

# *I-Know*

## Integrating Information from Molecule to Man: Knowledge Discovery Accelerates Drug Development and Personalized Treatment in Acute Stroke.

**I-Know is a knowledge discovery IT -based tool designed to aid early stroke diagnosis, stroke treatment, drug development and identification of risk factors as targets in disease prevention for the benefit of European industry and citizens.**

### Objectives of the project

Acute stroke is a major socioeconomic burden in EU. The disabilities following the disease develop rapidly and prompt treatment of patients is imperative. Currently a drug dissolving the blood clot (rtPA – thrombolysis) is the only established treatment, but this is only implemented at highly specialised centres. There is consequently a strong geographical inequality in the availability of this treatment - nationally and internationally within EU.

At the same time there is an intense search by pharmaceutical industry and academic biomedical research to identify drugs that will stop the tissue damage progressing after acute stroke.

The knowledge discovery tool, ***I-Know*** will:

- Provide instant, user-friendly ITbased diagnosis and therapeutic guidance, reducing the infrastructural, economic and educational barriers currently hindering advanced stroke treatment at less specialised units.
- Use advanced data mining techniques to model disease progression based on large multinational databases providing state-of-the-art diagnosis of every EU citizen irrespective of knowledge barriers.
- Provide a platform for modeling beneficial or adverse effects recorded during clinical trials, allowing optimal use of preclinical data in subsequent individualized patient management.
- Be designed to integrate data across descriptive levels to devise disease models that will bring scientific progress to stroke research.

***“I-KNOW meets the challenges of an ageing population by improving care for the parallel increase in stroke victims”***

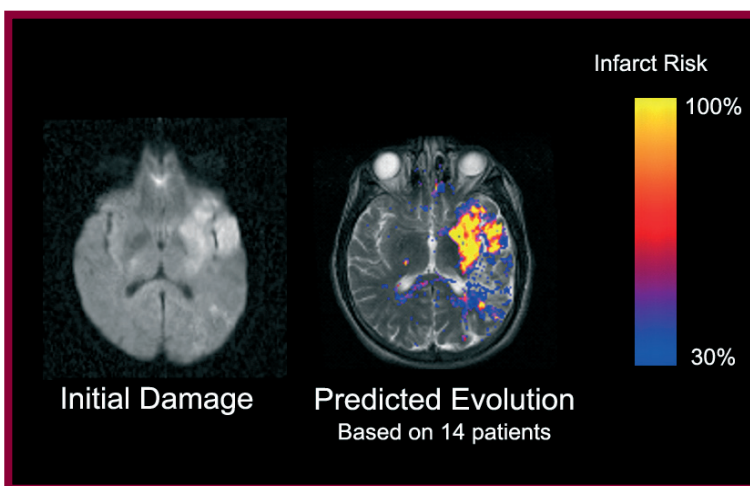
### Project Description

Currently, Computerized Tomography (CT) is the most widely used imaging modality in the clinical management of acute stroke. CT is very sensitive to haemorrhagic stroke and is therefore important in minimizing adverse effects in thrombolytic treatment.

Magnetic Resonance Imaging (MRI), is a growing image modality in acute stroke, and recent research has shown that MRI may delineate micro-structural damage after acute stroke by Diffusion Weighted Imaging (DWI – showing regions of cellular damage), and measure the extent of reduction of blood supply by so-called perfusion weighted imaging - PWI. More importantly MRI has high specificity in

terms of predicting final outcome in acute stroke patients, lending confidence to the development of powerful systems for the support of patient management and in the study of drug efficacy.

Currently, the logistics of performing acute MRI and the lack of access to advanced processing tools and expertise for these advanced imaging data limit health care professionals in fully exploiting the benefits of acute MRI images. Through computerized stroke disease progression models (DPMs), ***I-Know*** will provide an accurate diagnosis in individual. Interacting with the physician, ***I-Know*** will produce images, predicting the course of the disease given available therapeutic options and their specific actions recorded in other patients (DPMs from clinical trials). In a system seamlessly integrated with eHealth systems, this allows physicians to diagnose and treat the patient on the basis of a wealth of information otherwise impossible to integrate by the human mind.



## Expected Results & Impacts

The *I-Know* system is believed to result in improved diagnostic and therapeutic capability for treatment of ischemic diseases within EU.

This is anticipated to lower mortality and degree of disability of the victims, thereby improving their quality of life after an ischemic disease.

The *I-Know* system:

- Meets the challenges of an ageing population by improving care for the parallel increase in stroke victims.
- Reduces geographical inequality in access to care by facilitating advanced diagnostics and treatment locally.
- Allows full utilization of the investment placed by society in advanced diagnostic technology.
- Manages and integrates huge amounts of health information.
- Assists health professionals by providing 'best-practice' and expert advice in stroke treatment.
- Provides detailed accounts of adverse effects and outcome, providing excellent tools for bench-marking to support health managers in quality assurance in stroke care.
- Addresses the issues of interoperability and user friendliness by developing automated algorithms and separately analyze the products integration into an eHealth environment with electronic health records.

The resulting, lower socio-economic burden of cerebral ischemic diseases will allow for reallocation of resources to other measures, improving the quality of life of EU citizens as a whole.

## I - K n o w

**Integrating Information from Molecule to Man: Knowledge Discovery Accelerates Drug Development and Personalized Treatment in Acute Stroke**

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- Université Claude Bernard (FR)
- Fundació Privada Institut d'Investigació Biomèdica de Girona (SP)
- University of Cambridge (UK)
- Universitätsklinikum Hamburg-Eppendorf (DE)
- Universitätsklinikum Freiburg für die Medizinische Fakultät der Albert-Ludwigs-Universität (DE)
- Systematic Software Engineering A/S (DK)
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**Instrument:** STREP

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