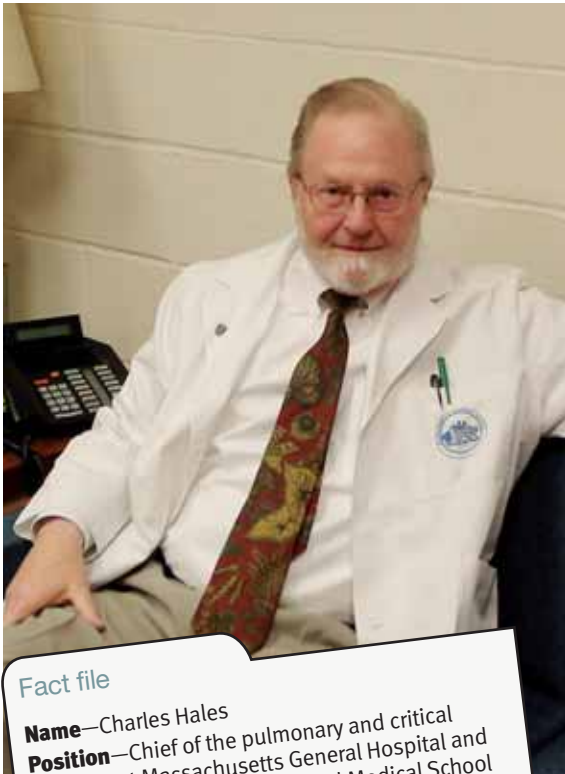


A respiratory doctor

Charles Hales is a doctor, researcher, and educator in respiratory medicine. He inspired **Hugh Ip**



Fact file

Name—Charles Hales
Position—Chief of the pulmonary and critical care unit at Massachusetts General Hospital and professor of medicine at Harvard Medical School
Biography—Hales graduated as a medical doctor from Emory University in 1966 and was drafted to serve as a medical officer in the navy. He began work at Massachusetts General Hospital in 1971 as a clinical and research fellow and has published more than 160 articles

What research are you working on?

In pulmonary hypertension our interest has been to attack the overgrowth of smooth muscle cells that occurs in the blood vessels, narrowing the lumen, which increases the resistance to flow. Heparin is a powerful antiproliferative agent for smooth muscle cells in addition to being an anticoagulant. We designed and built heparins with big side chains, which reduce their anticoagulant effect but retain their antiproliferative properties. They have worked in rats, mice, guinea pigs, and pigs. We're getting ready to test them in people.

I also work on smoke inhalation from fires. It's not the heat that causes pulmonary oedema but toxins in the smoke, in particular acrolein. We are looking at the effect of smoke toxins on the mucosal lining of the trachea and the bronchi. Sometimes the mucosa just sloughs off in burn injuries, and the plug that fills up the airways causes asphyxiation; it needs to be removed through bronchoscopy.

The smoke initiates apoptosis in the cells through the JNK (c-Jun N-terminal kinases) pathway. When we've been able to inhibit the JNK pathway it's made a marked difference in mice and rats, and the production of apoptotic cells was much reduced. If you expose 12 rats to 15 minutes of smoke from burning cotton, they would all be dead in five days. But if they are given treatment with the JNK inhibitor within 45 minutes of smoke exposure, you can impede apoptosis, and seven out of 12 survive.

Can you tell me about a recent clinical project?

We worked on the PIOPED 1 (prospective investigation of pulmonary embolism diagnosis) study, which looked at ventilation-perfusion lung scans, and showed that they are not a good test for pulmonary emboli, with a lot of false positives. Most recently we've completed PIOPED 2, which was looking at the computed tomography angiogram, and showed that it is quite sensitive. But it also has a substantial number of false positives, predominantly in small vessels. It's a warning to clinicians to think twice about a small clot in a distal vessel in a patient that you didn't think had a clot anyway—it may be an artefact.

How do you balance research with your clinical duties and teaching?

You need good assistance in the laboratory because you cannot do everything yourself. Clinically, this is a reason why people narrow their focus of interest, so they can be up to date in that area. I try to do my part, but I certainly have lots of help along the way.

What is the greatest challenge for medical educators?

Medical students can't memorise everything, yet there's so much they're expected to know. The focus on what's really important for you to learn is a subject of an everlasting series of faculty meetings. Nobody wants to give up the time they've got. To put something new in means you've got to knock something old out.

What advice do you have for students?

A broad beginning is essential: spend time in different areas to get a taste of what's there. Then find an area that you particularly like. Then learn beneath the surface—not just what's in the textbook but what's in the literature as well—to get a firm basis. And ask questions about things along the way.

Medicine is a lifelong learning experience, and it's becoming more so because the facts are coming out faster and faster. Those of us who work in large centres have a distinct advantage because the knowledge is just flowing around. Every specialty has lectures that are open for all to attend. Every time you consult a doctor in another specialty you get educated. Doctors in private practice don't have the luxury of getting that kind of feedback.

How do you advise medical students to choose a specialty?

Try some specialties and see for yourself what you do and don't like. For example, there's a lot of death and dying in critical care units. If you're not comfortable talking to families and taking care of patients that you're going to help die—hopefully with dignity—then probably that's not the right specialty for you. For some people the emotional input is too great, and they don't want to do that for a career. Others will happily pay that price to get physiology in action. You hang up adrenaline, and in minutes you see what happens. If that is insufficient you can add volume or other pressors and at the same time monitor blood pressure, pulse, urine output, central venous pressure, and oxygen saturation.

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