

More than 4,000 components of blood chemistry listed

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U of A biochemist David Wishart.

After three years of exhaustive analysis led by a University of Alberta researcher, the list of known compounds in human blood has exploded from just a handful to more than 4,000.

“Right now a medical doctor analyzing the blood of an ailing patient looks at something like 10 to 20 chemicals,” said U of A biochemist David Wishart. “We’ve identified 4,229 blood chemicals that doctors can potentially look at to diagnose and treat health problems.”

Blood chemicals, or metabolites, are routinely analyzed by doctors to diagnose conditions like diabetes and kidney failure. Wishart says the new research opens up the possibility of diagnosing hundreds of other diseases that are characterized by an imbalance in blood chemistry.

Wishart led more than 20 researchers at six different institutions using modern technology to validate past research, and the team also conducted its own lab experiments to break new ground on the content of [human-blood](#) chemistry.

“This is the most complete chemical characterization of blood ever done,” said Wishart. “We now know the normal values of all the detectable chemicals in blood. Doctors can use these measurements as a reference point for monitoring a patient’s current and even future health.”

Wishart says blood chemicals are the “canary in the coal mine,” for catching the first signs of an oncoming medical problem. “The blood chemistry is the first thing to change when a person is developing a dangerous condition like high cholesterol.”

The database created by Wishart and his team is open access, meaning anyone can log on and find the expanded list of blood chemicals. Wishart says doctors can now tap into the collected wisdom of hundreds of blood-research projects done in the past by researchers all over the world. “With this new database [doctors](#) can now link a specific abnormality in hundreds of different blood chemicals with a patient’s specific medical problem,” said Wishart.

Wishart believes the adoption of his research will happen slowly, with hospitals incorporating new search protocols and equipment for a few hundred of the more than 4,000 blood-chemistry markers identified by Wishart and his colleagues.

“People have been studying blood for more than 100 years,” said Wishart. “By combining research from the past with our new findings we have moved the science of [blood](#) chemistry from a keyhole view of the world to a giant picture window.”

Provided by University of Alberta

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