Haemodialysis (HD) is a life-saving treatment for more than 1,700,000 patients with chronic kidney disease (CKD) stage 5. CKD persists as a chronic worldwide epidemic and HD is the most frequently (70%) adopted treatment modality. The evolution in the history of HD technology has greatly helped to make the HD procedure a safe and more biocompatible extracorporeal therapy.

While the extracorporeal circuit offers a large surface of contact of the blood with foreign materials, namely the dialysis membrane, the tubings and the large volumes of the dialysate, the concept of biocompatibility is of utmost importance and has greatly evolved in the last two decades. Significant advances include the improvement of the blood-dialyzer membrane and biocompatible dialysates.

In my presentation, I will summarize the most important steps in the evolution from the concept of the blood-dialyzer membrane interaction to that of the whole HD system compatibility and the important role of nano-controlled spinning process in the evolution to our present new concept of HD membranes novel based on nanotechnology manufacturing principles.

In face of very recent development of cell-to-cell communication and signal transduction, we will also discuss the newly hypothesis for a role of extracellular vesicles (exosomes and microvesicles) in cell activation, as well as in tissue and vascular repair. Emerging results from our studies have enlightened a role of extracellular vesicles and of their miRNA in on-line hemodiafiltration, the most compatible and cardioprotective HD modality.
Short CV:

Prof. Dott. Ing. Emanuele Gatti is Chief Executive Officer for Europe, Latin America, Middle East and Africa and Global Chief Strategist at Fresenius Medical Care Management AG. After completing his studies in bioengineering, Dr. Gatti lectured at several biomedical institutions in Milan. He continues to be involved in comprehensive research and development activities.

Dr. Gatti has been with the company since 1989. Before being appointed to the Management Board of Fresenius Medical Care in 1997, he was responsible for the dialysis business in Southern Europe.

He is Visiting Professor and Honorary Senator at the Danube University in Krems, Austria. Moreover, he has been Invited Special Lecturer at Alma Mater University Bologna (Italy), Accadis Business School in Bad Homburg (Germany), Frankfurt School of Finance (Germany), Vienna University of Economics and Business (Austria), DIA Dessau (Germany), Humboldt University Berlin (Germany), Politecnico di Milano (Italy) and Università di Torino (Italy).