Collaborate Either Multi-Disciplinarily, Trans-Disciplinarily, or Inter-Disciplinarily, and Please Advance Together

Jaume Marrugat

Unitat de Lípids i Epidemiologia Cardiovascular.
Institut Municipal d'Investigació Mèdica (IMIM).
Facultat de Medicina. Universitat Autònoma de Barcelona. España.

«There are more things in heaven and earth,
Horatio,
Than are dreamt of in your philosophy.»

«Hay más cosas en el cielo y en la tierra, Horacio,
de las que se pueden soñar en tu filosofía.»
(W. Shakespeare. *Hamlet*, act I scene 5)

It is now no longer possible to acquire 95% of existing knowledge in the course of a human lifetime, as could be done in the 17th century. We have been drawn into specialization, subspecialization and, even superspecialization. We know tiny parcels of knowledge very well. The hedonism characterizing industrialized society induces to us to seek out scientific discussion by limiting it to those who understands us without difficulty and are pleased with our speech: those who practice the same discipline as we do. The immediate consequence of this phenomenon, which began in the 20th century, is that we have made parallel progress in many specialties, with scant contacts between specialties. In particular, we run the risk of losing huge opportunities to acquire a broad perspective on health problems. Cardiovascular disease is a paradigm of the problem: we continue to insist on studying ischemic heart disease, cerebrovascular disease, peripheral arteriopathy, and mesenteric ischemia separately when all of them have a common origin in arteriosclerosis and overlap in their comorbidity and risk factors. Diabetes, a major risk factor of ischemic heart disease, is studied by endocrinological specialists with little contact with cardiologists, angiologists-vascular surgeons, cardiac surgeons, internists, epidemiologists, primary care physicians, or basic researchers. The same could be said of the study of arterial hypertension, the dyslipidemias, or the effect of smoking.

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In this issue of the journal, Bordons and Zulueta[1] report the results of a survey made in a sample of investigators who received aid from the Spanish National Plan for cardiovascular research, or published articles in reference journals in this area in the 1990s. It seems that most authors characterize the composition of their research groups as multidisciplinary. This is good news that underlines a trend prevalent in our times: the perception that good investigation requires a broad perspective on health problems. The Spanish Society of Cardiology recognized this need at the end of the last century and maintains sections on cardiology subspecialties that include very active basic and epidemiological research groups. This year, in addition, its congress was deliberately denominated «of cardiovascular diseases.» The Spanish Ministry of Health and Consumption has shown its clear intention to create a suitable substrate for the proliferation of the multidisciplinarity of excellence by announcing aid for the creation of Thematic Networks of Investigation.[2] Among these networks, the cardiovascular network occupies a large area due to the enormous morbidity and mortality caused by the diseases studied in the area.[3] I suspect that the European Union long ago understood this need, since the VI Framework Programme of European investigation contemplated a multidisciplinary approach as a priority in their call for Expressions of Interest for European Networks of excellence and cooperative projects, which recently closed.[4] Also, the U.S. National Institutes of Health is dedicating its resources to integrating interdisciplinary visions of health problems. In particular, it aims to have findings in clinical and basic research find expression in the realm of public health as rapidly as possible.[5]

Note: Some of the ideas expressed in this editorial have been published by their author in the internal bulletin of the Sociedad Española de Epidemiología (SEE NOTE, no. 20).

Correspondence: Dr. J. Marrugat.
Unitat de Lípids i Epidemiologia Cardiovascular. IMIM.
Dr. Aiguader, 80. 08003 Barcelona. España.

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Meanwhile, cardiovascular scientific reference journals (*Circulation*, *Journal of the American College of Cardiology*, the *European Heart Journal*, and the REVISTA ESPAÑOLA DE CARDIOLOGÍA) include regular or frequent sections on basic and epidemiological research in addition to clinical sections, which not too long ago were the sole reason for the existence of these journals.

An early example of the need to approximate different disciplines was the determination of the structure of DNA by Watson and Crick, who had to resort to crystallography, chemistry, radiology, and genetics to establish the double helix architecture.[6] From this episode to the present situation of genomics, proteinomics, and post-genome metabolomics, less than half a century has passed.

Languages and lexicons diverge, and the same idea is expressed with different words whose conceptual subtleties are minimal: although one can become accustomed to anything, to the medical ear «genetic variability» sounds better than «genetic polymorphism,» the term used by molecular biologists to express approximately the same idea. Cardiologists have become «interventionists,» more and more often applying invasive methods, whereas cardiac surgeons tend to use «minimally invasive» surgery to revascularize stenotic coronary arteries. Both specialties require experimentation in animals and basic research to understand the underlying pathological processes of their work. There seems to be many timid attempts – frank or not – toward convergence.

The clairvoyant octogenarian epidemiologist Mervyn Susser magnificently expressed the idea when he said that health problems must be considered simultaneously at three levels: molecular, individual, and group.[7] With regard to groups, Epidemiology has made important advances in understanding disease using its approach to studying the determinants of disease in groups and individuals. The article by Bordons and Zulueta touches on its role in Spain, which these authors characterize as «cross-sectional.» My opinion, naturally biased, is that the objectivity of the article by Bordons does not do justice to the role of epidemiology in the study of cardiovascular diseases in Spain: epidemiologists are mentioned in only 13% of surveys as an integral part of the team. Nevertheless, this medical discipline, which has its own journals, projects, authorities, and international recognition and makes substantial contributions to knowledge of, very particularly, diseases derived from arteriosclerosis, has not yet been recognized as a specialty in Spain. It is clear that Susser´s three-part vision is completed – that is, complemented – by the clinical perspective (or the individual point of the Susser triad) and the molecular perspective addressed by basic research.[7]

Most investigators have discarded, or are in the process of doing so, isolated work as a way of responding to the most relevant questions of science. A few decades ago, our predecessors discovered that teamwork improved the yield of individual effort. Perhaps the time for yet more humility is arriving. Perhaps the giant scientific egos will disappear in the future and give way to the collective leadership of multidisciplinary teams that reduce certain disciplines or specialties to a merely instrumental role. The maximum skill of the great scientists of the future may be their ability to perceive how to approach scientific questions broadly.

The collective approach will have to develop a common terrain where individual team members can identify the elements of convergence of their own scientific interests. This must be reflected in congresses, meetings, and other activities of scientific societies, which must learn how to include the contributions of other specialties and disciplines in their own presentations. The catalytic effect on professional relations of biomedical research campuses, which concentrate many disciplines sharing space and resources, should not be overlooked. It is not easy to find a common language and ethos, or to simplify the exposition of one´s own knowledge so that persons from other specialties can understand the messages inherent to each of them. Individuals, people and investigators, have the last word in finding the best way to forge the links that facilitate multidisciplinary cooperation: it suddenly seems that we are all implicated in this effort.

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