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Challenge 1: How to put in place a very broad collaboration between multiple academic groups at Cambridge University and MedImmune Research?

- Interactions between academia and industry, historically, have been highly beneficial in financial and reputational terms to both parties.
- Success stems from the link of key people in academia and industry who would most benefit from working together.
- We would like to find creative ways to remove potential barriers to these collaborations: for example, intellectual property ownership issues.

Mentors: Tris Vaughan, Ralph Minter

Challenge 2: How to foster innovation and invention at MedImmune?

- The market for pharmaceuticals is increasingly competitive. To be successful industry needs to innovate.
- MedImmune has created structures and processes that encourage innovation.
- We would like your ideas on how we could be more innovative.

Mentor: Stephen Clulow

Challenge 3: How to identify operational efficiencies by assessing the utilization of operational assets?

- The cost of purchasing the necessary technology to support the Research needs of the Pharmaceutical and Biotech Industry increases year on year.
- Some R&D companies and academic institutions have looked at shared service laboratories as a way of providing a model which delivers better access to assets and a better overall utilization of scientific equipment.
- We would like your ideas about what methodologies or tools we could use to allow better understanding of how we currently use our scientific assets.

Mentor: Martin Butler

Challenge 4: How to prioritise drug project and business improvement activities simply and effectively?

- Diligent use of resources whilst delivering on agreed business priorities is mandatory for the pharmaceutical industry and MedImmune.
- Using prioritisation processes and tools to rank any project and ensuring delivery in ranking order is used at MedImmune to guide functions and project teams as they apply resources.
- We would like your holistic ideas on how MedImmune can apply prioritisation as effectively in our organisation as possible.

Mentor: Uwe Huedepohl

Challenge 5: How to use publicly available structural biology information to inform drug discovery and development?

- The relationship between structure and function is well established for proteins especially in disease.
- A huge amount of structural data for a variety of proteins relevant in diseases is publicly available e.g., Protein Data Bank.
- What kind of information can be derived from the known structures and how could this information be used in biologics drug discovery.

Mentor: Sudharsan Sridharan

Challenge 6: How to build a business case for more *in silico* modelling in the pharmaceutical industry?

- One reason for the very high cost of drug discovery and development is the attrition rates of candidate products. Typically, >90% of compounds that enter the first phase of clinical trials fail to become a product.
- Employment of *in silico* techniques to select pharmacological targets that are most likely to be successful is in its infancy, in contrast for example to the aircraft industry.
- We would like your ideas on how we could use examples from other industries to make a business case for the employment of more *in silico* techniques in drug discovery and development.

Mentor: Balaji Agoram

Challenge 7: How to measure the transport of protein drugs into the brain?

- The blood brain barrier (BBB) operates as a selective barrier allowing the transport of essential nutrients, but restricting access to other molecules including both small and large molecular weight drugs.
- We would like to develop technologies that overcome the BBB and deliver protein drugs to the brain, however, measuring how much of a protein actually reaches the brain once across the BBB is challenging.
- We would like your ideas on how to measure the amount of a protein drug in the brain. We want this to be a non-invasive method. Ideally it will allow us to discriminate between drug within the blood vessels of the brain and drug that has crossed the blood brain barrier to reach the neurons.

Mentor: Carl Webster

Challenge 8: How to build pharmacology models for biopharmaceuticals?

- The general assumption, historically based on “small molecule” drugs in Pharmacology is that complete inhibition/suppression of the target pathway is required to demonstrate maximal efficacy
- In contrast, the pathways targeted by “large molecule” drugs such as antibodies are usually dysregulated in subjects compared to those of normal individuals. However, even in normal subjects some level of pathway activation is generally present to maintain homeostasis and support physiological function.
- We would like your ideas on how we could build a pharmacological approach where the objective is to re-establish a “physiological” level of activity rather than complete suppression.

Mentor: Fabio Magrini

Detailed description of each of the challenges:

Challenge 1: How to put in place a very broad collaboration between multiple academic groups at Cambridge University and MedImmune Research?

Mentors: Tris Vaughan, Ralph Minter

There is a long history of interactions between academia and industry, many of which have been highly beneficial, in financial and reputational terms, to both parties. For biopharmaceuticals in particular, it is known that 26 of 112 approved biological drugs in the last 25 years originated outside of the industrial sector (i.e. from Governmental entities, Universities and Non-profit organisations) [1]. These include some well-known and highly profitable drugs such as Remicade (NYU), Avonex (Columbia) and Herceptin (Columbia). As well as products, many key R&D enabling technologies originated in academia – one notable example being phage display of antibodies, which enables the rapid isolation of fully human therapeutic antibodies and became the technology platform on which the success of Cambridge Antibody Technology (now MedImmune) was founded. Although these are compelling examples of the commercialisation of academic ideas they are in most cases not examples of true collaboration but rather a handover, in return for cash or drug royalties, of products and technologies. This model, which is effectively an in-licensing model, is well-established and both parties are well practised at utilising it.

Instead of the in-licensing model, **we would like to explore the concept of a broad, multi-discipline collaboration between industry and academia, which starts much further upstream in the innovation process**. Some key points to explore include:

- How do we best link up the key people in academia and industry who would most benefit from working together?
- How do we better advertise (a) the major challenges which face industry, and (b) the novel concepts and experimental technologies from academia which may help resolve them?
- Are there creative ways to remove potential barriers to collaboration, such as intellectual property ownership issues?

[1] Cockburn I, et al., National Bureau of Economic Research working paper 6018 (1997)

Challenge 2: How to foster innovation and invention at MedImmune?

Mentor: Stephen Clulow

The market for pharmaceuticals is increasingly competitive [1]. The industry faces pressure for cheaper, more cost-effective medicines, increasing regulatory pressure to ensure drugs are safe and efficacious, and more competition from low cost generic medicines [1]. To be successful and justify a price premium, new medicines must offer novel treatment paradigms or significantly more benefits than existing medicines [1]. The pharmaceutical industry needs to innovate.

There is a relationship between the innovation success and overall performance of a company [2]. The most innovative companies have 22% greater profit margins and 18% greater shareholder value than the bottom two-thirds of companies [2]. Yet, there is a poor relationship between innovation spending and innovation performance [2]. The top innovative companies invest a lower percentage of revenue in R&D than their sector averages [2]. It is the innovation capabilities of a company that matter [2].

There is a lot of published information describing how companies can become more innovative [3], including some examples from the pharmaceutical industry [4].

MedImmune has created structures and processes that encourage innovation. For example,

- A dedicated technology group that develops innovative platform technologies.
- A science career track where staff are encouraged to bring new ideas into the organisation and to publish their work.
- Science days featuring presentations from external and internal speakers, poster and breakout sessions.
- Invention and patent procedures, with an in-house IP team who work with scientists to write, file and defend patents.
- 'Open innovation' through post-doctoral programmes, partnerships and collaborations.

We would like your ideas on how we could be more innovative. How can we foster innovation and invention at MedImmune?

Background Information.

[1] Witty, A. (2010) Research and develop, The Economist The World in 2011. Available: http://www.gsk.com/media/downloads/economist-world-in-2011-gsk-witty.pdf

[2] Jaruzelski B. and Dehoff, K. (2010) The global innovation 1000 How the top innovators keep winning, Strategy and Business [Online] 61. Available: http://www.strategy-business.com/article/10408

[3] Jeffrey, P. (2008) Educating your management team about innovation. Available: http://www.slideshare.net/jdpuva/innovation-briefing

[4] Future Think LLC (2008) The Innovators Interview: Rob Spenser. Available: http://www.slideshare.net/futurethink/innovator-interview-rob-spencer-pfizer

Challenge 3: How to identify operational efficiencies by assessing the utilisation of operational assets?

Mentor: Martin Butler

The cost of purchasing the necessary technology to support the Research needs of the Pharmaceutical & Biotech Industry increases year on year. With budgets being constantly being scrutinised it is essential that companies have methodologies to measure the total cost of ownership of such purchases and the efficiencies that they can deliver to the organisation [1].

In order to develop such strategies companies have started to rely more and more upon external third party service providers who can manage an outsourced maintenance service and in addition help to measure the performance of equipment [2]. However such services are limited in their ability to give an actual understanding of an assets actual utilisation; and therefore influence future purchasing strategies by R&D functions. MedImmune has recently appointed GE Healthcare as their global vendor for asset equipment maintenance.

Lean Six Sigma experts have also identified that the best performing companies have the ability to understand the utilisation & reliability of their assets. They also cite the manufacturing industry where the need for data on asset utilisation, availability and performance has a direct impact on the bottom line and similar could be said of an R&D organisation [3].

Some R&D companies and academic institutions have looked at shared service laboratories as a way of providing a model which delivers better access to assets and a better overall utilisation of this equipment [4} This allows a consolidation to a select number of manufacturers and also allows abetter tracking of assets and their usage.

Cambridge Antibody Technology (now MedImmune) developed its own software system to collect data on asset utilisation but focussed upon large scale automation rather than a broader spectrum of assets. Could this early stage software be further developed to provide data analysis in the use of our current asset portfolio? [1].

Medimmune's aim for this project is to better understand what methodologies or tools we could use to produce data that would allow for a better understanding of how we currently use our scientific assets. How reliable are these assets; are they being fully utilised in each R&D function; can assets be shared across functional groups and how do we plan future purchasing strategy based upon this information?

Background Information.

[1] Benn et al 'An automated metrics System to measure & improve the success of Laboratory Automation implementation' JALA, February 2006.

[2] Weinert, J (GE Healthcare); 'Managing Maintenance (and much more)' Next Generation Pharmaceutical, August 2009: http://www.ngpharma.eu.com/article/Managing-maintenance-and-much-more

[3] LaPlante, M ; 'Conference Report: Maintenance is not a Necessary Evil', PharmaManufacturing.com, September 2010: www.pharmamanufacturing.com/industrynews/2010/049.html

[4] Sujitjorn, S; 'Centralized Use of Laboratory Equipment for Engineering Education at SUT' (abstract): http://fie-conference.org/fie95/4c4/4c43/4c43.htm

Challenge 4: How to prioritise drug project and business improvement activities simply and effectively?

Mentor: Uwe Huedepohl

Diligent use of resources whilst delivering on agreed business targets is mandatory for the pharmaceutical industry and MedImmune

Whilst tools to prioritise projects (drug projects and business improvement projects) exist and are used, MedImmune is interested to explore holistically how prioritisation can be applied as effective in an organisation as possible

Any good business has to be conscious of its business priorities and delivers against those in ranking order. Business targets within MedImmune are foremost drug project related targets but also business improvement targets. Existing prioritisation processes and tools rank drug projects in a few categories (typically 3) as well as identify the most important business improvement projects. The information is used to guide functions and project teams as they apply resources against the projects and as they control progress against the targets.

The challenge is to apply the available prioritisation lists effectively to gain maximum value:

- Highest probability of success for the high priority projects
- Most efficient resource usage

MedImmune as a company dedicated to continuous improvement, reviews its processes around prioritisation and application of priorities in the business and would value an independent input in this challenge.

Challenge 5: How to use publicly available structural biology information to inform drug discovery and development?

Mentor: Sudharsan Sridharan

The relationship between structure and function is well established for proteins especially in diseases. Knowledge of protein structures is critical for pharmaceutical industries in areas such as rational drug design, for example, fragment based drug discovery, and the design of novel protein scaffolds that can be of use in biopharmaceutical drug discovery [1]. A huge amount of structural data for a variety of proteins relevant in diseases is publicly available e.g., Protein Data Bank. As MedImmunes' efforts are focused on biologics (antibodies, protein therapeutics) drug discovery, structures of Fab's, antigen-antibody complexes and targets for biologics drug discovery are of special interest to MedImmune. Solution(s)/answer(s) to this challenge would help obtain novel ideas for utilizing structural data and different kinds of information derived from structural data to inform/support projects and strengthen in-house structural bioinformatics capabilities.

Question:

How to use publicly available structural biology information to inform drug discovery and development? More specifically, how can we implement structural bioinformatics approaches to drive biologics drug discovery?

MedImmune is particularly interested in structural data relevant to biologics drug discovery and development. To put the above question in context, one can ask for example, with the current knowledge of the nature of antigen-antibody interfaces [2,3] and structure of a particular antigen-antibody complex of interest can an optimisation strategy be designed to get better antibodies against the antigen?

We would like the participating team(s) to think in terms of what kind of information can be derived from the known structures and how this information is relevant and can be used in biologics drug discovery.

Selected references of interest are given below to give the teams a feel for utilizing knowledge of structures in drug discovery.

[1] Chandra N. et al. Structural bioinformatics: deriving biological insights from protein structures (2010). Interdiscip Sci. 2, 347-66.

[2] Birtalan S et al. The intrinsic contributions of tyrosine, serine, glycine and arginine to the affinity and specificity of antibodies. (2008) J. Mol. Biol. 377, 1518-28.

[3] Wu X et al. Rational design of envelope indentifies broadly neutralizing human monoclonal antibodies to HIV-1. (2010) Science, 329, 856-61.

Challenge 6: How to build a business case for more *in silico* modelling in the pharmaceutical industry?

Mentor: Balaji Agoram

The cost of developing a pharmaceutical drug that hits the market in 2011 will be in excess of $1billion. By way of comparison, the cost of an aircraft carrier is approximately $700M and a space shuttle $500-700M. One reason for the very high cost of drug discovery and development is the attrition rates of candidate products. Typically, >90% of compounds that enter the first phase of clinical trials fail to become a product [1]. While the pharmaceutical industry is grappling with the reduced industrial productivity, there is also an ongoing explosion in the basic research data emerging from post-genomic laboratory investigations.

The success of the industry in the next decade will hinge on how it answers the following key questions:

1. How to select the potentially successful targets from the emerging vast pool of basic scientific information.
2. How to optimally test them in clinical trials.
3. How to identify the patients who are most likely to benefit from the treatment.
4. How to identify the correct dose that causes beneficial effect without causing serious side effects are all questions of critical importance to this field.

In order to deliver on these counts, innovations in how drugs are tested before market launch are needed. One of them would be the application of more *in silico* approaches, where a prospective drug is tested in computational models before major investments. In spite of the advent of the information age, pharmaceutical industry could be considered among the laggards in adopting technological solutions to their problems. In fact, it is only in the last decade that mathematical data modelling and simulation has become *de rigeur* in designing and interpreting clinical trials. Employment of *in silico* techniques to select pharmacological targets that are most likely to be successful is in its infancy. In contrast, the people carrying aircrafts of 2025 are now being simulated in the labs of Boeing, and Airbus, without a single part being built! [2]. So, how can one use examples from other industries to make a business case for the employment of more *in silico* techniques in drug discovery and development?

References:

[1]. Can the pharmaceutical industry reduce attrition rates? (2004) Kola and Landis
http://www.nature.com/nrd/journal/v3/n8/pdf/nrd1470.pdf

[2] http://www.smh.com.au/photogallery/travel/nasa-unveils-future-of-air-travel/20110118-19uvw.html?selectedImage=1

Challenge 7: How to measure the transport of protein drugs into the brain?

Mentor: Carl Webster

The brain provides a number of challenges to the pharmaceutical industry. As well as being an immensely complex organ the brain is also protected from the outside world by mechanisms that can prevent drugs from reaching it.

The brain is part of the central nervous system. It is made up principally of neurons and their supporting cells, and is permeated by a very large number of blood vessels. It is suggested that each neuron in the brain has its own blood capillary to provide it with the required nutrients. There are an estimated 400 miles of capillaries in the human brain.

The brain is complex and performs highly sensitive functions. It needs to be protected from the outside world and the rapidly fluctuating physiology of the rest of the body. It is protected by several barriers. It is contained within the skull that protects it from physical insults. Inside the bone there are the meningal membranes which provide a further physical barrier. These limit access to the brain from outside. Most importantly, with respect to the delivery of drugs to the brain, there is a barrier between the blood vessels of the brain and the neurons making up the central nervous system. This is the so called blood brain barrier (BBB) [1]. The BBB operates as a selective barrier allowing the transport of essential nutrients, hormones and other molecules into and out of the brain, but preventing the passage of most other things.

Protein drugs, such as antibodies, are large molecules and these 'macromolecules' are often prevented from reaching the brain by the BBB. Several companies are attempting to develop technologies that will enable these drugs to be transported across the blood brain barrier. However, even if these technologies are successful there is a further challenge: measuring and how much of the protein has actually reached the brain. Most of the techniques available rely on inserting probes into the brain or physically removing the brain to measure the drug levels [2]. The large number of blood vessels in the brain make it difficult to know exactly what is in the brain tissue and what is still within the blood vessels.

We would like your ideas on how to measure the amount of a protein drug in the brain. We want this to be a non-invasive method. Ideally it will allow us to discriminate between drug within the blood vessels of the brain and drug that has crossed the blood brain barrier to reach the neurons.

Selected further reading:

[1] Blood brain barrier

http://www.newworldencyclopedia.org/entry/Blood-brain_barrier

[2] Examples of invasive methods for measuring drug in the brain

http://en.wikipedia.org/wiki/Microdialysis

Challenge 8: How to build pharmacology models for biopharmaceuticals?

Mentor: Fabio Magrini

The general assumption in Pharmacology is that complete inhibition/suppression of the target pathway is required to demonstrate maximal efficacy. This is based on a "small molecule" approach where generally a linear dose response can be observed, the limitation to dosing is due to on- and off-target toxicities and the target is usually a "broad" gatekeeper for a given pathway /pathology.

Large molecules are usually used as "targeted therapies" where a specific target is selected on the basis of its key and selective role and expression in a pathological situation. Off target toxicities are also seldom seen with large molecules. In addition to this, traditionally there is no advantage in exploring a large range of doses with biologics since increases over the doses needed to completely suppress the pathway will only lead to accumulation of the antibody and will have materially no additional effect.

Normally the pathways targeted by large molecules are dysregulated compared to those of normal individuals. However, even in normal subjects some level of pathway activation is generally present to maintain homeostasis and support physiological function.

These observations suggest that, with large molecules, it would be appropriate to envisage a pharmacological approach where the objective is to re-establish a "physiological" level of activity rather than complete suppression. Further, it would be possible to argue that target suppression/stimulation outside a physiological range could be responsible for the toxicities currently observed in licensed products in this area.

With these principles in mind, it would be of interest to test the hypothesis that:

- A physiological level of "activation" could be feasibly included in a PK/PD model to inform dose-ranging and clinical trial activities
- Molecules directed against cellular targets and soluble ligands may require different modelling assumptions
- Incremental doses above those to repristinate a "normal" activation level will induce on-target toxicities in absence of an additional benefit
- Finally a PK/PD simulation model should be built and tested for existing biologics to verify the hypothesis.

Mentors:

Tristan Vaughan PhD

Senior Director, Research – Lead Generation

Tristan first joined Cambridge Antibody Technology (CAT) in 1993. Following the acquisition of CAT by AstraZeneca, his multidisciplinary team of 80 staff is responsible for generating around two thirds of the antibody portfolio for MedImmune, AstraZeneca's biologics business unit. Prior to his current appointment, Tristan held key operational responsibilities as part of the successful CAT-AstraZeneca strategic alliance and prior to that for CAT's Milestone and Royalty based Alliances. He is an inventor on the Humira® and Benylsta® patents, and has been involved in the discovery of over 30 candidate antibodies that have subsequently entered preclinical/clinical Development. He also developed the platform technology to build phage antibody libraries of > 10^{10} members from which sub-nM affinity mAbs can readily be isolated. Before joining CAT, he was a postdoctoral fellow at the University of Toronto. Tris is a University of Leeds graduate from the Genetics Department.

Ralph Minter PhD

Principal Scientist, Technology

After completing a PhD in Immunology at the University of Durham in 1999, Ralph joined the Antibody Engineering Department at Cambridge Antibody Technology (CAT) in the group of Tris Vaughan. In this role he worked on the isolation and optimisation of antibodies which are now undergoing clinical trials, such as LymphoStat-B and HGS-ETR1. For several years Ralph then headed the Lead Optimisation team, which used phage and ribosome display to optimise the potency of over 50 antibodies, many of which are currently in preclinical and clinical studies, either in house or with collaborators. Ralph is currently a Principal Scientist in the Technology group at MedImmune and is running a wide range of projects, covering novel target discovery, protein engineering and novel therapeutic platforms.

Stephen Clulow PhD

Director of Knowledge and Information Management and Informatics

Stephen has a PhD in genetics and has worked in small molecule and biopharmaceutical R&D. Stephen leads a team that develops and deploys computer-based tools for scientific data analyses, information sharing, knowledge management and idea generation. They help scientists spend more time doing better science and enable R&D to get more from it's investment in experimental work. Stephen is interested in stimulating creativity and innovation in individuals, groups and organisations.

Martin Butler

Director of European Strategic Sourcing for MedImmune

Martin is based at the companies R&D facility at Cambridge, UK. Martin has responsibility for all Sourcing activities at Cambridge and also provides support to the Medimmune manufacturing facility in Liverpool and their plant in Nijmegen, Netherlands. Martin also works as part of MedImmune's Global Sourcing team based out of Medimmune's Gaithersburg, Maryland headquarters.

Prior to joining Medimmune Martin held various Sourcing and Procurement roles within the Pharma and Biotech industries including Pfizer, Warner Lambert and Millennium Pharmaceuticals. Most recently Martin was responsible for developing a purchasing consortium of 80 plus Biotech companies in the East of England for the Biotech Trade Association ERBI (now known as One Nucleus).

Uwe Huedepohl, PhD

Vice President. R&D Project and Portfolio Management

Uwe has a Master in Chemistry and a PhD in Biochemistry. His thesis on initiation of transcription in archaebacteria at the Max-Planck Institute for Biochemistry was awarded with the Otto Hahn medal. He started to apply his scientific knowledge at Hoffmann-La Roche in Basel through contribution to development and launch of several biopharmaceutical products. Zeneca approached Uwe in 1997 to build its biopharmaceutical analytical capabilities and post merger with Astra Uwe contributed to AZ's definition of the corporate biopharmaceutical strategy, followed by creating the first Biopharmaceutical Project Management and Leadership function in 2005. He joined MedImmune in 2008 and led the global project management and business operations function within Biopharmaceutical Development. Since mid 2010, Uwe leads the Project and Portfolio Management function within Research and Biopharmaceutical Development.

	His function brings together Portfolio Management, Research Project Management, Biopharmaceutical Development Project Management and Team Leaders, Research Scientific Writing and Development Scientific Writing. Outside the company, Uwe had been the elected chairman for the UK PASG biotech working party as well as the AZ representative in the PIPMG steering committee and has organized related conferences.
	## Sudharsan Sridharan PhD Scientist I, Structural Bioinformatics, Protein Sciences, Lead Generation Sudharsan Sridharan (Sid) is a Scientist in the Protein Sciences group at MedImmune Ltd. His job role is to provide structural bioinformatics support for projects across all therapeutic areas at MedImmune. The work involves modelling protein structures, protein docking, structural analyses etc to inform projects at various stages of discovery and development. Prior to joining MedImmune he worked as a postdoctoral research associate in Prof. Sir Tom Blundell's lab in the Dept. of Biochemistry at Cambridge University. He holds a Ph.D. in structural biology from Texas A&M University.
	## Balaji Agoram PhD Director, Pharmacokinetics/dynamics, and Bioanalysis Balaji Agoram has a doctorate in Chemical Engineering from the University of Colorado, Boulder and ~10 years of experience in both pharmaceutical and biotechnology industries. He is passionate about the reduction in costs - both in terms of money, time, and resources - within the drug R&D industry through the use of more green technologies such as *in silico* ones.

Carl Webster PhD

Associate Director Research Technology

Carl Webster has a BSc in biochemistry from Bath University and a PhD in Molecular Biology from Leicester University. He followed his education with a post doc position at Cambridge University on the role of high mobility group proteins in gene regulation.

Carl was recruited to CAT* in 1997. He has worked on a number of projects with CAT's partners, isolating antibodies to therapeutic targets and providing gene cloning, expression technologies for antigens and scFv, and real time PCR to CAT's drug programmes. He is now Associate Director Research Technology for MedImmune, leading teams involved in protein engineering and drug delivery.

Fabio Magrini, M.D.

Senior Director of Clinical Development

Fabio Magrini serves MedImmune as senior director of clinical development, Inflammation and Autoimmunity. In this role, Dr. Magrini is responsible for the delivery of two autoimmunity programs including assessment and prioritisation of additional indications and global publication planning. He is also a clinical representative who provides strategic input in the combined AZ/MedImmune portfolio management activities including the definition of development Target Product Profiles for the chosen indications.

Prior to joining MedImmune in 2008, Dr. Magrini held the position of clinical science leader at Roche Products, Ltd. He was responsible for the clinical strategy of the product including life cycle opportunities, new indications, and differentiation strategies. Dr. Magrini also worked as the medical affairs manager at Amgen UK/Ireland where he was responsible for Rheumatoid Arthritis and the UK launch of Kineret.

Dr. Magrini attended the University of L'Aquila, Department of Dermatology and was an Honorary Clinical Fellow at the Addenbrooke's NHS Trust, Department of Dermatology. Prior to his training as a dermatologist, Magrini's interests in the molecular and cell biology of cancer allowed him to work in Italy, the USA and England and to become familiar with several techniques for the analysis of nucleic acids and proteins.