Title of the thesis	PhArmaceutical Solid State devices AGainst diabetEs worsening
Acronym	PASSAGE
Reference number	007

Hosting institution	**Employer**
Université de Lille Website: https://www.univ-lille.fr/home/	Université de Lille Website: https://www.univ-lille.fr/home/
Hosting research unit 1	**Hosting research unit 2**
Name: U1008 Advanced Drug Delivery Systems Acronym: U1008 Identification number: Address: Université de Lille College of Pharmacy 3, rue du Professeur Laguesse 59006 Lille, France Website: http://u1008.univ-lille2.fr/	Name: Unité Matériaux Et Transformations Acronym: UMET Identification number: UMR 8207 Address: Université de Lille Cité scientifique Bâtiment C6 59655 Villeneuve d'Ascq Website: http://umet.univ-lille1.fr/
Principal supervisor	**Co-supervisor**
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Thesis information

Keywords	Polymer blends, hot-melt extrusion, antidiabetic drugs, physical state, storage stability
Abstract	We are seeking for a PhD candidate eager to work in an international and interdisciplinary project for three years. The project PASSAGE lies on the interface Pharmaceutics/Physics and will benefit from a collaboration between two laboratories of the University of Lille: • INSERM U1008: Advanced Drug Delivery Systems, located in Lille • UMR CNRS 8207: Unité Matériaux Et Transformations (UMET), located in Villeneuve d'Ascq. Dr. Susanne Muschert (pharmacist) and Dr. Emeline Dudognon (physicist) will jointly supervise the PhD thesis. The scientific approach aims to formulate diabetes mellitus type II drugs to treat hyperglycaemia into a once-daily dosage form by the means of hot-melt extrusion. The model drugs show low bioavailability due to short half-lives, leading to numerous daily dose intakes (of a conventional dosage form) and fluctuations within the drug-plasma concentrations, thus the patient's compliance is in decline with this long-term treatment. Controlled release dosage forms, where the active pharmaceutical ingredient (API) is embedded within a polymer matrix, can help to overcome these hurdles. However, the physical state of the API is of outmost importance within this kind of systems, since the drug release kinetics and the bioavailability crucially depend on the physical state of the drug within the polymer matrix, being either a disordered state (amorphous) or a crystalline one. The **main research objective of PASSAGE** is to investigate the impact of processing parameters of the rather novel pharmaceutical production technique of hot-melt extrusion with polymer blend matrices on the

	physical state, the release behaviour of the model drugs and the long-term stability of the device. The highly cross-linked working steps will take place in Lille at the Inserm U1008 site for formulation, drug dissolution and quantification studies, whereas the in-depth physical state analysis of the polymer matrix and the API will take place in the UMET lab in Villeneuve d'Ascq (both situated in the same metropole). An intersectorial collaboration will take place with Bioneer:Farma, situated in Copenhagen (Denmark) and specialised in in-vitro dissolution studies under bio-relevant conditions. But also Leistritz Extrusionstechnik will offer the opportunity of an immersion in the industrial world, this extrusion equipment manufacturer is implanted in Nuremberg (Germany). In addition, a secondment in the research lab of Prof. DeBeer at the University of Ghent (Belgium) is planned. He is an internationally recognized expert in process analytical technology (PAT) applications.
Expected profile of the candidate	University studies of Pharmaceutics (ideally specialized in formulation/ pharmaceutical technology), Engineering (specialized in pharmaceutical or nutritional process technology) or Physics (ideally specialized in disordered systems). Capacity to work in a multidisciplinary team and in various environments. Fluent English skills (written and spoken). Good organizational and communicational skills.
Application procedure & Eligibility criteria	The application procedure and eligibility criteria are detailed on the European doctoral programme PEARL website www.pearl-phd-lille.eu. The funding is managed by the I-SITE ULNE foundation which is a partnership foundation between the University of Lille, Engineering schools, research organisms, the Institut Pasteur de Lille and the University hospital. The application file will have to be submitted before March 31, 2021 (10:00 AM - Paris Time) and emailed to the following address : international@isite-ulne.fr.
Net salary and Lump Sum	A net salary of about €1,600 + €530 per month to cover mobility, travel and family costs.