Kim H, Cho US: Mis16 Independently Recognizes Histone H4 and the CENP-A(Cnp1)

Specific Chaperone Scm3sp. J Mol Biol. 427, 3230-3240. (2015)

6. **An S**, Yeo KJ, Jeon YH, Song JJ: Crystal structure of human histone methyltransferase Ash1L

catalytic domain and its implications on the regulatory mechanism. J Bio Chem. 286, 8369-

8374. (2011)

7. **An S**, Han JI, Kim MJ, Park JS, Han JM, Baek NI, Chung HG, Choi MS, Lee KT, Jeong TS:

Ethanolic extracts of Brassica campestris spp. rapa roots prevent high-fat diet-induced obesity

via beta(3)-adrenergic regulation of white adipocyte lipolytic activity. J Med Food. 13, 406-414.

(2010)

8. Han JM, Kim MJ, Baek SH, **An S**, Jin YY, Chung HG, Baek NI, Choi MS, Lee KT, Jeong TS:

Antiatherosclerotic effects of Artemisia princeps Pampanini cv. Sajabal in LDL receptor

deficient mice. J Agric Food Chem. 57, 1267-1274. (2009)

9. **An S**, Jang YS, Park JS, Kwon BM, Paik YK, Jeong TS: Inhibition of acyl-coenzyme

A:cholesterol acyltransferase stimulates cholesterol efflux from macrophages and stimulates

farnesoid X receptor in hepatocytes. Exp Mol Med. 40, 407-417. (2008)

10. **An S**, Park YD, Paik YK, Jeong TS, Lee WS: Human ACAT inhibitory effects of shikonin

derivatives from Lithospermum erythrorhizon. Bioorg Med Chem Lett. 17, 1112-1116. (2007)

11. **An S**\*, Cho KH\*, Lee WS, Lee JO, Paik YK, Jeong TS: A critical role for the histidine residues

in the catalytic function of acyl-CoA: cholesterol acyltransferase catalysis: evidence for

catalytic difference between ACAT1 and ACAT2. FEBS Lett. 580, 2741-2749. (2006)

12. Cho KH\*, **An S**\*, Lee WS, Paik YK, Kim YK, Jeong TS: Mass-production of human ACAT-1

and ACAT-2 to screen isoform-specific inhibitor: A different substrate specificity and inhibitory

regulation. Biochem Biophys Res Commun. 309, 864-872. (2003)

Review Articles

1. **An S** and Song JJ: The coded functions of noncoding RNAs for gene regulation. Mol. Cells. 31,

491-496. (2011)

1. **PATENTS**

1. Tae-Sook Jeong, LEE Woo-Song, KIM Hyoung-Chin, Yang-Kyu Choi, Ju-Ryoung Kim, **So-Jin**

**An**, Kyoung-Ran Im, Ki-Chang Jang, Og-Sung Moon, Jun-Seock Son. Administering terpenoids

selected from ferruginol derivatives, dehydroabietinol, kayadiol and delta-cadinol, that inhibit

acyl Coenzyme A: cholesterol acyltransferases and oxidation of low-density lipoproteins, for the

treatment of hyperlipemia or atherosclerosis. US Patent No. 7825162 Application No. 12/265,

088 (2010/11/2)

2. Tae-Sook Jeong, LEE Woo-Song, KIM Hyoung-Chin, Yang-Kyu Choi, Ju-Ryoung Kim, **So-Jin**

**An**, Kyoung-Ran Im, Ki-Chang Jang, Og-Sung Moon, Jun-Seock Son. Phenanthrene derivative;

acylcoenzime A-cholesterol acyl transferase inhibitor; anti-oxidative activity to low density

lipoproteins (LDL); hyperlipidemia and atherosclerosis caused by the LDL oxidation and the

synthesis and accumulation of cholesteryl ester. US Patent No. 7820212 Application No. 12/181,

583 (2010/10/26)

3. Tae-Sook Jeong, LEE Woo-Song, KIM Hyoung-Chin, Yang-Kyu Choi, Ju-Ryoung Kim, **So-Jin**

**An**, Kyoung-Ran Im, Ki-Chang Jang, Og-Sung Moon, Jun-Seock Son. Abietane diterpenoid

compound, and composition comprising extract of torreya nucifera, or abietane diterpenoid

compounds or terpenoid compounds isolated from them for prevention and treatment of

cardiovascular disease. US Patent No. 7517542 Application No. 10/591,282 (2009/4/14)