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**From:** Mary Ellen [mwalling@telus.net]  
**Sent:** 2011-Aug-18 2:38 PM  
**To:** Tim Rundle; Barry Milligan; Morrison, Diane; Peter.McKenzie@mainstreamcanada.com; sonja.saksida@cahs-bc.ca  
**Cc:** Miller-Saunders, Kristi; Thomson, Andrew; Saunders, Mark; Erenst, Vincent; Clare Backman; Fernando Villarroel; Stewart Hawthorn; Barb.Cannon@creativesalmon.com  
**Subject:** RE: sampling program -request for samples -please read and follow up

Thanks Tim-appreciate that. Things are moving pretty quickly here so appreciate the follow-up.  
Mary Ellen

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**From:** Tim Rundle [mailto:tim.rundle@creativesalmon.com]  
**Sent:** Thursday, August 18, 2011 1:38 PM  
**To:** 'Mary Ellen'; 'Barry Milligan'; 'Morrison, Diane'; Peter.McKenzie@mainstreamcanada.com; sonja.saksida@cahs-bc.ca  
**Cc:** Kristi.Miller@dfo-mpo.gc.ca; 'Thomson, Andrew'; mark.saunders@dfo-mpo.gc.ca; 'Erenst, Vincent'; 'Clare Backman'; 'Fernando Villarroel'; 'Stewart Hawthorn'; Barb.Cannon@creativesalmon.com  
**Subject:** RE: sampling program -request for samples -please read and follow up

Hello Mary Ellen, / Kristi,

Our veterinarian Sonja was not on the list, I've included her here to keep her in the loop as well as our Biology manager Barb Cannon who will coordinate samples with Sonja from Creative.

Best Regards,

Tim

Tim Rundle  
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**From:** Mary Ellen [mailto:mwalling@telus.net]  
**Sent:** August-18-11 12:17 PM  
**To:** 'Barry Milligan'; 'Morrison, Diane'; Peter.McKenzie@mainstreamcanada.com  
**Cc:** Kristi.Miller@dfo-mpo.gc.ca; 'Thomson, Andrew'; mark.saunders@dfo-mpo.gc.ca; 'Erenst, Vincent'; 'Clare Backman'; 'Fernando Villarroel'; 'Stewart Hawthorn'; 'Tim Rundle '  
**Subject:** sampling program -request for samples -please read and follow up

Hello everyone. As requested here is some additional information on the next steps for Dr Miller's research.

Thanks Kristi –here are the vets email addresses. They are expecting to hear from your group. I have also cc:d the Managing Directors to keep them in the loop.  
I will ask Dr Brown for the ACRDP Committee to consider funding this work using the extra funds (I am a member of the ACRDP committee and had previously provided some other suggestions but will send something off to her right away explaining the importance of this work.)  
Please let me know if there is anything else you need.

Mary Ellen

**From:** Miller-Saunders, Kristi [mailto:Kristi.Miller@dfo-mpo.gc.ca]  
**Sent:** Thursday, August 18, 2011 11:27 AM  
**To:** Mary Ellen  
**Cc:** Thomson, Andrew; Saunders, Mark  
**Subject:** RE: sampling program -request for inclusion

Mary Ellen,

Thank you for the follow-up and I do appreciate the willingness of the industry to work with us.

We have identified a novel salmon parvovirus from adult and smolt liver tissues that were positive for the mortality-related genomic signature presented originally in the paper published in Science in Jan 2011. This DNA virus is not endogenous (it is not present in all tissues within an individual, and has never been observed from fin clip DNA samples). Molecular screening for this virus shows that it is present in multiple tissues (highest intensity in kidney and liver, but also in brain, gill, heart, and spleen), although not necessarily in all tissues within an individual. Prevalence rates in kidney and liver are relatively high (20-90%) in sockeye salmon smolts leaving the Fraser river, and generally decrease (but do not disappear entirely) during early ocean residence. We have not observed this virus in Harrison sockeye smolts.

The virus is also observed in adult salmon returning to spawn in the Fraser River. From the limited data we have thus far enumerating prevalence rates in smolts and adults from the same year-class, it appears that prevalence is lower in returning adults than in smolts entering the ocean, but more work is needed on this.

The patterns of parvovirus prevalence among tissues and life history stages are very similar to those of the mortality-related genomic signature, but we are still conducting research to establish whether the virus is always associated with, or causative of, the genomic signature in all tissues. Challenge work will aid in this assessment. Moreover, we still need to demonstrate whether this virus is transmissible and under what conditions, if any, it can cause disease.

We have attained samples from a variety of wild Pacific salmon species (primarily sockeye, coho and Chinook, but also some pink and chum), as well as samples from SEP to test for this virus. We have observed the virus in Chinook and coho, although it appears to be at a much reduced prevalence in coho. We are now looking to obtain samples from the Aquaculture industry to determine whether it is present in cultured salmon.

Our data thus far indicate that the virus is transmitted to sockeye salmon before they leave their natal spawning areas, as this is where the highest prevalence rates exist. Moreover, returning adult salmon can carry the virus in both Juan de Fuca Strait and Johnstone Strait. These data do not point to a strong involvement of salmon net pens in the transmission of this virus to migrating salmon. However, given the very public scrutiny that we are currently under when it comes to potential disease issues, it would be prudent that we begin to understand the full range of species that can carry this novel virus, and ultimately determine in what species and under what conditions it can cause acute or chronic disease.

Sampling Program for Industry

We would like to obtain samples from industry that include multiple life history stages and a random sampling of ocean farms. It is important that the samples include hatchery fish, smolts soon after arrival in the ocean, and samples of post-smolts and 1 year old fish in May-September. This initial survey would only address whether Atlantic salmon can carry the virus, not whether it causes disease. While we know that Chinook salmon can carry the virus, and we have a small number of Chinook salmon from Creative salmon already in hand for another study, it would be useful to obtain a broader life-history range for cultured Chinook as well.

Depending upon the results of this survey, if we do identify the parvovirus in Atlantic salmon, we may want to follow up with challenge work and/or screening of industry samples of moribund fish to determine if the virus is associated with disease. But we would await a determination on this for a later date.

I had heard that there was some ACRDP money that has not yet been spent, about 30K I believe. As we do not have funding to do this screening, it would be helpful if you could suggest (to Laura Brown) that this work could be funded using these extra funds. Otherwise, the actual screening will have to await our finding funds to do so.

The samples would be processed in my lab by my technician Amy Tabata. We have a quantitative PCR test for this virus that would be used. We would relay the results of this screening to the industry before any results were to be made public through publication or otherwise. I would emphasize that this initial screening is merely to establish whether the virus is present in industry fish, and if so, at what intensity and prevalence at various life history stages. Its mere presence does not implicate that it is causing disease or transmitting the virus to wild fish, only that these fish could carry the virus. Establishing resultant disease and transmission would require follow-up studies, some thing we are just undertaking in sockeye salmon.

If we find that the virus is causative of the mortality-related genomic signature in sockeye salmon, it may be worthwhile to also establish the transcriptional response of Atlantic salmon to the virus. In our studies on the IHN virus, we found that the transcriptional response was significantly weakened in fish that suffer little disease or mortality from the virus; a study by Maureen Purcell also suggested a much weakened transcriptional response of salmon to less virulent strains of the virus. As such, level of transcriptional response can aid in the determination of potential disease impacts in various strains or species. This, however, is something for the future, again depending on the results of the industry survey.

Please pass this email on to the industry, and cc me so that I can obtain their contact information. I won't be able to do much else until after the evidentiary hearings, and I suspect you too will be very busy over the next few weeks. It is important, however, that we have begun the discussions about how to move forward before the disease and aquaculture hearings start.

Thanks,

*Kristi Miller*

Head, Molecular Genetics Section  
Pacific Biological Station  
Nanaimo, BC

phone (250) 756-7155

fax (250) 756-7053

Please Note new email address effective Jan 2008:

[Kristi.Miller@dfo-mpo.gc.ca](mailto:Kristi.Miller@dfo-mpo.gc.ca)

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**From:** Mary Ellen [mailto:mwalling@telus.net]

**Sent:** August 12, 2011 11:53 AM

**To:** Miller-Saunders, Kristi  
**Subject:** FW: sampling program -request for inclusion

sorry had wrong email address.

All the best,

Mary Ellen

Mary Ellen Walling, Executive Director  
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**From:** Mary Ellen [mailto:mwalling@telus.net]  
**Sent:** Friday, August 12, 2011 11:40 AM  
**To:** 'Thomson, Andrew'  
**Cc:** 'mark.saunders@dfo-mpo.gc.ca'; 'kristi.miller-saunders@dfo-mpo.gc.ca'; 'Backman, Clare'; 'Tim Rundle'; 'Fernando Villarroel'; 'Stewart Hawthorn'; 'Barry Milligan'; 'Morrison, Diane'; 'Peter.McKenzie@mainstreamcanada.com'  
**Subject:** FW: sampling program -request for inclusion

At the DFO dinner meeting this week you mentioned that Dr Miller is looking for samples of Atlantic salmon to test -as she has now identified a sequence for a virus. She is presently according to you testing wild and enhancement fish for this viral sequence. She has some farmed Chinook which could be tested. As you recall, we asked you to provide us with a brief summary on the proposed study -it will be important to understand who the research team is, what the timelines are for the study, what conclusions can and cannot be drawn from the findings and how this will be communicated and by whom. I reinforced this request following our tour the next day.

Once we have received the paper from you I had planned to forward to the vets to begin sample collection. I had arranged with our companies to mention to the vets that this is underway and to expect the request from DFO.

I understand you have been in touch with the companies as a follow up. Please cc me on all correspondence related to this matter. Please provide a summary on the proposed study.

All the best,

Mary Ellen

Mary Ellen Walling, Executive Director  
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**From:** Thomson, Andrew [mailto:Andrew.Thomson@dfo-mpo.gc.ca]  
**Sent:** Friday, August 12, 2011 8:56 AM  
**To:** Clare.Backman@marineharvest.com; Tim.Rundle@creativesalmon.com; Fernando.Villarroel@mainstreamcanada.com; Stewart Hawthorn

**Cc:** Saunders, Mark; Miller-Saunders, Kristi

**Subject:** sampling program

as per our conversation on Monday, I would like to request the contact details for your veterinarians so that our Science Branch staff can contact them to discuss details of the proposed sampling program.

Andrew J. L. Thomson

Director - Aquaculture Management Division | Gestion de l'aquaculture  
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