TO MAGNIFICO RETTORE OF UNIVERSITA' DEGLI STUDI DI MILANO **ID CODE 6784**

I the undersigned asks to participate in the public selection, for qualifications and examinations, for the awarding of a type B fellowship at **Dipartimento di CHEMISTRY**

Scientist- in – charge: BERNARDI ANNA

[DAVIE KENNETH]

CURRICULUM VITAE

PERSONAL INFORMATION

Surname	KENNETH
Name	DAVIE

PRESENT OCCUPATION

Appointment	Structure
Final year PhD Student	Osaka University, Graduate School of Science, Department of Chemistry, Laboratory of Natural Products Organic Chemistry.

EDUCATION AND TRAINING

Degree	Course of studies	University	year of achievement of the degree
Bachelor degree	Bachelor of Education Science (Specializing Chemistry and Biology) • Courses: Organic Chemistry; Natural Products Chemistry; Biochemistry; Inorganic Chemistry; Physical Chemistry; Analytical Chemistry; Environmental Chemistry; Industrial Chemistry; General Chemistry; Microbiology; Animal Physiology; etc.	University of Malawi	2017
PhD degree	PhD in Chemistry • Research: Synthesis and functions of lipid As derived from *Alcaligenes faecalis* and their conjugates with tumor-associated carbohydrate antigen for the	Osaka University	2024

	development of self-adjuvanting vaccines		
Master degree	Master of Science (MSc) in Chemistry • Research: Synthesis and functions of monophosphoryl lipid As from symbiotic bacteria *Alcaligenes faecalis* • Courses: Natural Product Chemistry; Organic Biochemistry; Biomolecular Chemistry; Protein Chemistry; Structural Organic Chemistry; Topics in Inorganic Chemistry; Physical Organic Chemistry; Chemistry on Catalysis; Analytical Chemistry of Interface; Basic Macromolecular Science; Introductory Biology	Osaka University	2021

REGISTRATION IN PROFESSIONAL ASSOCIATIONS

Date of registration	Association	City
November 2020	The Chemical Society of Japan	Osaka
October 2021	The International Endotoxin and Innate Immunity Society	Osaka
July 2022	The Japanese Society of Carbohydrate Research	Osaka

FOREIGN LANGUAGES

Languages	level of knowledge
English	Advanced

AWARDS, ACKNOWLEDGEMENTS, SCHOLARSHIPS

Year	Description of award
2019-2024	Japanese Government (MEXT) Scholarship for masters and PhD studies
2015	University of Malawi (Chancellor College) Dean's list award: award of a certificate in recognition as one of the best students based on merit of performance
2014	University of Malawi Achievement Award: award of a prize by the National Bank of Malawi as one of the outstanding students based on merit of performance in the faculty.

TRAINING OR RESEARCH ACTIVITY

- Chemical synthesis of diphosphosrylated and monophosphorylated lipid As derived from symbiotic bacteria *Alcaligenes faecalis*.
    - Synthesis of suitably protected building blocks in form of monosaccharides including glycosyl acceptor and donor from glucosamine
    - Glycosylation reaction between the glycosyl acceptor and donor to get an appropriately protected disaccharide backbone.
    - Stereoselective synthesis of single and double fatty acid chains via nucleophilic substitution reactions.
    - Condensation of synthesized fatty acids to the disccharide backbone through ester and amide linkages upon selective cleavage of protecting groups.
    - Introduction of phosphate groups to appropriate positions and cleavage of all remaining protecticing groups
    - Purification of synthesized lipid As by liquid-liquid partition chromatography.
    - Analysis of the synthesized compounds by NMR spectroscopy
    - Evaluation of innate immunostimulatory activities of the synthesized lipid As in human and murine cells
    - Investigation of vaccine adjuvant functions *in vivo* by administering the synthesized lipid As to mice using OVA model antigen

- Synthesis of conjugates of *A. faecalis* lipid As with tumor-associated carbohydrate antigen for development self-adjuvanting vaccines
    - Synthesis of a lipid A intermediate block with an azidated 6'-position
    - Synthesis of benzyl-protected sugar-mimic linker with an azide group at one end from D-mannitol
    - Synthesis of tumor-associated carbohydrate Tn antigen derivative from D-galactose
    - Condensation of the benzyl-protected linker to the azidated lipid A block via amide bond formation
    - Condensation of the Tn antigen derivative to the lipid A via the linker by amide linkage and cleavage of all protecting groups
    - Analysis of the synthesized compounds by NMR spectrocopy
    - Evaluation of innate immunoactivation in vitro and Tn antigen-specific antibody response in vivo elicited the synthesized lipid A conjugates

- Synthesis of conjugate of *A. faecelis* lipid A with Tetanus toxoid peptide (T cell epitope) and tumor-assoaciated carbohydrate Tn antigen (B cell epitope) to develop a three-component vaccine conjugate
    - Synthesis of the conjugate of lipid A and sugar-mimic linker modified with a maleimide moiety at the linker end
    - Synthesis of the conjugate of T cell epitope peptide and carbohydrate Tn antigen through standard Fmoc solid phase peptide synthesis with a propyl-thio at the *N*-terminus
    - Purification of the conjugate of T cell epitope and B cell epitope by reverse phase HPLC
    - Analysis of the synthesized compounds by NMR spectrocopy
    - Conjugation of lipid A block with peptide-Tn conjugate via maleimide-thio addition reaction

PROJECT ACTIVITY

Year	Project
2017/06/01 to 2018/03/31	• Scientific validation of traditional medicines produced in Malawi against their efficacy to cure various infections o Qualitative and quantitative analysis of bioactive compounds o Qualitative and quantitative screening of heavy metals and essential elemnets in the medicines

CONGRESSES AND SEMINARS

Date	Title	Place
2024/05/11	• Chemical Synthesis of *Alcaligenes faecalis* Lipid A Conjugates with Tn antigen Towards the Development of Self-Adjuvanting Vaccine ○ The 24th Kansai GlycoScience Forum	Osaka University Hall, Toyonaka campus, Osaka, Japan
2024/03/18 to 2024/03/21	• Synthesis of *Alcaligenes faecalis* Lipid A Conjugates with Tumor-Associated Carbohydrate Tn antigen Towards the Development of Self-Adjuvanting Vaccine ○ The 104th Annual Meeting of the Chemical Society of Japan	Funabashi campus, Nihon University College of Science and Technology, Chiba, Japan
2023/11/20 to 2023/11/23	• Chemical Synthesis of Monophosphoryl lipid As from *Alcaligenes* and a Conjugate of Lipid A with Tumor-Associated Carbohydrate Tn Antigen ○ The 15th International Kyoto Conference on New Aspects of Organic Chemistry	Rihga Royal Hotel, Kyoto, Japan
2023/09/07 to 2023/09/09	• Synthesis of Monophosphoryl lipid As from *Alcaligenes faecalis* and Conjugation of lipid A to Tumor-Associated Carbohydrate Antigen ○ The 42nd Annual Meeting of the Japanese Society of Carbohydrate Research	Torigin Cultural Hall, Tottori City, Japan
2023/07/09 to 2023/07/13	• Chemical Synthesis of *A. faecalis* Monophosphoryl lipid As and a Conjugate of Lipid A with Tn Antigen ○ The 21st European Carbohydrate Symposium	*Maison de la Chimie*, Paris, France
2023/05/10 to 2023/05/12	• Synthesis of *Alcaligenes faecalis* Monophosphoryl lipid As and Lipid A conjugate with Tumor-Associated Carbohydrate Tn antigen ○ The 7th Gratama Workshop	Nagasaki Brick Hall, Nagasaki, Japan
2022/07/10 to 2022/07/15	• Chemical Synthesis of *Alcaligenes faecalis* Monophosphoryl Lipid As and their Immunological fucntions ○ The 30th International Carbohydrate Symposium	Online, from Brazil
2021/10/19 to 2021/10/21	• Synthesis and immune function of monophosphoryl lipid As from symbiotic bacteria *Alcaligenes faecalis* ○ The 11th Chemical Society of Japan Chemistry Festa	Online, Japan.
2021/10/12 to 2021/10/15	• Innate Immune Function of Chemically Synthesized Monophosphoryl Lipid As from *Alcaligenes faecalis* ○ The 16th Meeting of the International Endotoxin and Innate Immunity Society	Kobe International Conference Center, Hyogo, Japan
2021/03/19 to 2021/03/22	• Synthesis and functions of monophosphoryl *Alcaligenes faecalis* lipid As ○ The 101st Annual Meeting of the Chemical Society of Japan	Online, Japan.

PUBLICATIONS

Articles in reviews
• Chemically Synthesized *Alcaligenes* Lipid A as an adjuvant to Augment Immune Responses to *Haemophilus Influenzae* Type B Conjugate Vaccine. *Frontiers in Pharmacology*. 2021. [Liu, Z., Hosomi, K., Shimoyama, A., Yoshii, K., Sun, X., Lan, H., Wang, Y., Yamaura, H., **Kenneth, D.**, Saika, A., Nagatake, T., Kiyono, H., Fukase, K., and Kunisawa, J.]

OTHER INFORMATION

• Teaching assitant (TA) experience; Laboratory of Natural Products Organic Chemistry; Graduate School of Science; Osaka University   ○ Teaching exeriments of organic synthesis of glycans to undergraduate students under Osaka University International Summer Program (ISP)

• Chemistry demonstrator experience; Department of Chemistry, University of Malawi
  ○ Supporting undergraduate chemistry experiments
  ○ Tutoring Chemistry to undergraduate students

Declarations given in the present curriculum must be considered released according to art. 46 and 47 of DPR n. 445/2000.

The present curriculum does not contain confidential and legal information according to art. 4, paragraph 1, points d) and e) of D.Lgs. 30.06.2003 n. 196.

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Please DO NOT SIGN this form.

Place and date: Osaka University, Japan, August 24th, 2024.