

## A.

### Dr. Jason T. Duskey

#### **Recent Work Information:**

Department of Life Sciences  
University of Modena and Reggio Emilia  
Modena, MO  
Italy  
Google Scholar: Jason Duskey  
Orcid: <https://orcid.org/0000-0003-2204-1981>

#### **Personal information:**

Birthdate: 23.01.1985  
V. Sabotino 111 Modena  
Mobile: +39 327 898 4270  
Email:  
[jasonthomas.duskey@unimore.it](mailto:jasonthomas.duskey@unimore.it)  
[jduskey@gmail.com](mailto:jduskey@gmail.com)  
US Citizen



### Short Profile

- Ph.D. in Medicinal and Natural Products Chemistry (Pharmacy)
  - Peptide nanoparticle design for DNA/siRNA tumor targeting
- Career earnings of ~€500,000 in personal or collaborative funding
- 40 + publications in high tier peer-reviewed journals
- Postdoctoral fellowships at University of Basel and Modena and Reggio Emilia
  - Designed smart polymeric nanoparticles to deliver active biological compounds and characterization and optimization of PLGA nanoparticles for the delivery of enzymes
- Experienced in bioconjugate and polymer formulations for small drug, DNA, and siRNA payloads, peptide synthesis, and bio-conjugate chemistry
- Expert knowledge in cell culture and extensive knowledge in mouse models
- Trained and experienced with *in vivo* mouse handling and testing
- Extensive training with radiation and biohazard materials
- Supervised over 30 students (15 bachelors, 5 masters, and 12 Ph.D.)
- Organized Courses
- Familiar/active in both Italian and German, Mother Language English
- >25 lectures at international conferences (15 invited guest speaker) and many posters
- International collaborations/network including France, Ireland, Switzerland, Australia, Italy, Germany, Columbia, Uruguay, and United States
- **13/04/2021 Abilitation awarded** BANDO D.D. 2175/2018, SETTORE CONCORSUALE 03/D2 TECNOLOGIA, SOCIOECONOMIA E NORMATIVA DEI MEDICINALI: Professore Universitario di Seconda Fascia (art. 16, comma 1, Legge 240/10)

### B. Professional Experience

#### B1. Positions Officially held

**01.07.2022 – Present**

#### **RTD B Fixed researcher with track to professorship**

Nanomedicine targeted to hard to treat diseases such as brain cancer. This research includes the design formulation, optimization, and characterization of Nanomed in which ligands are added to the surface to improve drug targeting.

**16.04.2021 - 01.04.2022**

#### **Senior Research position (assegno di ricerca) University of Modena and Reggio Emilia in Conjunction with the Creutzfeldt–Jakob disease Foundation CJDF.**

*Ottimizzazione del delivery al cervello mediato da nanoparticelle di una porfirina tetracationica con potenti attività anti-prionica.*

This project was designed to analyse an active porpherin against Prions disease, that has already shown to have curative effects *in vitro*, and its inhibitory effects on targeting of already established g7 and other BBB targeting ligands in order to increase their brain targeting efficiency for improved and therapeutic *in vivo* treatments. This project will use NMR to analyse targeting peptides in solution with the novel porpherin in order to determine which moieties are binding and inhibiting the targeting capacity of the surface modified NMeds. Further experiments will be performed to validate new BBB targeting peptides that avoid this inhibitory effect and testing their ability to target the porpherin encapsulated in polymeric nanoparticles to the brain.

**01.06.2020 – 01.12.2020**

**6-month pilot project grant. Collaboration with the Bernal institute and the University of Limerick, Nmeds for improved GBM targeting, Unit participant, main author of project proposal.**

This project was a short term preliminary study (extended due to Covid) in order to study the cell binding and uptake of various different novel and potential BBB and GBM specific ligands for improved NMed therapeutics.

**01.04.2020- 30.03.2021**

**Post-Doctoral Research, University of Modena and Reggio Emilia/Fondazione Umberto Veronesi: “Glioblastoma Targeting with Nanotechnological Approaches”:**

*Improved GBM targeted NPS*

This project revolves around my design and testing of new targeting ligands to improve NP delivery both across the BBB and specifically to GBM cells for safer and more efficient brain cancer treatments.

**01.09.2019-30.03.2020**

**Junior Research position (assegno di ricerca) University of Modena and Reggio Emilia**

*Advanced NMed design for delivery of drugs with a wider range of physical characteristics*

I am designing and formulating novel NMed utilizing both polymer, sterol, and hybrid components in order to increase the versatility for the encapsulation of novel drugs of various chemical properties. This includes the encapsulation of small molecules, peptides, proteins, and enzymes for various diseases. A special focus is being placed on new anti-glioblastoma drugs/diagnostic agents and incorporating ligands for their targeted delivery to the brain. This involves the design, conjugation, formulation, and in vitro testing of uptake and killing potential of novel NMed to create not only a treatment method but an early-stage diagnostic agent.

**04.09.2019 - 3.10.2019**

**Unimore DSV Mobility Grant with the Biosciber labs University of Limerick.**

*Improved GBM Targeting*

**01.04.2019- 31.08.2019**

**Collaborazione coordinate continuative, University of Modena and Reggio Emilia**

*Nanoparticles for the delivery of bioactive agents*

This project had three major aims. 1) Formulation of nanomedicine carriers for delivery of anti-prion disease pharmaceuticals. 2) Optimization of methods to better evaluate the biodistribution (formulation and extraction from animal tissues) of lipidic and polymeric nanoparticles for in vivo biodistribution studies. 3) Formulation of targeted nanomedicine carriers targeted to Glioblastoma.

**01.04.2018 - 30.03.2019**

**Post-Doctoral Research (Borsista), University of Modena and Reggio Emilia/Fondazione Umberto Veronesi: “Targeted PLGA Nanoparticles for Gene Therapeutic Treatment of Krabbe Disease.”**

*Design, Formulation, and characterization of brain targeted nanoparticles for enzyme replacement therapy, and gene therapy of lysosomal storage diseases*

I optimized targeted PLGA nanoparticles against lysosomal storage disease. The goal is to increase stability, binding, and delivery of enzyme or plasmid DNA loaded nanoparticles *in vitro* and *in vivo*.

**01.04.2017- 30.03.2018**

**Post-Doctoral Research (Borsista), University of Modena and Reggio Emilia/Fondazione Umberto Veronesi: “Targeted PLGA Nanoparticles for Gene Therapeutic Treatment of Krabbe Disease.”**

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I optimized targeted PLGA nanoparticles against lysosomal storage disease. The goal is to increase stability, binding, and delivery of enzyme or plasmid DNA loaded nanoparticles *in vitro* and *in vivo*.

**05.04.2016- 31.03.2017**

**Assegnista, University of Modena and Reggio Emilia funded by ELA**

*Nanoparticles for the delivery of Enzymes to Treat Lysosomal storage diseases*

For the efficient delivery of enzymes to the brain, special techniques were designed to encapsulate an increased amount of large molecule enzymes into PLGA nanoparticles utilizing methodology much less

destructive for the enzyme to form the nanoparticles. This included the increased encapsulation of GALc (the enzyme lacking in Krabbe's disease and its *in vitro* testing for the ability to recover cell toxicity in lysosomal disease cell models, in collaboration with the NEST institute Pisa.

**01.01.2014- 31.01.2016**

**Post-Doctoral Research, University of Basel:**

*Design, formulation, and in vitro characterization of polymer-based nanoparticles and nanoreactors for improved therapeutics*

I explored Cellular uptake and stability of polymer nanoparticles for improved delivery into cells. The ultimate goal was to produce nanoparticles that could have targeted delivery, but also encapsulate triggerable activation of the cargo to create multifunctional nanoreactors. This includes the rational design and formulation of multifunctional (targeted, reducible, pH-sensitive, etc.) polymer nanoparticles for improved delivery and functional use in cells.

**10.02.2009 – 05.09.2013**

**Ph.D. University of Iowa Thesis Title:**

*“The Development and Biological Evaluation of Octreotide Containing Peptides for Receptor Mediated Non-Viral Gene Delivery”*

Targeted gene delivery peptides were designed to contain the somatostatin receptor 2 ligand Octreotide, a DNA binding peptide, and a PEG stealthing moiety. This involved me synthesizing peptides leading to advanced peptide bioconjugates by the use of orthogonal protecting groups. Formulations with these peptides were made by complexing with DNA or siRNA and analyzed for polyplex size, charge, shape, and toxicity. *In vitro* testing was performed to determine the biological activity of these compounds to bind somatostatin receptor 2 and create gene expression.

**Extended Project University of Iowa (06.09.2013- 15.12.2013)**

*In Vivo Analysis of Gene Delivery Systems*

I assessed the *in vivo* characteristics of polycationic peptides for their ability to increase circulatory half-life by decreasing serum interaction and first-pass clearance from the blood. This includes the handling of animals to perform biodistribution studies of radio-iodinated polyplexes, long term pharmacokinetic analysis, and live animal imaging of luciferase gene expression of these compounds. Current research is also being performed to generate live animal pharmacokinetic analysis techniques to dramatically decrease the difficulty, cost, and the number of mice required for statistically significant pharmacokinetic analysis.

**26.08.2007-04.09.2009**

**Masters Work, University of Iowa:**

*“The Development and Biological Evaluation of Octreotide Containing Peptides for Receptor Mediated Non-Viral Gene Delivery”*

Targeted gene delivery peptides were designed to contain the somatostatin receptor 2 ligand Octreotide, a DNA binding peptide, and a PEG stealthing moiety. This involved me synthesizing peptides leading to advanced peptide bioconjugates by the use of orthogonal protecting groups. Formulations with these peptides were made by complexing with DNA or siRNA and analyzed for polyplex size, charge, shape, and toxicity. *In vitro* testing was performed to determine the biological activity of these compounds to bind somatostatin receptor 2 and create gene expression.

**01.07.2006 - 31.07.2007**

**Cargill Corn Milling Cedar Rapids:**

*Internship in QA and product testing*

I was in charge of quality assurance and testing in plant products such as feed, high fructose corn syrup, slurry, gluten, and other corn products. I was responsible for the continual quality check to ensure that all processes were running appropriately, and customers were getting products in the required specification range. Also, I was put in charge of designing and calibrating the first FTIR based mill sample calibration which has since become operational cutting sample testing times down from 24 hours to in-line sample testing in the matter of seconds.

## **B2. Involvement in other projects and Collaborations**

### **2023 - Present**

PNRR: Health Extended ALliance for Innovative Therapies, Advanced Lab-research, and Integrated Approaches of Precision Medicine - HEAL ITALIA “Innovative diagnostics and therapies in precision medicine

### **2023 - Present**

Telethon grant: Deciphering Cholesterol efficacy on cognition in prodromal Huntington’s disease

### **2023 - Present**

Prin Grant 2022: Deciphering cell- and circuit-specific behavioral correlates following cholesterol-based Precision Nanomedicine in early Huntington’s disease.

### **2023 - 2024**

FAR: Nanomedicine for therapy of genetic iron-loading disorders: application in hemochromatosis, ferroportin disease and aceruloplasminemia

### **2019 - 2023**

Telethon grant: Pigment Epithelium- derived Factor (PEDF)peptides as therapeutic agents for inherited retinal degeneration

### **01-07-2019 - Present**

#### **Co-Funded AGAPI Grant collaboration for researchers under 40**

Flow- dependant regulation of Angiopoietin-2 and the role of Genistein in modulating the Angiogenic potential and Immunomodulation abilities of mesenchymal stem cells isolated from dental pups

### **01-01-2019 – 01.01.2023**

#### **Progetti di ricerca scientifica e tecnologica di grande rilevanza, Ministero degli Esteri (MAECI)**

Progetti di ricerca scientifica e tecnologica di grande rilevanza, Ministero degli Esteri (MAECI),  
Progetti Italy-USA in collaboration with the Prestigious Princeton University, Nanomedicine for BBBcrossing  
in CNS oncologic pathologies. Role: Unit Participant. Which led to the publications:  
10.3390/pharmaceutics12010072, 10.3390/molecules25204593, 10.3389/fphar.22.00574,  
10.3390/polym12040823, 10.1016/j.nano.2020.10.2226, 10.3390/pharmaceutics11110572,  
10.2217/nnm-2019-0367, 10.1080/17425247.2020.1698544, 10.1016/j.ijpharm.2019.118655.

### **01-07-2018 - Present**

#### **IMI EU Grants**

Investigating Mechanisms and Models predictive of accessibility of therapeutics (IM2PACT) Into the Brain. Collaboration with 23 international partners (im2pact.org) Unit Participant: Progetti di ricerca scientifica e tecnologica di grande rilevanza, Ministero degli Esteri,  
Progetti Italy-USA in collaboration with the prestigious Princeton University, Nanomedicine for BBBcrossing in CNS oncologic pathologies. Which produced the publications:  
10.3390/pharmaceutics12010072, 10.1016/j.nano.2020.102226, 10.2217/nnm-2019-0367,  
10.1080/17425247.2020.1698544, 10.1016/j.ijpharm.2018.03.061

### **01-01-2018 - Present**

#### **Project Regionale PorFESr:Mat2Rep**

Progetto Regionale PorFesr:Mat2Rep Biomateriali multifunzionali per l'autoriparazione di tessuti ed organi. In collaboration with 10 international research institutes and companies (mat2rep.it) Role: Unit Participant: Which led to publications: 10.3389/fphar.2020.00574, 10.3390/polym12040823

### **01-12-2017 - Present**

**Telethon and Ministero della Salute in collaboration with the Mario Negri Institute**  
Nps for the in vivo delivery of a novel porphyrin with anti-prion therapeutic activity

### **05-04-2016 a 01-04-2017**

### **ELA Research Foundation**

European Leukodystrophy Association (ELA) Research Foundation: Development of a novel, nanovector-mediated enzyme replacement therapy for Globoid Cell Leukodystrophy (GLD) in collaboration with the NEST Research Center Pisa Italy, Role: Unit Participant which produced the publications: 10.1016/bs.irm.2017.08.006

**01-01-2016 - 04-04-2016**

**FAR UNIMORE grant: Single Particle Tracking: nanomedicine and quantum dots, Role: Independent Researcher**

### **B3. Teaching**

- a. **Mount Mercy College 2005- 2007-** student center for excellence tutor. The University paid me to do a work-study helping tutor any student who arrived at the help center in science and math.
- b. **University of Iowa 26.08.2007 – 05.09.2013**  
Wrote, proctored, and graded exams for 150 pharmacy students each year
- c. **University of Basel 01.05.2015- 31.01.2016**  
Organized, managed, and taught Physical chemistry lab practicum for 150 bachelor level students
- d. **University of Modena 01.05.2016 – present**  
Aid in the lab practicum for the biotechnology bachelor level students
- e. **University of Modena and Reggio Emilia 2020-present**  
Nanomedicine Doctoral course
- f. **University of Modena and Reggio Emilia 2022-2023**  
tecnologia di farmaceutics
- g. **University of Modena and Reggio Emilia 2023-present**  
Produzione Tecnologica Di Farmaci (IV anno, II semestre, CTF -9 CFU; 76 ore)

### **C. Education**

<b>13/04/2021</b>	<b>Abilitation awarded</b> (BANDO D.D. 2175/2018, SETTORE CONCORSUALE 03/D2 TECNOLOGIA, SOCIOECONOMIA E NORMATIVA DEI MEDICINALI)
04.09.2009 - 05.09.2013	Ph.D. Pharmacy, College of Pharmacy, University of Iowa, Iowa City Iowa USA. Supervisor: Professor Kevin G. Rice The department of Pharmacy hosted a PhD in medicinal and natural products chemistry that combined the masters and PhD into one degree.
26.08.2007 - 04.09.2009	Ph.D. Pharmacy, College of Pharmacy, University of Iowa, Iowa City Iowa USA. Supervisor: Professor Kevin G. Rice The department of Pharmacy hosted a PhD in medicinal and natural products chemistry that combined the masters and PhD into one degree.
20.08.2003 - 18.05.2007	B.S. Biology and Chemistry. Mount Mercy College, Cedar Rapids, Iowa USA.
19.08.1999 - 22.05.2003	High school diploma, Widefield High School, Colorado Springs, CO USA

#### **D. Publications:**

I have published over 30 peer-reviewed scientific articles and two book chapter in high profile journals in the field with citations of 320 to date and an h-index of 15 and growing. These are listed below with the journal impact factor and citations per article.

1. Fernandez CA, Baumhover NJ, **Duskey JT**, Khargharia S., Kizzire K., Ericson MD, Rice KG Metabolically Stabilized Long-Circulating PEGylated Polyacridine Peptide Polyplexes Mediate Hydrodynamically Stimulated Gene Expression In Liver. *Gene Therapy*. 2011; 18(1): 23-27 (3.227, cited 23 times)
2. **Duskey JT**. "The development and biological evaluation of Octreotide containing peptides for receptor mediated nonviral gene delivery." PhD (Doctor of Philosophy) thesis, University of Iowa, 2013. <http://ir.uiowa.edu/etd/4965>. N/A
3. **Duskey JT**, Rice KG Nanoparticle Ligand Presentation for targeting solid Tumors. *AAPS PharmSciTech*, 2014; 15(5): 1345-1354 (2.608, cited 18 times)
4. Khargharia S, Baumhover NJ, **Duskey JT**, Crowley S, Rice KG The uptake Mechanism of PEGylated DNA Polyplexes by the Liver Influences Gene Expression. *Gene Therapy*. 2014; 21(12): 1021-1028 (3.227, cited 8 times)
5. Liu J, Crowley ST, **Duskey JT**, Khargharia S, Wu M, Rice KG Miniaturization of Gene Transfection Assays in 384 and 1536-Well Microplates. *Anal. Biochem*, 2015; 470: 14-21 (3.286, cited 7 times)
6. Car A; Baumann P; **Duskey JT**; Chami M, Bruns N; Meier W pH-responsive PDMS-b-PDMAEMA micelles for intracellular anticancer drug delivery. *Biomacromolecules*. 2014; 15(9): 3235-3245 (5.667, cited 68 times)
7. Richard PU, **Duskey JT**, Stolarov S, Spulber M, Palivan CG New concepts to fight oxidative stress: 3D supramolecular antioxidant nano-assemblies. *Expert Opin. Drug. Deliv*. 2015; 12(9): 1527-1545 (5.40, cited 14 times)
8. Najer A, Thamboo S, **Duskey JT**, Palivan CG, Beck HP, Meier W Analysis of Molecular Parameters Determining the Antimalarial Activity of Polymer-Based Nanomimics. *Macromolecular Rapid Communications*. 2015; 36(21): 1923-1928 (4.441, cited 4 times)
9. Liu J, Postupalenko V, **Duskey JT**, Palivan CG, Meier W pH-triggered reversible multiple protein-polymer conjugation based on molecular recognition. *J. Phys. Chem. B*. 2015; 119(36): 12066-12073 (2.923, cited 1 time)
10. Sigg SJ, Postupalenko V, **Duskey JT**, Palivan CG, Meier W Stimuli-Responsive Codelivery of Oligonucleotides and Drugs by Self-Assembled Peptide Nanoparticles. *Biomacromolecules*. 2016; 17(3): 935-945 (5.667, cited 21 times)
11. Baumhover NJ, **Duskey JT**, Khargharia S, White CW, Crowley ST, Allen RJ, Rice KG Structure–Activity Relationship of PEGylated Polylysine Peptides as Scavenger Receptor Inhibitors for Non-Viral Gene Delivery. *Mol. Pharmaceutics*. 2015; 12(12), 4321–4328 (4.396, cited 13 times)
12. Nussbaumer MG, Rother M, Renggli K, Chami M, Postupalenko V, **Duskey JT**, Bruns N Chaperonin-Dendrimer. Conjugates for siRNA Delivery. *Advanced Science*. 2016; 3(10) (12.441, cited 18 times)
13. Dinu IA, **Duskey JT**, Car A, Palivan CG, Meier W Engineered non-toxic cationic nanocarriers with photo-triggered slow-release properties. *Polymer Chemistry*. 2016; 7(20): 3451-3464 (4.760, cited 14 times)
14. **Duskey JT**, Belletti D, Pederzoli F, Vandelli MA, Forni F, Ruozi B, Tosi G Current Strategies for the Delivery of Therapeutic Proteins and Enzymes to Treat Brain Disorders. *International Review of Neurobiology*. 2017; 137: 1-28 (2.371, cited 1 time)
15. Belletti D, Grabrucker AM, Pederzoli F, Menrath I, Vandelli MA, Tosi G, **Duskey JT**, Forni F, Ruozi B Hybrid nanoparticles as a new technological approach to enhance the delivery of cholesterol into the brain. *Int J Pharm*. 2018; 543(1-2): 300-310 (4.213)
16. Tosi G, Pederzoli F, Belletti D, Vandelli MA, Forni F, **Duskey JT**, Ruozi B Nanomedicine in Alzheimer's disease: Amyloid beta targeting strategy. *Prog Brain Res*. 2019; 245(2): 57-88 (3.174 cited 1 time)
17. Rigon L, Salvalaio M, Pederzoli F, Legnini E, **Duskey JT**, D'Avanzo F, De Filippis C, Ruozi B, Marin O, Vandelli MA, Ottonelli I, Scarpa M, Tosi G, Tomanin R Targeting Brain Disease in MPSII: Preclinical Evaluation of IDS-Loaded PLGA Nanoparticles. *Int J Mol Sci*. 2019; 20(8) (4.183)
18. Pederzoli F, Ruozi B, **Duskey JT**, Hagemeyer S, Sauer AK, Grabrucker S, Oddone N, Daini E, Zoli M, Vandelli MA, Tosi G, Grabrucker AM Nanomedicine against A $\beta$  aggregation by  $\beta$ -sheet breaker peptide delivery: in vitro evidences. *Pharmaceutics* 2019; 11(11) (3.746)
19. Oddone N, Pederzoli F, **Duskey JT**, De Benedictiis, CA, Grabrucker AM, Forni, F, Vandelli MA, Ruozi B, Tosi G ROS-responsive "smart" polymeric conjugate: Synthesis, characterization and proof of concept study. *Inter. J. Pharm*. 2019; 570. (4.213)

20. **Duskey JT**, Baraldi C, Gamberini MC, Ottonelli I, Da Ros F, Tosi G, Forni F, Vandelli MA, Ruozi B Investigating Novel Syntheses of a Series of Unique Hybrid PLGA-Chitosan Polymers for Potential Therapeutic Delivery Applications. *Polymers*. 2020; 12(4): 823 (3.164)
21. Tosi G, **Duskey JT**, Kreuter J Nanoparticles as Carriers for Drug Delivery of Macromolecules Across the Blood-Brain Barrier. *Expert Opin Drug Deliv*. 2020 17(1):23-32 (4.84)
22. Oddone N, Boury F, Garcion E, Grabrucker AM, Martinez C, Da Ros F, Janaszewska A, Forni F, Vandelli MA, Tosi G, Ruozi B, **Duskey JT** Synthesis, Characterization, and In Vitro Studies of an Reactive Oxygen Species (ROS)-Responsive Methoxy Polyethylene Glycol-Thioketal-Melphalan Prodrug for Glioblastoma Treatment. *Front Pharmacol*. 2020; 11: 574. (4.4)
23. Hoyos-Ceballos GP, Ruozi B, Ottonelli I, Da Ros F, Vandelli MA, Forni F, Daini E, Vilella A, Zoli M, Tosi G, **Duskey JT\***, López-Osorio BL Drug delivery across the blood–brain barrier: recent advances in the use of nanocarriers PLGA-PEG-ANG-2 Nanoparticles for Blood–Brain Barrier Crossing: Proof-of-Concept Study. *Pharmaceutics*. 2020; 12(1): 72. (4.773)
24. **Duskey JT**, Ottonelli I, DA Ros F, Vilella A, Zoli A, Kovachka S, Spyraakis F, Vandelli MA, Tosi G, Ruozi B Novel peptide-conjugated nanomedicines for brain targeting: In vivo evidences. *Nanomed. Nanotech. Biol. Med*. 2020; 28. 10.1016/j.nano.2020.102226 (5.57)
25. **Duskey JT**, Da Ros F, Ottonelli I, Zambelli B, Vandelli MA, Tosi G, Ruozi, B Enzyme Stability in Nanoparticle Preparations Part 1: Bovine Serum Albumin Improves Enzyme Function. *Molecules*. 2020. doi: 10.3390/molecules25204593
26. Birolini, Giulia, Valenza, Marta, Ottonelli, Ilaria, Passoni, Alice, Favagrossa, Monica, **Duskey, JT**, Bombaci, Mauro, Vandelli, Maria Angela, Colombo, Laura, Bagnati, Renzo, Caccia, Claudio, Leoni, Valerio, Taroni, Franco, Forni, Flavio, Ruozi, Barbara, Salmona, Mario, Tosi, Giovanni, Cattaneo, Elena. Insights into kinetics, release, and behavioral effects of brain-targeted hybrid nanoparticles for cholesterol delivery in Huntington's disease. *JOURNAL OF CONTROLLED RELEASE*. 2021; 330. doi: 10.1016/j.jconrel.2020.12.051(3.267)
27. Musumeci T., Bonaccorso A., Carbone C., Impallomeni G., Ballistreri A., **Duskey JT.**, Puglisi G., Pignatello R. Development and biocompatibility assessments of poly(3-hydroxybutyrate-co-ε-caprolactone) microparticles for diclofenac sodium delivery. *JOURNAL OF DRUG DELIVERY SCIENCE AND TECHNOLOGY*. 2020;60. doi: 10.1016/j.jddst.2020.102081 (2.734)
28. Sgarbi V, Ruozi B, Pederzoli F, **Duskey JT**, Ottonelli I, Oddone N, Vandelli MA, Forni F, Tosi G Glioblastoma: state of art of treatments and application of polymeric and lipidic nanomedicines. Book: *Nanotherapy for Brain Tumor Drug Delivery; Neuromethod series*. Ed. Springer Nature Publishers. 2021 10.1007/978-1-0716-1052-7\_1
29. Cano A, Turowski P, Ettcheto M, **Duskey JT**, Tosi G, Sánchez-López E, García ML, Camins A, Souto EB, Ruiz A, Marquié M, andBoada M.Nanomedicine-based technologies and novel biomarkers for the diagnosis and treatment of Alzheimer's disease: from current to future challenges. *J. Nanobiotechnol*. 2021 19:122. <https://doi.org/10.1186/s12951-021-00864-x>.
30. Alastra G, Aloe L, Baldassarro AV, Calzà Lara, Cescatti M, **Duskey JT**, Focarete ML, Giacomini D, Giardino L, Giraldo V, Lorenzini L, Moretti M, Parmeggiani I, Sannia M, Tosi G. Nerve Growth Factor Biodelivery: a limiting step in moving toward extensive clinical application? *Front Neurosci*. 2021; 15: 695592. doi: 10.3389/fnins.2021.695592
31. Ottonelli I, Grazioli MV, Rinaldi A, Parmeggiani I, Vandelli MA, Tosi G, Ruozi B, and **Duskey JT**. Optimization to Formulate Therapeutic PLGA-Chol Hybrid NPs with microfluidics for their Potential Scale-Up and Commercial Production. *Pharmaceutics*. 2021. 17;13(9):1495. doi: 10.3390/pharmaceutics13091495.
32. **Duskey, J.T.**; Ottonelli, I.; Rinaldi, A.; Parmeggiani, I.; Zambelli, B.; Wang, L.Z.; Prud'homme, R.K.; Vandelli, M.A.; Tosi, G.; Ruozi, B. Tween® Preserves Enzyme Activity and Stability in PLGA Nanoparticles. *Nanomaterials* 2021, 11, 2946, doi:10.3390/nano11112946.
33. Ottonelli, I.; Caraffi, R.; Tosi, G.; Vandelli, M.A.; **Duskey, J.T.**; Ruozi, B. Tunneling Nanotubes: A New Target for Nanomedicine? *International Journal of Molecular Sciences* 2022, 23, 2237, doi:10.3390/ijms23042237
34. Rinaldi A.,Caraffi R., Grazioli M.V., Oddone N., Giardino L., Tosi G., Vandelli M.A., Calzà L., Ruozi B. and **Duskey J.T.**, Applications of the ROS responsive Thioketal linker for the production of smart nanomedicines, *Polymers* 2022, 14, doi: 10.3390/polym14040687
35. **Duskey, J.T.**; Rinaldi, A.; Ottonelli, I.; Caraffi, R.; De Benedictis, C.A.; Sauer, A.K.; Tosi, G.; Vandelli, M.A.; Ruozi, B.; Grabrucker, A.M. Glioblastoma Multiforme Selective Nanomedicines for Improved Anti-Cancer Treatments. *Pharmaceutics* 2022, 14, 1450, doi:10.3390/pharmaceutics14071450.

36. Alessia Romeo, Angela Bonaccorso, Claudia Carbone, Gabriella Lupo, Carmelina Daniela Anuso, Giovanni Giurandella, Cinzia Caggia, Cinzia Randazzo, Nunziatina Russo, Giovanni Luca Romano, Claudio Bucolo, Rizzo Milena, Giovanni Tosi, **Jason Thomas Duskey**, Barbara Ruozi, Rosario Pignatello, Teresa Musumeci: Melatonin loaded hybrid nanomedicine: DoE approach, optimization and in vitro study on diabetic retinopathy model, *intern. j. pharm.* 2022 Nov 5;627:122195. doi: 10.1016/j.ijpharm.2022.122195
37. Ottonelli, I.; **Duskey, J.T.**; Genovese, F.; Pederzoli, F.; Caraffi, R.; Valenza, M.; Tosi, G.; Vandelli, M.A.; Ruozi, B. Quantitative Comparison of the Protein Corona of Nanoparticles with Different Matrices. *International Journal of Pharmaceutics: X* 2022, 4, 100136, doi:10.1016/j.ijpx.2022.100136.
38. Ilaria Ottonelli, Andrea Bighinati, Elisa Adani, François Loll, Riccardo Caraffi, Maria Angela Vandelli, Frank Boury, Giovanni Tosi, **Jason Thomas Duskey\***, Valeria Marigo, and Barbara Ruozi. Optimization of an injectable hydrogel depot system for the controlled release of retinal targeted hybrid nanoparticles, *Pharmaceutics*. 2022 Dec 21;15(1):25. doi: 10.3390/pharmaceutics15010025 .
39. Francesca Rodà, Riccardo Caraffi, Silvia Picciolini, Giovanni Tosi, Maria Angela Vandelli, Barbara Ruozi, Marzia Bedoni, Ilaria Ottonelli, and Jason **Thomas Duskey\***, Recent Advances on Surface-Modified GBM Targeted Nanoparticles: Targeting Strategies and Surface Characterization. *IJMS*. 24:2496. 10.3390/ijms24032496
40. **Jason T. Duskey**, Alexander B. Cook, Gabriella Costabile, Giovanni Tosi, and Michele Schlich New formulation approaches Chapter 18: An overview of current drug delivery strategies for glioblastoma treatment and barriers to progress.
41. Moretti, M.; Caraffi, R.; Lorenzini, L.; Ottonelli, I.; Sannia, M.; Alastra, G.; Baldassarro, V.A.; Giuliani, A.; **Duskey, J.T.**; Cescatti, M.; et al. “Combo” Multi-Target Pharmacological Therapy and New Formulations to Reduce Inflammation and Improve Endogenous Remyelination in Traumatic Spinal Cord Injury. *Cells* 2023, 12, 1331, doi:10.3390/cells12091331.
42. Birolini, G.; Valenza, M.; Ottonelli, I.; Talpo, F.; Minoli, L.; Cappelleri, A.; Bombaci, M.; Caccia, C.; Canevari, C.; Trucco, A., **Duskey**, Caraffi ; et al. Chronic Cholesterol Administration to the Brain Supports Complete and Long-Lasting Cognitive and Motor Amelioration in Huntington’s Disease. *Pharmacological Research* 2023, 106823, doi:10.1016/j.phrs.2023.106823.
43. Ottonelli, I.; Sharma, A.; Ruozi, B.; Tosi, G.; **Duskey, J.T.**; Vandelli, M.A.; Lafuente, J.V.; Nozari, A.; Muresanu, D.F.; Buzoianu, A.D.; et al. Nanowired Delivery of Curcumin Attenuates Methamphetamine Neurotoxicity and Elevates Levels of Dopamine and Brain-Derived Neurotrophic Factor. In *Progress in Nanomedicine in Neurologic Diseases*; Sharma, H.S., Sharma, A., Eds.; Advances in Neurobiology; Springer International Publishing: Cham, 2023; pp. 385–416 ISBN 978-3-031-32997-5. Progress in Nanomedicine in Neurologic Disease, doi.org/10.1007/978-3-031-32997-5
44. d’Avanzo, N.; Sidorenko, V.; Simón-Gracia, L.; Rocchi, A.; Ottonelli, I.; Ruozi, B.; Longo, F.; Celia, C.; Teesalu, T. C-End Rule Peptide-Guided Niosomes for Prostate Cancer Cell Targeting. *Journal of Drug Delivery Science and Technology* 2024, 91, 105162, doi:10.1016/j.jddst.2023.105162.
45. Rinaldi, A.; Dumas, F.; Duskey, J.T.; Imbriano, C.; Belluti, S.; Roy, C.; Ottonelli, I.; Vandelli, M.A.; Ruozi, B.; Garcion, E.; et al. Polymer-Lipid Hybrid Nanomedicines to Deliver siRNA in and against Glioblastoma Cells. *International Journal of Pharmaceutics* 2024, 654, 123994, doi:10.1016/j.ijpharm.2024.123994.
46. Ottonelli, I.; Adani, E.; Bighinati, A.; Cuoghi, S.; Tosi, G.; Vandelli, M.A.; Ruozi, B.; Marigo, V.; Duskey, J.T. Strategies for Improved pDNA Loading and Protection Using Cationic and Neutral LNPs with Industrial Scalability Potential Using Microfluidic Technology. *IJN* 2024, 19, 4235–4251, doi:10.2147/IJN.S457302.
47. Cuoghi, S.; Caraffi, R.; Anderlini, A.; Baraldi, C.; Enzo, E.; Vandelli, M.A.; Tosi, G.; Ruozi, B.; Duskey, J.T.; Ottonelli, I. Challenges of Enzyme Therapy: Why Two Players Are Better than One. *WIREs Nanomedicine and Nanobiotechnology* 2024, 16, e1979, doi:10.1002/wnan.1979.

### **E. Awards and Funding**

- 30.04.2004 - Freshman Chemist of the Year Award (Mount Mercy College) (**\$100**)
- 24.01.2012 - MNPC Graduate Student Travel Award – (**\$200**)
- 01.01.2016 - FAR UNIMORE grant: Single Particle Tracking: nanomedicine and quantum dots, Role: Independent Researcher (**Project budget 33,000 Euro**)
- 05.04.2016 - ELA Research Foundation: Development of a novel, nanovector-mediated enzyme replacement therapy for Globoid Cell Leukodystrophy (GLD), Role: Independent Researcher (**Project budget 50,000 euros**)

- 01.04.2017 - Fondazione Umberto Veronesi Research Fellow (~**30,000 euro**)  
*Targeted PLGA Nanoparticles for Gene Therapeutic Treatment of Krabbe Disease*
- 01.04.2018 - Fondazione Umberto Veronesi Research Fellow (~**30,000 euro**)  
*Targeted PLGA Nanoparticles for Gene Therapeutic Treatment of Krabbe Disease*
- 10.05.2018- Travel award 20th Herrenalber Barrier- and Transporter Meeting (**Full travel cost and registration ~500 euro**)
- 01.07.2019 Co-funded AGAPI Grant collaboration for Researchers under 40 (**Project Budget €80,000**)
- 07-11-2019 In vivo evidence for Novel Brain Targeted Peptide-Conjugated Nanomedicines". Best Poster Award, CRS Italy Section Catania
- 01.09.2019- University of Modena and Reggio Emilia Travel Grant Initiating a collaboration with BIUL (**€3,000**)
- 01.04.2020- Fondazione Umberto Veronesi Research Fellow (~**30,000 euro**)  
Improved nanomedicines for targeting Glioblastoma
- 01.06.2020- 6 month pilot project grant. Collaboration with the Bernal institute and the University of Limerick  
Nmeds for improved GBM targeting (**3,000 euro**)
- 13/04/2021 Abilitation awarded** (BANDO D.D. 2175/2018, SETTORE CONCORSUALE 03/D2 TECNOLOGIA, SOCIOECONOMIA E NORMATIVA DEI MEDICINALI)
- 2022-2023 FAR GBM: Nuovi approcci per il trattamento di Glioblastoma con Nanoparticelle e CAR-T
- 2021-2023 Creutzfeldt-Jakob Disease Foundation: Optimization of nanoparticle-mediated brain delivery of a tetracationic porphyrin with potent anti-prion activities
- 2020-2023 Progetti PORFERS: Mat2Rep, Studio di scaffolds per il lento rilascio di farmaci – applicazioni per Medicina Rigenerativa
- 2019-2023 PROGETTI DI RICERCA SCIENTIFICA E TECNOLOGICA DI GRANDE RILEVANZA, Ministero degli Esteri, Progetti Italy-USA, Nanomedicine for BBB-crossing in CNS oncologic pathologies
- 2019-2023 IMI EU Grants: Investigating Mechanisms and Models predictive of accessibility of therapeutics (IM2PACT) Into the Brain
- 2024 Travel grant: Chemotherapeutic Nanomedicines For simultaneous Brain and GBM Targeted Treatments. CRS World (Bologna\*) invited speaker AND travel grant winner
- 2024 Travel grant: Improved pDNA-loading in lipid NPs through microfluidics: optimization and in vitro trials, NanoLondon (november, London) travel grant winner

## **F. Conference Presentations (\* bold titles indicate invited speaker)**

- 10.02.2009 - Synthesis and Evaluation of Liver Selective Cholesterol Lowering Thyroid Hormone Analogues (University of Iowa)
- 25.01.2011 - Gene Delivery with Synthetic Bioconjugate Peptides (University of Iowa)
- 10.04.2011 - Synthesis of DNA Binding Bioconjugate Peptides Containing the Somatostatin Receptor Ligand Octreotide (University of Kansas)
- 03.08.2013 - The Development and Biological Evaluation of Octreotide Containing Peptides for Receptor Mediated Non-Viral Gene Delivery (University of Iowa)
- 04.05.2015 - Photo-Sensitive Cationic Polymers for Non-Toxic Stimulated Release and Delivery of Small Molecules (Paul Scherrer Institute)
- 27.08.2017 - **Protein, Enzyme, and Gene Delivery in Nanoscience (Nannoinnovations, Rome Invited Speaker)**
- 28.08.2017 - **Challenges in the Development of Nanoparticle-Based Systems for Enzyme Delivery to the Brain (Nannoinnovations, Rome Invited Speaker)**
- 07.05.2018 - **Recent Attempts to Surpass the BBB to treat Brain Disorders (Bad Herrenalb Transporter Days Invited Speaker)**
- 12.06.2019 - **Nanomedicine for Brain Diseases: preclinical application (Nannoinnovations, Rome Invited Speaker)**
- 30.09.2019- **Reaching Towards Improved Polymeric/Hybrid Nanoparticle Versatility for CNS Targeted Therapeutics Against Brain Diseases. Bernal Institute and University of Limerick (Seminar Series Department of Biological Sciences, BioSciber Group, Bernal Institute, Invited Speaker)**
- 20.11.2019- **Advancing Smart NMED's Against Brain Diseases from Conception to Completion University of Princeton USA (Seminar Series, Department of Chemical and Biological Engineering Invited Speaker)**
- 23.06.2020- **Tailored Nanomedicines for Drug Delivery to the Brain (Nanoworld Virtual Conference, Boston Invited Speaker)**
- 16-09-2020- **Invited Guest Speaker, Oral Presentation, Nannoinnovations, Rome Italy, "Brain Targeted Nanomedicine:More Than Just Crossing the BBB"**
- 14-10-2020- **Invited Speaker from selected Abstracts: ETPN 2020 virutal conference Pitch me up session, "Completing Targeted Nanomedicine Systems For Improved GBM Treatment Options."**
- 12-11-2020- **Seminar per studenti di LM Biotecnologie, "Nanomedicine: Researching to create improved treatments for Central Nervous System (CNS) diseases."**
- 14-09-2021- **Nanomeet2021 Porto Portugal, "Optimized Polymeric Nanomedicines for Enhanced Glioblastoma Multiforme (GBM) Targeting and Treatment"**
- 23-09-2021- **Nannoinnovations Roma, "Improved GBM Targeting: Nanomedicines Approaches from Conception to Testing.**
- 13-10-2021- **Optimization of nanoparticle-mediated brain delivery of a tetracationic porphyrin with potent anti-prion activities**
- 16-02-2022 **Jason Thomas Duskey: Nanomedicine: Researching to create improved treatments for central nervous system (CNS) diseases. Biotech Med seminar series**
- 27-02-2022 **Jason Thomas Duskey: Implantable and injectable polymeric delivery systems. The Amirkabir University of Technology Winter School.**
- 19-09-2022 **Jason Thomas Duskey: Targeted Nanomedicines for Cancer Therapy: More than Just Crossing the BBB. Nannoinnovations (Roma) Sett. 19-23**
- 25-10-2022 **Jason Thomas Duskey: Targeted Nanomedicines for Cancer Therapy: More than Just Crossing the BBB. COST ACTION Consortium presentations (Roma)**
- 12-14.06.2023 **Dually Targeted Brain and GBM Specific Nanomedicines. NANO ROME, 9th nanotech and nanomaterials research conference (Rome Italy) nannoinnovation 2023**
- 09-07-2024 **Jason Thomas Duskey: Chemotherapeutic Nanomedicines For simultaneous Brain and GBM Targeted Treatments. CRS World (Bologna\*) invited speaker AND travel grant winner**
- 08-22-2024 **Jason Thomas Duskey: Smart systems for hard to treat diseases, Sci (Milano)**
- 05-11-2024 **Jason Thomas Duskey: Improved pDNA-loading in lipid NPs through microfluidics: optimization and in vitro trials, NanoLondon (november, London) travel grant winner**

## Posters-

- 04-03-2017** A. Del Grosso, J. T. Duskey, L. Angella, E. Petri, I. Tonazzini, M. Allegra, F. Pederzoli, B. Ruozi, M.A. Vandelli, F. Forni, M. Caleo, G. Tosi, M. Cecchini "Moving towards a novel nanovector-mediated enzyme replacement therapy for Globoid Cell Leukodystrophy (GLD)". Gordan Conference, Lucca Italy.
- 01-10-2017** D. Belletti, F. Pederzoli, J. Keller, J. Duskey, N. Oddone, MA. Vandelli, G. Tosi, AM. Grabrucker, B. Ruozi "Curcumin loaded nanoparticles in Alzheimer's disease." CRS--macromolecules in Drug Delivery; Fisciano University, Salerno Italy.
- 01-10-2017** F. Pederzoli, D. Belletti, R. Tomanin, J. Duskey, N. Oddone, F. Forni, MA. Vandelli, B. Ruozi, G. Tosi, "Challenges in the development of enzyme loaded nanoparticles." Aitun, Bologna Italy, CRS Macromolecules in Drug Delivery.
- 10-05-2018** F. Pederzoli, J. Duskey, M.A. Vandelli, F. Forni, B. Ruozi, G. Tosi "Enzyme Replacement Therapy (ERT): an open challenge of nanomedicine" 12th Aitun Bologna, Italy.
- 12-05-2018** J. Duskey, MA. Vandelli, F. Forni, E. Marcolini, B. Ruozi, G. Tosi, R. Chiesa "PLGA Nanoparticles as Nanoparticle Carriers for Molecules Against Prion Disease" 12th Aitun, Bologna Italy.
- 12-05-2018** G. Tosi\*, F. Pederzoli, D. Belletti, J. Duskey, N. Oddone, MA. Vandelli, F. Forni, B. Ruozi "Nanomed. in Neurodeg. Disorders." ICONAN Roma Italy.
- 12-09-2018** D. Belletti, F. Pederzoli, J. Duskey, N. Oddone, MA. Vandelli, F. Forni, G. Tosi\*, B. Ruozi "Nanomed. in protein and enzyme del. to the brain." ICONAN Roma Italy.
- 12-09-2018** N. Oddone, D. Belletti, F. Pederzoli, J. Duskey, MA. Vandelli, F. Forni, B. Ruozi, G. Tosi, "Innov. in smart drug del. systems." ICONAN Roma Italy.
- 14-10-2018** J. Duskey, F. Forni, G. Tosi, MA. Vandelli, B. Ruozi, R. Chiesa, "Delivery of a Novel Prion Disease Inhibitor with CNS Targeted PLGA Nanoparticles." CRS Adv. Drug Del. and Biomat.: facts and vision, Padova Italy.
- 14-10-2018** F. Pederzoli, B. Ruozi, N. Oddone, R. Tomanin, MA. Vandelli, J. Duskey, F. Forni, G. Tosi, "Enzyme loaded PLGA nanoparticles." CRS Adv. Drug Del. and Biomat.: facts and vision, Padova Italy.
- 11-06-2019** N. Oddone, F. Pederzoli, AM. Grabrucker, JT. Duskey, F. Forni, MA. Vandelli, Ruozi B, G. Tosi "ROS- responsive "smart" polymer prodrugs...." AFI, Rimini, Italy.
- 18-06-2019** F. Pederzoli, B. Ruozi, J.T. Duskey, I. Ottonelli, S. Hagemeyer, AK. Sauer, S. Grabrucker, N. Oddone, E. Daini, M. Zoli, MA. Vandelli, AM. Grabrucker, G. Tosi "New strategies for delivery of a  $\beta$ -sheet breaker peptide against  $\beta$ -amyloid aggregation." Istituto superiore della sanità Rome, Italy.
- 18-06-2019** N. Oddone, F. Pederzoli, AM. Grabrucker, JT. Duskey, F. Forni, MA. Vandelli, B. Ruozi, G. Tosi "ROS-responsive "smart" polymer prodrugs: synthesis, characterization and proof of concept study" Istituto superiore della sanità Rome.
- 18-06-2019** F. Pederzoli, G. Tosi, JT. Duskey, N. Oddone, F. Forni, M. Valenza, E. Cattaneo, MA. Vandelli, B. Ruozi "NanoTechnological proposal for Chol-brain delivery nanomedicines as therapeutic approach." Istituto superiore della sanità, Rome Italy.

- 07-11-2019** JT. Duskey, F. Pederzoli, MA. Vandelli, F. Forni, B. Ruozi, G. Tosi, R. Chiesa "In vivo evidence for Novel Brain Targeted Peptide-Conjugated Nanomedicines". Best Poster Award: CRS Italy Catania Section, Catania Italy.
- 11-12-2019** Federica Da Ros<sup>1</sup>, Jason Thomas Duskey<sup>1</sup>, Giovanni Tosi<sup>1</sup>, Barbara Ruozi<sup>1</sup> Natalia Oddone<sup>1</sup>, Andreas Grabrucker<sup>1</sup>, Maria Vandelli<sup>1</sup>, Flavio Forni<sup>1</sup> "GLIOBLASTOMA-TARGETED NANOMEDICINES, School of Nanomedicine." Poster author: School of Nanomedicine, Trieste Italy.
- 11-12-2019** I. Ottonelli<sup>1</sup>, G. Tosi<sup>1\*</sup>, N. Oddone<sup>1</sup>, J. T. Duskey<sup>1</sup>, A. Vilella<sup>2</sup>, S. Kovachka<sup>3</sup>, F. Spyraakis<sup>3</sup>, M. A. Vandelli<sup>1</sup>, B. Ruozi, "NEW PEPTIDES FOR BRAIN TARGETING IN NANOMEDICINE" School of Nanomedicine, Trieste Italy.
- 17-12-2019** I. Ottonella<sup>1,b</sup>, G. Tosia<sup>\*</sup>, N. Oddone<sup>a,b</sup>, J. T. Duskey<sup>a</sup>, A. Vilella<sup>c</sup>, S. Kovachka<sup>d</sup>, F. Spyraakis<sup>d</sup>, M. A. Vandella<sup>a</sup>, B. Ruozi<sup>a\*</sup> "NANOMEDICINE FOR BRAIN TARGETING." Giornata della Chimica dell'Emilia Romagna, Modena Italy.
- 17-12-2019** Federica Da Ros<sup>1</sup>, Jason Thomas Duskey<sup>1</sup>, Giovanni Tosi<sup>1</sup>, Barbara Ruozi<sup>1</sup> Natalia Oddone<sup>1</sup>, Andreas Grabrucker<sup>1</sup>, Maria Vandelli<sup>1</sup>, Flavio Forni<sup>1</sup> Giornata della Chimica dell'Emilia Romagna, Modena Italy. "TAILORING POLYMERIC NANOPARTICLES FOR BLOOD-BRAIN CROSSING AND GLIOBLASTOMA TARGETING."
- 01-10-2020** Ilaria Ottonelli, Giulia Birolini, Federica Da Ros, Jason Duskey, Giovanni Tosi, Maria Angela Vandelli, Flavio Forni, Marta Valenza, Elena Cattaneo, Barbara Ruozi "Hybrid Cholesterol Nanoparticles to treat Huntington's Disease" - Workshop on glial cells-neuron crosstalk in CNS health and disease.
- 15-09-2020** Federica Da Ros <sup>1,2</sup>, Jason Duskey<sup>1,3</sup>, Vito Antonio Baldassarro <sup>4</sup>, Ilaria Ottonelli<sup>1,5</sup>, Giovanni Tosi<sup>1</sup>, Maria Angela Vandelli<sup>1</sup>, Flavio Forni<sup>1</sup>, Barbara Ruozi<sup>1</sup>. "Ibuprofen and T3 polymeric NPs for spinal injury Treatment" Nanoinnovation, Rome Italy.
- 15-09-2020** Ilaria Ottonelli, Giulia Birolini, Federica Da Ros, Jason Duskey, Giovanni Tosi, Maria Angela Vandelli, Flavio Forni, Marta Valenza, Elena Cattaneo, Barbara Ruozi "Cholesterol Nanoparticles to rescue Huntington's Disease Phenotype" Nanoinnovation, Rome Italy.
- 6-09-2021** Ilaria Ottonelli, Jason Thomas Duskey, Arianna Rinaldi, Maria Vittoria Grazioli, Irene Parmeggiani, Maria Angela Vandelli <sup>1</sup>, Giovanni Tosi "Microfluidic Vs Nanoprecipitation Protocols To Obtain Hybrid Nanoparticles: Preformulative Studies" - RDPA Modena
- 6-09-2021** Jason Thomas Duskey, Ilaria Ottonelli, Arianna Rinaldi, Irene Parmeggiani, Barbara Zambelli, Maria Angela Vandelli, Giovanni Tosi, and Barbara Ruozi\* "Enzyme Stability in Nanoparticle Preparations: Tween®-enzyme formulation and characterization" - RDPA Modena
- 21-09-2021** Ilaria Ottonelli, Jason T. Duskey, Irene Parmeggiani, Maria Vittoria Grazioli, Robert K. Prud'homme, Maria Angela Vandelli, Giovanni Tosi, Barbara Ruozi, "Hybrid Nanomedicines Production: From Benchtop To Microfluidics", Nanoinnovation2021 Rome
- 21-09-2021** Jason Thomas Duskey, Riccardo Caraffi, Arianna Rinaldi, Irene Parmeggiani, Barbara Zambelli, Maria Angela Vandelli, Giovanni Tosi, and Barbara Ruozi\* "Stabilization of  $\beta$ -Glucosidase in polymeric nanomedicines: formulation and activity studies" Nanoinnovation2021 Rome
- 27-09-2021** Ilaria Ottonelli, Jason T. Duskey, Irene Parmeggiani, Arianna Rinaldi, Barbara Ruozi, Valeria Marigo, Maria Angela Vandelli, Giovanni Tosi "Nanomedicines across barriers" Adritelf Scuola dottorale Biologicals in therapy. Online
- 03-11-2021** Arianna Rinaldi, Jason Thomas Duskey, Ilaria Ottonelli, Irene Parmeggiani, Maria Vittoria Grazioli, Riccardo Caraffi, Barbara Zambelli, Maria Angela Vandelli, Giovanni Tosi, and Barbara Ruozi "Tween® for the stabilization of  $\beta$ -Glucosidase in PLGA nanoparticles:

formulation and activity studies”, Annual Meeting of Young Chemists in Biological Sciences - online

- 17-12-2021** Arianna Rinaldia, Jason T. Duskey, Ilaria Ottonellia, Maura Samarani, Ines Saenz de Santa Maria, Maria Vittoria Grazioli, Barbara Ruozi, Maria Angela Vandellia, Giovanni Tosi, NOVEL LIGAND MODIFIED PLGA NANOPARTICLES FOR GLIOBLASTOMA MULTIFORME TARGETING, XX giornata della Chimica, Ferrara
- 17-12-2021** Arianna Rinaldia, Jason T. Duskey, Riccardo Caraffi, Giovanni Tosi, Maria Angela Vandellia, Barbara Ruozi, OPTIMING TEMOZOLOMIDE LOADING INTO HYBRID PLGA-CHOLESTEROL NANOPARTICLES FOR GLIOBLASTOMA MULTIFORME TREATMENT, XX giornata della Chimica, Ferrara
- 17-12-2021** Ilaria Ottonelli, Jason Thomas Duskey A, Riccardo Caraffi A, Irene Parmeggiani A, Arianna Rinaldi A,B, Barbara Zambelli C, Maria Angela Vandelli A, Giovanni Tosi A, and Barbara Ruozi A COMPARATIVE STUDY OF TWEEN AND BSA ON ENZYME STABILIZING EFFECTS IN PLGA NMED FORMULATIONS - XX giornata della Chimica ER, Ferrara
- 17-12-2021** Irene Parmeggiani\*, Vito Antonio Baldassarro, Riccardo Caraffi, Maria Vittoria Grazioli, Giovanni Tosi, Maria Angela Vandelli, Barbara Ruozi, Laura Calzà. IBUPROFEN AND IBUPROFEN-PARACETAMOL CONJUGATE POLYMERIC NANOPARTICLES FOR TRAUMATIC BRAIN INJURY XX giornata della chimica ER, Ferrara
- 07-06-2022** Ilaria Ottonelli a,b, Riccardo Caraffi a, Jason Thomas Duskey a, Maria Vittoria Grazioli a, Maria Angela Vandelli a, Barbara Ruozi a, Giovanni Tosi, Hybrid Nanomedicines: From Benchtop to Microfluidic Production. How Far Are We From Clinical Applications?. Workshop “Novel frontiers in nanocarriers preparation and characterization”, Roma, 7/06/2022
- 07-06-2022** Riccardo Caraffi 1, Ilaria Ottonelli 1,2, Jason Thomas Duskey 1, Maria Angela Vandelli 1, Barbara Ruozi 1, Giovanni Tosi 1 OPTIMIZING NOVEL HYBRID AND LIPIDIC NANOMEDICINES FOR THE DELIVERY OF THE MODEL DRUG LOPERAMIDE, Workshop “Novel frontiers in nanocarriers preparation and characterization”, Roma.
- Jason Thomas Duskey a, Arianna Rinaldi a,b, Riccardo Caraffi a, Chiara DeBenedictis c, Ann Katrin Sauer c, Andreas Grabrucker c, Barbara Ruozi a, Maria Angela Vandelli a, Giovanni Tosi a. GBM Targeted NMedS for Improved Cancer-Cell Specificity - Workshop “Novel frontiers in nanocarriers preparation and characterization”, Roma, 7/06/2022
- 12-07-2022** Jason Thomas Duskeya, Arianna Rinaldia,b, Irene Parmeggiana, Riccardo Caraffia, Barbara Ruozia, Maria Angela Vandellia, Giovanni Tosia, POLYMER-LIPID HYBRID NANOPARTICLES AGAINST GLIOBLASTOMA MULTIFORME: TEMOZOLOMIDE AND siRNA DELIVERY, Pavia.
- 12-07-2022** Ilaria Ottonelli1,2, Riccardo Caraffi2, Jason Thomas Duskey2, Frank Boury3, Valeria Marigo4, Barbara Ruozi2, Giovanni Tosi, “NANOPARTICLE-LOADED THERMOSENSITIVE HYDROGELS FOR RETINAL DELIVERY OF A NEUROPROTECTIVE PEPTIDE”, Nanomed2022 Pavia.
- 20/21-03-2023** Ilaria Ottonelli1, Jason Thomas Duskey1, Riccardo Caraffi1, Valeria Marigo2, Frank Boury3, Marta Valenza4, Barbara Ruozi1, Maria Angela Vandelli1, Giovanni Tosi - “Hybrid Nanomedicines for CNS delivery: Optimization, Targeting, and Scale-up” 4th European conference on pharmaceuticals, Marsiglia 20-21/03/2023
- 24-28-07-2023** Ilaria Ottonelli, Sabrina Cuoghi, Jason Duskey, Maria Angela Vandelli, Barbara Ruozi, Giovanni Tosi - “Nanomedicines for spinal cord injuries: from optimization to in vivo efficacy” - CRS Annual Meeting & Exposition, Las Vegas, USA 24-28/07/2023
- 13-09-2023** I. Ottonelli, S. Cuoghi, J.T. Duskey, M.A. Vandelli, B. Ruozi, G. Tosi - “WHAT FUTURE LIES AHEAD FOR NANOMEDICINE?” - 50th Symposium Adritelf, Trieste 13/09/2023
- 13-09-2023** I. Ottonelli1, S. Cuoghi, R Caraffi1, F. Rodà1, J. T. Duskey1, M.A. Vandelli1, B. Ruozi1, L. Calzà2, G. Tosi1 - “NANOMEDICINES FOR TRAUMATIC SPINAL CORD INJURY:

- DESIGN, OPTIMIZATION, AND IN VIVO EFFICACY” Trieste, 50th Symposium Adritelf 13/09/2023
- 5-7/10/2023** Ilaria Ottonelli<sup>1</sup>, Elisa Adani<sup>2</sup>, Sabrina Cuoghi<sup>1</sup>, Jason T. Duskey<sup>1</sup>, Valeria Marigo<sup>2</sup>, Maria Angela Vandelli<sup>1</sup>, Barbara Ruozi<sup>1</sup>, Giovanni Tosi<sup>1</sup> - “Microfluidic production of pDNA-loaded lipid NPs: optimization and in vitro efficacy” CRS Italy Workshop, Palermo
- 20/12/2023** Sabrina Cuoghi, Elisa Adani, Jason T. Duskey, Valeria Marigo, Maria Angela Vandelli, Barbara Ruozi, Giovanni Tosi, and Ilaria Ottonelli - “OPTIMIZATION AND IN VITRO EFFICACY OF MICROFLUIDICS-PRODUCED LIPIDIC NPS FOR GENE DELIVERY” XXII giornata della chimica ER, 20 dicembre 2023 Parma.
- 05/06/2024** Cuoghi S., Cescatti M., Quadalti C., Baraldi C., Ruozi B., Vandelli M.A., Tosi G., Calzà L., Duskey J.T. - FROM ACADEMIC TO INDUSTRIAL DEVELOPMENT: A NANOMEDICINE PLATFORM FOR THE DELIVERY OF THERAPEUTIC PROTEINS AGAINST RARE NEUROMETABOLIC DISEASES - 63° SIMPOSIO AFI, Rimini 05-07/06/2024
- 07/06/2024** Caraffi R., Baraldi C., Tosi F., Ruozi B., Tosi G., Duskey J.T.; Controlled denaturation of lactoferrin: an unexplored self-assembly technique for gene delivery nanoparticles; 63° SIMPOSIO AFI, Rimini 05-07/06/2024
- 05/06/2024** Anderlini A.1, Duskey J.T.1, Milcovich G.1, Rodà F.1,2, Vandelli M.A.1, Ottonelli I.1 ; A MICROFLUIDIC APPROACH TO THE FORMULATION OF CATIONIC AND NEUTRAL LIPID NANOPARTICLES LOADING AND PROTECTING pDNA: TOWARDS LINKING BENCHTOP METHODS AND INDUSTRIAL SCALABILITY FOR THE PRODUCTION OF GENE THERAPEUTICS; 63° SIMPOSIO AFI, Rimini 05-07/06/2024

## **G. Organization of Conferences**

- 2008 + 2012 MIKI conference (rotating conference between the Minnesota, Iowa, Kansas, and Illinois Department of Pharmacy each year. (~300 students)
- 06.06.2014 Swiss Soft Days – Conference focused on Bioactive compounds and new delivery research (~300 Professors, PhD, masters, and postdoctoral fellows)
- 11.06.2018 NanoFAR – conference of PhD students and local/National industrial partners discussing nanomedicine (>80 participants from 15 countries)
- 14.09.2021 Nanomeet2021. International conference in presence and online of 35+ countries (Role: moderator)
- 20.09.2023 Nanoinnovations Rome
- 20.11.2023 Nanoinnovations Modena
- 12/06/2024 ETPN Milano
- 12/09/2024 Nanoinnovations Rome

## **H. Public Communication**

- 18.03.2017 - Nanoscience and Targeted Delivery to the Brain Held a seminar each year for young students to increase recruitment of young students to science (Liceo Scientifico Modena)
- 21.04.2018 - Nanoscience and Targeted Delivery to the Brain Held a seminar each year for young students to increase recruitment of young students to science (Liceo Scientifico Modena)
- 18.07.2017 - TV interview, program “Detto tra Noi” highlighting Foreigners in Research and the local winners of the Umberto Veronesi Grant. (Local and national web broadcasts)
- 13.09.2020 - Targeted Nanomedicine Delivery to the Brain to treat Brain Cancer, to increase recruitment of young students to science (Liceo Scientifico Modena)
- 13-10-2021-** Optimization of nanoparticle-mediated brain delivery of a tetracationic porphyrin with potent anti-prion activities. Seminario Pubblico per tutti I benefattori e I genitori che hanno donato alla Fondazione Creutzfeldt Jacobs Disease. (Webcast)

## **I. Transferable skills/knowledge**

### **1. Techniques and skills**

- a. Formulation work:** Peptide polyplex formulation and polymeric nanoparticles for siRNA and DNA delivery, AON, protein, and enzyme delivery
- b. DNA sample preparation:** expression, purification, partialization
- c. siRNA sample preparation:** handling, formulation and knockdown experiments

- d. **Protein Purification and expression:** bacterial strain purification, and visualization (polyacrilimide gels, numerous staining techniques, and western blot analysis)
  - e. **LSM and FCS:** cell uptake, *In vitro* nanoreactor studies, Co-localization, binding, and release studies
  - f. **Peptide Synthesis:** solid-phase synthesis, bioconjugation, and PEGylation for *In vitro* and *in Vivo* use
  - g. **Spectroscopy:** UV-Vis, Fluorescence, Atomic Force Microscopy, electrospray Ionization, Mass Spectrometry, Band shift assay (SDS PAGE), STEM.
  - h. **Chromatography:** RP-HPLC ESI-MS, Size Exclusion Chromatography, Ion Exchange Chromatography/Fast Protein Liquid Chromatography, Affinity Chromatography
  - i. **Animal handling (mice):** Tail Vein Dosing, Hydrodynamic Dosing, Hydrodynamic Stimulation, Biodistribution of Radio-Labeled Formulations, Liver Perfusion to Isolate Primary Hepatocytes and Kupffer Cells, Bioluminescent imaging, Jugular Vein Cannulation, Pharmacokinetics
  - j. **Cell Culture:** Culture Mammalian Cells, Isolation of Primary Hepatocytes, Isolation of Stably Transfected Cells, Luciferase Gene Expression, Binding Assay, Competitive Binding Assays, 384 well and high throughput miniaturization of assays, Toxicity assay: MTS, MTT, comet assay
  - k. **FACS Analysis:** protein and peptide charge separation techniques
  - l. **Radiation Training:** DNA Iodination, Peptide Iodination, Autoradiography (Gels)
  - m. **Cancer Targeting studies** – ligand binding, formulations, in vitro and in vivo assays for cancer detection and targeting by nanoparticle formulations
2. **Transferable skills/Language skills:** English mother language, German B1-B2, Italian B2 (professional experience).
- a. **Writing/proofreading:** Published 25 documents and have helped revise > 100 others. Due to being a native English speaker in two foreign labs, I was often looked upon to help read, revise, and edit documents and papers.
  - b. **International collaborations:** I have worked with scientifically diverse labs from over 10 countries and 4 continents and will openly share collaboration opportunities and knowledge with the host.
  - c. **IT Knowledge:** Operating Systems: All Windows operating systems, Microsoft Office, Word, Excel, Powerpoint, Outlook.  
**Imaging software:** Adobe Photoshop and illustrator  
**Graphing and data analysis programs:** Excel, origin, sigma plot.  
**Systems software:** Familiar with Agilent and Shimadzu programming for HP-LC, IVIS live animal imaging software, and IGOR imaging software, Unicorn for FPLC, numerous analytical analysis software, and other
  - d. **Teaching and Mentoring:** Experienced in project management and student training (See above)

## **J. Professional Memberships**

2008-2014 Member of the American Society for Gene and Cell Therapy  
 2021 – present CRS Italy Chapter (Controlled Release Society)  
 2024 – present SCI (Società Chimica Italiana)

## **K. Editorial Board or Associate/Review Editor**

1. Guest Editor for the open access journal *Molecules* (ISSN 1420-3049).
2. Editor: Research Topic "Innovation in Nano-medicine: Brain Delivery".
3. Special Guest Editor in *Pharmaceutics*: nanomedicine across Barriers
4. Editorial board: *Journal of Nanomaterials and Molecular Nanotechnology*
5. Editor Board Member: *Journal of Current Trends in Pharmaceutical Sciences* (ISSN: 2321-3760)
6. In consideration for Executive Guest Editor for *Drug Delivery Letters*
7. Editorial Board Member: *Journal of Current Trends in Pharmaceutical Sciences*.
8. Editorial Board Member: *Journal of Nanotechnology Research*
9. Guest Editor Special edition *Polymeric Systems for Nutraceutical and Biomedical Applications*; *Polymers*
10. Guest editor for the *International Journal of Nanomedicine* (Taylor and Franices) has launched a new Article Collection on Nanoparticle Applications in Brain Disorders: Gene Therapy and Enzyme Replacement Therapy
11. Reviewer for the French Republic ANR (agency of national Research) 2023

## **L. Reviewer**

1. *Pharmaceutics*
2. *Journal of Clinical Medicine* (MDPI)

3. MDPI general system
4. Nanomaterials

**In commission on the Doctorate school: HEALTH INNOVATIVE PRODUCTS AND TECHNOLOGIES (HIP-TECH) - TECNOLOGIE E PRODOTTI INNOVATIVI PER LA SALUTE (Modena)**