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**ARE THE FRACTAL SKELETONS THE EXPLANATION  
FOR THE PLANKTON PARADOX AND THE IN-STENT  
RESTENOSIS?**

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Nature is permeated by phenomena in which active processes, such as chemical reactions and biological interactions, take place in environmental flows. They include the dynamics of growing populations of plankton in the oceans and the evolving distribution of ozone in the polar stratosphere. I will show that if the dynamics of active particles in flows is chaotic, then necessarily the concentration of particles have the observed fractal filamentary structures. These structures, in turn, are the skeletons and the dynamic catalysts of active processes, yielding an unusual singularly enhanced productivity. I will argue that this singular productivity could be the hydrodynamic explanation for the plankton paradox, in which an extremely large number of species are able to coexist, negating the competitive exclusion principle that asserts the survival of only the most perfectly adapted to each limiting resource. I will then suggest that the presence of such fractal skeletons in arterial flow could be the explanation for the eventual restenosis of arteries after a stent-assisted angioplasty.

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- [1] Chemical and biological activity in open flows: A dynamical system approach, T. Tel, A. Moura, C. Grebogi and G. Karolyi, Phys. Reports 413, Issues 2-3, pages 91-196 (2005).